

Digital Restoration

from Start to Finish

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Digital Restoration from Start to Finish

How to Repair Old and Damaged Photographs

Third Edition

Ctein

This third edition of *Digital Restoration from Start to Finish* walks you step-by-step through the entire process of restoring old photographs and repairing new ones using Adobe Photoshop, Photoshop Elements, GIMP, and more. This best-selling guide is now updated with the latest software advancements and new techniques, including hand-tinting in lab, ~~repairing water-damaged photos~~, and tips for the Spot Healing Brush and masked layers. No process detail is overlooked, from choosing the right hardware and software to getting the photographs into the computer, getting the finished photo out of the computer, and preserving it for posterity.

Learn how to:

- Scan faded and damaged prints or films
- Improve snapshots with Shadow/Highlight adjustment
- Correct uneven exposure
- Fix color and skin tones quickly with Curves, plug-ins, and Hue/Saturation adjustment layers
- Correct uneven exposure and do dodging and burning-in with adjustment layers
- Hand-tint your photographs easily
- Correct skin tones with airbrush layers
- Clean up dust and scratches speedily and effectively
- Repair small and large cracks with masks and filters
- Eliminate tarnish and silvered-out spots from a photograph in just a few steps
- Minimize unwanted print surface textures
- Erase mildew spots
- Eliminate dots from newspaper photographs
- Increase sharpness and fine detail
- Maximize print quality

Ctein is a photographer and artist living in Daly City, California. He is a photographer, artist, and contributor to *The Online Photographer* and co-author of the bestselling thriller *Saturn Run*.

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Preface

What's New in the Third Edition

More than 20,000 words of the text in this second edition of *Digital Restoration* are new, but none of the information from the first edition has been lost. Older material that I cut out of the first two editions to make room for the new is available online and indexed at <http://photo-repair.com/DR3.htm>. It's really like you're getting a substantially bigger book (for no additional money).

What's new in this edition? Here are the highlights:

- ~~The Table of Contents now has a section that lists all the major additions to the third edition of the book, so you don't have to hunt through it for the important new techniques and information.~~
- I've added a Table of Contents to the online material and expanded the print book Index to include the online material. I can't hyperlink the website to the book's Table of Contents and Index entries because this book is primarily a dead-tree document (true even if you've bought the e-book version). It makes looking stuff up a two-step process, but it's a big improvement over no web index at all.
- I've expanded and improved the "Quick Diagnosis" guide to the end of Chapter 1. If you're not sure how to proceed on a restoration, look at the illustrations on these pages and see if there's a photo there that shows the same problem as yours. Next to that photo you'll find pointers to the pages in the book where I take on that problem. ~~I've added a table that tells you when I've used one photograph repeatedly in the book and where you can find it.~~
- I've expanded Chapter 2, "Hardware for Restoration," to cover the newest displays and interfaces, what to get and what to avoid.
- Chapter 3, "Software for Restoration," is almost entirely new. I'm using many new plug-ins and third-party software that really improve my productivity and make it even easier for me to do great restorations, and they're reviewed there (all the old reviews are online). I also cover Adobe's new subscription model for Photoshop, which makes it affordable for a lot more people.
- Chapter 4, "Getting the Photo into the Computer," has a great new trick for minimizing cracks, ripples, and paper texture when you scan your photograph.
- Chapter 5, "Restoring Tone," introduces stacked adjustment layers, which simplifies making complex adjustments to a photograph's tones.

- In Chapter 6, “Restoring Color,” I show you how to use Hue/Saturation layers to fix out-of-gamut and weird colors.
- Chapter 7, “Making Masks,” includes a new method for easily selecting the boundary of a print that’s been matted and faded unevenly.
- Chapter 8, “Damage Control,” includes a tutorial on using the amazing AKVIS Retoucher to quickly clean up a photograph.
- Chapter 10, “Beautification,” is greatly expanded. There are new instructions on how to selectively sharpen a photograph, and I introduce several easy techniques that make faces and skin tones come out much more attractive.
- In Chapter 11, “Examples,” I’ve moved the previous edition’s examples online to make room for a new ones.
- Chapter 12, “Printing,” includes major new information about custom profiles. The short version? You may not need them at all; in fact, you may well be better off with printer-managed color. Amazing but true!

