Beyond Photography - The Digital Darkroom

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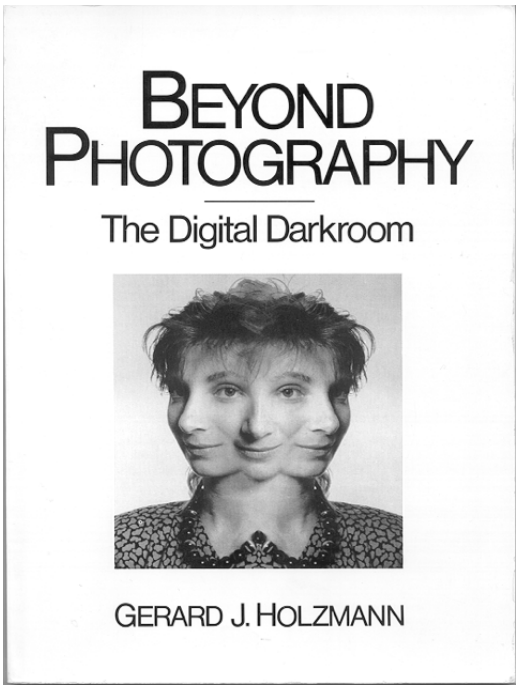

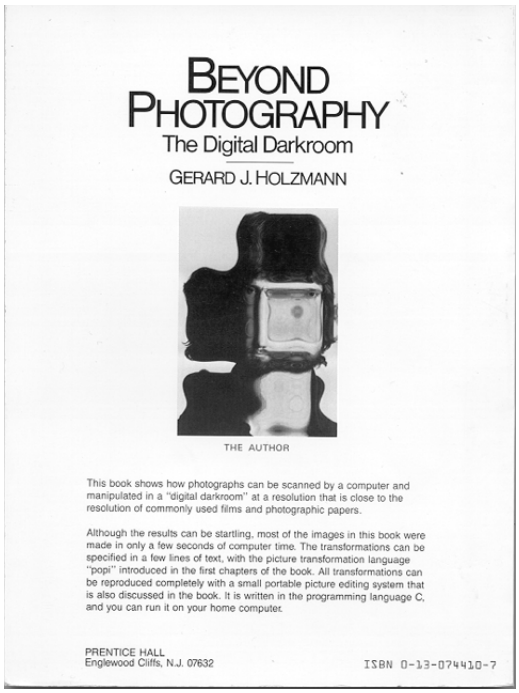

ISBN 0-13-074410-7
Out of print since 1995.

Published by Prentice Hall in 1988.
128 pages, with 89 photos.

Back cover text

This book shows how photographs can be scanned into a computer and manipulated in a `digital darkroom' at a resolution that is close to the resolution of commonly used films and photographic papers.

Although the results can be startling, most of the images in this book were made in only a few seconds of computer time. The

transformations can be specified in a few lines of text with the picture transformation language `popi' that is introduced in the first chapters of the book. All transformations can be reproduced completely with a small portable picture editing system, that is also discussed in the book. It is written in the programming language C, and you can run it on your home computer.

Preface to the Online Version (Jan. 2003)

This book describes an early digital image editing system that was developed at Bell Labs in 1984 by Gerard Holzmann, with a lot of help from Rob Pike, and Ken Thompson. The book was published by Prentice Hall in 1988, and went out of print in 1995.

The C sources for the popi (portable pico) image editor that are discussed in the book can still be downloaded from Bell Labs as a shell archive. Also available is a tar-file with the pre-ANSI C source code for the original pico implementation for the VAX, from 1984, including the on-the-fly compiler that Ken Thompson and Rob Pike wrote. (Of course, unless you still have a VAX-750 from the early eighties, this is mostly for inspiration.)

Although the book never sold a large number of copies, it inspired a lot of people in different ways. For many years there was a blossoming users group that maintained an extended version of the sources, with support for many different types of displays (see for instance the archive from Rich Burridge's site). Some re-implementations of the software as Java applets have also been spotted on the web at various points in time.

In 1989 CNN Science and Technology Report covered the digital image editing method introduced in the book (see clip). We also made a short video (PixelFace), a portion of which was included in the CNN story.

Especially after the book went out of print, it has become somewhat of a cult-classic, cherished by geeks and gurus for its irreverent distortions of the pictures of some well-known computer scientists that all worked at Bell Labs at the time the book first came out, e.g., Al Aho (now at Columbia University), Ken Thompson (now retired from Google), Dennis Ritchie (who sadly passed away in October 2011), Rob Pike (now at Google in Australia), Jon Bentley (now at Avaya), Doug McIlroy (now at

Dartmouth), Theo Pavlidis (now retired from the State University of NY), Greg Chesson (sadly passed away in June 2015), Luca Cardelli (now at Microsoft Research), and of course Peter Weinberger, one of our first victims of image transformations (now also at Google). (See pjw.html for some background on this.)

In retrospect, the book is also notable for first coining the term *digital darkroom*. At the time the book was published, the term most commonly used was the misnomer 'electronic darkroom.' The pico and popi (portable pico) editors predate many now familiar mainstream photo editing programs, such as Adobe Photoshop. You can still find many of the effects from the book among the more popular effects that are included in Photoshop (though without credit to the book alas).

The book also made