Overall, I’m putting a lot more emphasis on working with layers and other types of nondestructive edits. Also, 16-bit greyscale and 48-bit color is now the only way to go, in my judgment (unless you’re using Photoshop Elements or GIMP). Computers today are so powerful and RAM and hard drives so cheap that there’s little reason for not doing this. Still, if you’re using an older “underpowered” system, these methods are not obligatory, and I’ll explain alternate ways of getting to the same results that won’t overstress your machine.

Enjoy the new and improved *Digital Restoration from Start to Finish*.

pax,
Ctein

Introduction

Why Restore Digitally?

I love reviving old photographs. I get almost as much pleasure from saving someone’s cherished, but presumably lost, photograph as from printing a brand-new one of my own. I enjoy it so much that I even started a second business (<http://photo-repair.com>) just for doing digital photo restoration.

Digital photo restoration is no more magical nor mysterious than ordinary photographic printing . . . and no less. It still feels like a minor miracle has occurred when a lovely photographic print, brand new or restored to life, appears before my eyes. But whether it happens in the darkroom or at the computer, that miracle is based in established routine, using tools and techniques that anyone can learn. Experience and skill count for a lot, which is why I’m a good printer (and restorer), but it’s not a secret art. Anyone can learn to restore photographs, just as anyone can learn to print.

Digital restoration recovers and restores a photograph to its proper glory while leaving the original object unaltered. You can restore almost any type of original photograph—color and B&W; slides, negatives, and prints; sheet film, roll film, and glass plates. You can even reconstruct full-color images from color separation films or plates. The restoration process doesn’t involve any physical manipulation of the original photograph beyond making a high-quality scan. All the restorative work takes place in the computer, not on the original photograph, which means there’s much less risk of damage to the original than with conventional physical photo restoration.

Digital restoration can work wonders; it usually produces much greater improvements in image quality than conventional physical restoration. It’s possible to re-create truly beautiful photographs digitally, something that is often impossible with physical restoration. If restoring the image, not the original photograph, is what’s important, digital restoration is the safest and the best way to resurrect a photograph.

Digital restoration has one other significant advantage over physical restoration: the results are theoretically permanent. A physical restoration of a photograph is subject to physical deterioration, just as the original photograph was. With modern materials and techniques, physical restorations will probably last longer than the original photographs did, but they won’t last indefinitely; no physical artwork does. A digital restoration has a potentially unlimited life. As long as proper procedures and precautions are in place, it can be maintained indefinitely in its pristine and original form.

A physical restoration is a unique object, just as the original photograph was. That rarity may be part of its value, but it's also a curse; the restored artifact is just as prone to loss or destruction as it ever was. A digital restoration can be shared with others as prints or images on a screen, it can be duplicated exactly, and it can be stored in multiple places. Once a photograph is digitally restored, its prospects for remaining part of our culture become vastly improved.

Digital restoration can have many goals (see Chapter 1, “The Big Picture”), but the primary objective is to resurrect the photograph that was originally there. The heart of what I do is not painting, drawing, or hand-tinting. Restoration is never a matter of mere retouching. The only time I “create” parts of a photograph is when that area in the original is so badly damaged that there is nothing of the image to be recovered.

When you are restoring a photo, you're doing much more than simply performing technical manipulation. Your goal may not even be strict restoration; you may also be reinterpreting the original photograph for different sensibilities and times, as you would when printing any photograph. Always think like a photographer, and never forget that you are working on a photograph made by some other photographer. Don't lose sight of this; you want to be “in their head,” with the objective of making a beautiful photograph, not just a serviceable rendering.

You won't always know where you're going when you're doing a restoration, because originals are often so badly deteriorated that you can't even get a sense of what the photograph must have looked like until you're halfway done. That's different from most crafts, where the skilled artist can pretty well visualize what the final artwork should look like before ever picking up a tool. Nonetheless, when you start out, you'll have some idea in your head of where you want to take the work. Always maintain an aesthetic sensibility about what you are doing and why, and always remember to take that mental step back from the work, look at it, and ask yourself, “Does this photograph look good?”

About This Book

I'm big on workflow. As my friends The Flying Karamazov Brothers put it, “It doesn't matter how you get there if you don't know where you're going.” That's why this book is much more than just a compendium of image processing tricks and techniques. I think it's important to understand the entire job of creating a digital restoration from start to finish. The core of restoration is the magic you perform digitally in your favorite image processing program, but that core means little if you don't have a good grasp of the complete work path, from getting the deteriorated photograph into the computer to preserving the restored image for the future. I want to make you aware of the context in which you do restoration and how to set up your working environment to do it.

This book mirrors the workflow as much as possible. The first three chapters set the stage on which you'll work. That's where I talk about your objectives and requirements for a restoration job, what computer hardware will best let you meet those goals, and what software is especially valuable

for the restorer. I devote the fourth chapter to converting the photograph to digital form, because extracting the maximum useful amount of data from the photograph is the key to achieving a good restoration.

The heart of the restoration process (and of this book) is the digital techniques and tools that actually work the magic of restoration. Chapters 5 through 10 teach you the “moves.” You can read this book as an extended single course in restoration (that's kind of how I wrote it), or you can mine it for particular tricks and techniques you need to solve specific problems. Each chapter starts off with a list of “how-tos.” Each how-to points to a place in the chapter where you can learn how to accomplish a particular task. All the how-tos are listed in their own table of contents (at the end of the regular table of contents) for easy reference.

What comes next is learning how to put those moves together to create a complete “performance.” Chapter 11, “Examples,” presents complete, step-by-step restorations that start with originals and proceed through to fully restored images. Chapter 11 sets a very high bar; I'm a perfectionist. Chapter 11 demonstrates the ultimate level of quality I can achieve in a restoration, but you don't have to go that far. Most of the time you'll find that considerably less effort will turn out great results. Many of the how-tos and examples in the other chapters are sufficient unto themselves. It doesn't take a lot of work to do a very satisfying restoration.

Once the restoration is complete, you'll need to get it back out of the computer. So I finish the book with chapters on printing and archiving. It's not enough just to make a good print of the photograph you've restored. You should also take steps to ensure that the restoration file endures.

I could no more write a book about digital restoration that didn't focus on Adobe Photoshop than I could write a book on business planning that omitted Microsoft Excel. Photoshop is the big player in digital photography, and I'll be the first to acknowledge that it offers capabilities nothing else does.

I prepared most of the photographs and restorations for this book using Adobe Photoshop under Windows and Mac OS. Most of the software tools and techniques in this book work just as well under either OS (with a few exceptions); for the most part, the only difference is certain keystrokes.

Most of my methods work with earlier versions of Photoshop, although the further back you go, the more limitations you'll run into as far as what tools you can use. To prove that a restorer doesn't need the latest and greatest, Example 3 in Chapter 11 is a restoration I did in the 1990s with Photoshop 5.5 running on a 233 MHz Pentium machine.

Photoshop isn't necessary. There are much less costly alternatives that will let you do restoration work efficiently. I discuss a few of these in Chapter 3, “Software for Restoration.” My goal is to give you skills and knowledge you can apply to do good restorations with any competent image processing program.

A good alternative for the serious worker who wants to own their software outright but spend

under \$100 (and is using a Windows machine or emulator) is Picture Window. I've worked extensively with this program as well as Photoshop. It's entirely capable and eminently affordable. On the Mac side, Affinity Photo is the best Photoshop substitute I've seen. There's more about both programs in Chapter 3.

I use many different third-party plug-ins and software utilities for doing my restoration work. Chapter 3 provides summaries of all of them. If one of these tools catches your interest when you read about me using it elsewhere in the book, you can learn more about that program there. These tools and the cases to which I've applied them are also indexed in the back under "software."

About Other Books

Can you have too many Photoshop and digital printing books? Absolutely! I have a shelf full of excellent books, every one of which has something of value to impart. The problem is that you could spend your whole life reading books such as these and only two things would happen. The first is that you would never get any photographs made and printed, and the second is that eventually your brain would fill up and your head explode.

Some folks have undeniably proven themselves gurus in this field. I'll read anything by (the late) Bruce Fraser or Andrew Rodney. If you want to understand the underlying principles of Photoshop specifically and digital printing in general, these gentlemen have it nailed. But the single book that I would say you absolutely, positively need to have on your shelf is Martin Evening's *Adobe Photoshop for Photographers* (also from Focal Press, just like the book you're holding in your hands). I can't think of a better book for telling you how to actually use the program.

I read a previous edition before sitting down to write the second edition of this book. Every time I read something pertinent that I didn't know, I'd forgotten to include, or that I'd never had explained to me really clearly before, I flagged that page with a Post-It. I flagged a good 40 pages, and it's not as if I'm a beginner; I've been doing electronic (what we called it in the old days) printing for over 30 years. Point made?

The other book that ought to be on your must-buy list is Katrin Eismann's *Photoshop Restoration & Retouching*, from Peachpit. Katrin is brilliant, even though she modestly claims otherwise. Her retouching skills are awesome, as is her ability to create entirely missing portions of photographs out of thin air. I'll never be close to her when it comes to wholesale re-creation of absent imagery and fine-art retouching. The new (fourth) edition may be out by the time this book hits print.

If you read and assimilate the two books just discussed and mine, you'll know enough to take over the world.

If you are interested in doing accurate restorations of old prints and want to understand better what they should look like and how they have deteriorated, there is no finer book than *Care and Identification of 19th-Century Photographic Prints* by James M. Reilly. The Image Permanence

Institute has reprinted the book for \$60 (<https://www.imagepermanenceinstitute.org/store/publications/care-id-photographic-prints>). I recommend it for the dedicated restorer.

Keeping in Touch

Longtime readers know that I'm always happy to answer questions and provide helpful advice whenever I can. If you have any questions about the content of this book or need any assistance in matters photographic, feel free to e-mail me at ctein@pobox.com. Should that e-mail address change, you'll still be able to reach me through my websites, Ctein's Online Gallery (<http://ctein.com>) and Digital Photo Restoration by Ctein (<http://photo-repair.com>).

Photo-repair.com has a web page devoted to this book at <http://photo-repair.com/DR3.htm>. This section of my site contains PDFs of all the material excised from previous editions of this book, along with sample image files from this book for you to work with. The folks who provided their personal photographs for this book have generously given permission for me to put the files online for your private enjoyment. You can download them to practice restoration techniques. These files are for your personal use on your computer only. Do not redistribute them, publish them, post them on your website, or link to them.

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First and foremost, I would like to thank Deirdre Byrne, who patiently encouraged me to write a third edition of this book; my former editors, Kimberly Duncan-Mooney and Anna Valutkevich; and my current editors, Judith Newlin and Galen Glaze, who also demonstrated equally remarkable and gracious patience and understanding as this edition slouched its way toward reality. Mhairi Bennett, Andrew White, and ~~[[XXX — any further editors]]~~ did a wonderful job of transforming my text and illustrations into this finished book. A special thanks goes out to David Dyer-Bennet for generously providing the fine cover photograph of me and Elmo, Paula's and my loquacious African grey.

Finally, I would like to thank those wonderful folks who provided the personal and family photographs that serve as examples throughout this book: Dan Becks, Scott Brock, Grace Butler, Emilio Castrillo, Lloyd Chambers, Tee Corinne, Howard Davidson, Jules Dickinson, Bayla Fine, John Fleshin, Sarah Goodman, Bill Jemison, Ericka Johnson, Stuart Klipper, Scott Lewis, Laura Majerus, Clyde McConnell, Ron Mowry, Diederik Muller, Myrna Parmentier, Jane Reber, Carol Everhart Roper, Kiril Sinkel, and Steve Schoen.

About the Author

Ctein is the author of close to a thousand articles on photographic topics and of *Post Exposure: Advanced Techniques for the Photographic Printer* (Focal Press, 2000), as well as the science fiction novel *Saturn Run* with John Sandford. He did darkroom printing for over 40 years and was of the foremost practitioners of the art of dye transfer printing. Nowadays, he's strictly digital. He's been making electronic and digital prints for over 30 years. Ctein resides in Daly City, California, in a house that overlooks the ocean, with his companion of 30 years, Paula Butler, along with 20,000 books, too many computers and printers, and three demented psittacines.

Quick Diagnostic Guide to Restoration

If your photograph looks like this . . . and you would like it to look more like this,
then try the methods on the pages listed below.



See pages xxx to xxx



See pages xxx to xxx



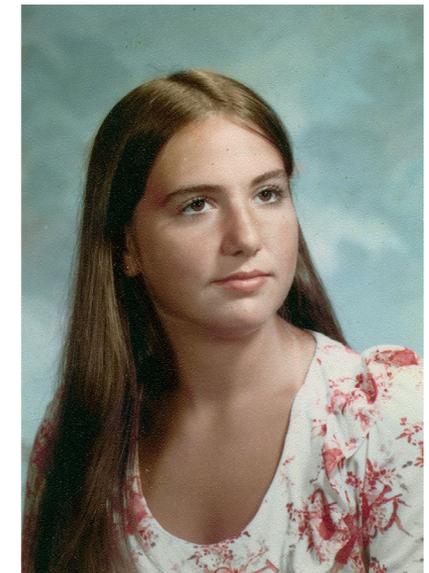
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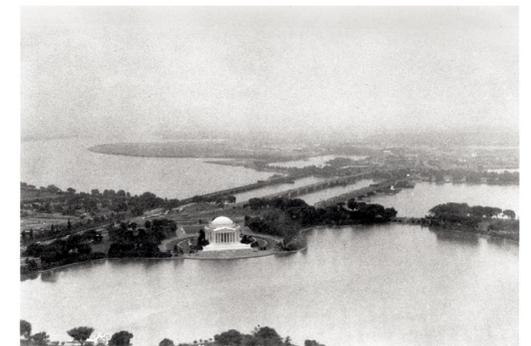
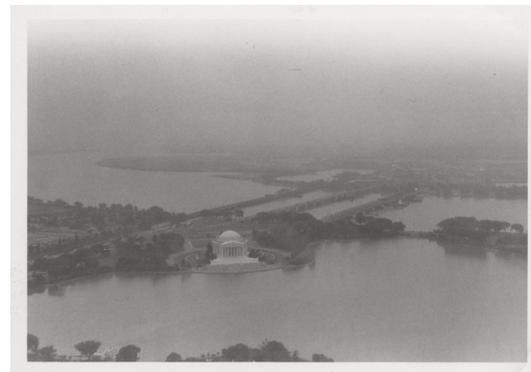
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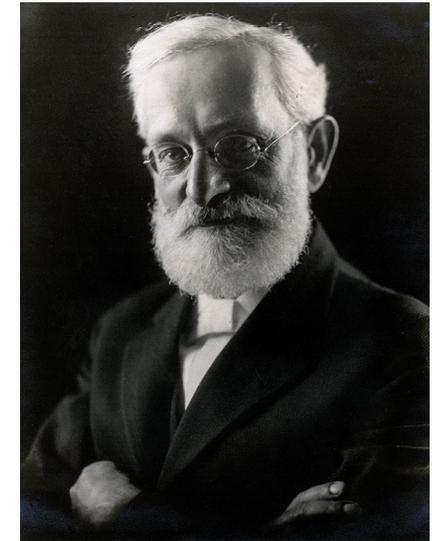
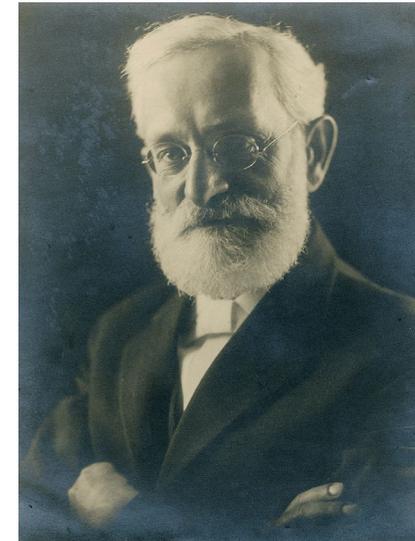
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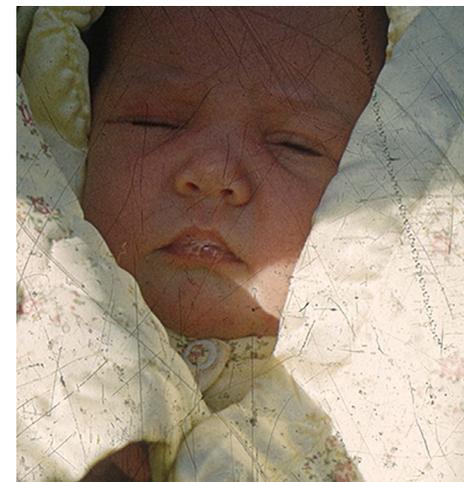
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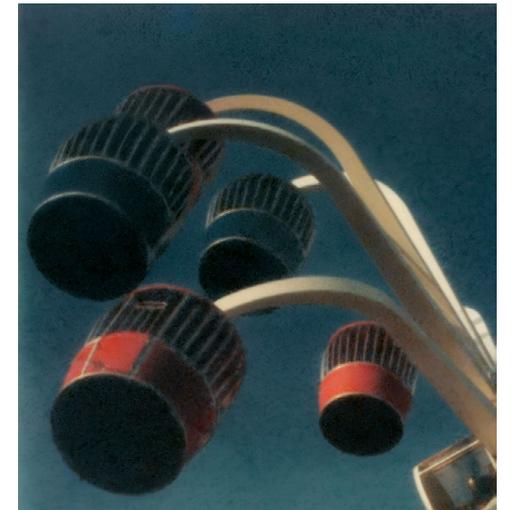
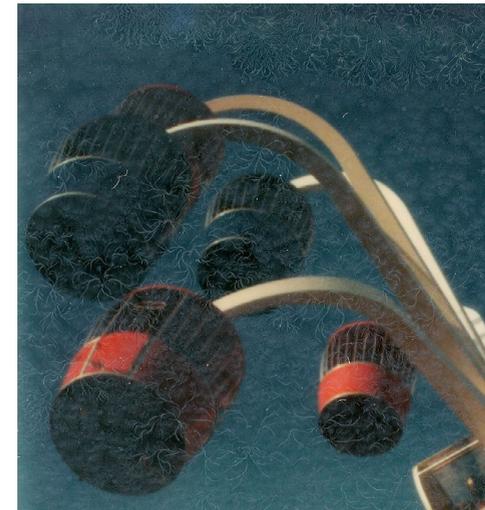
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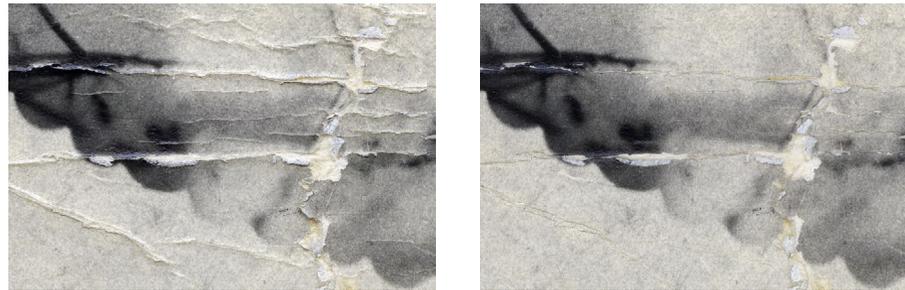
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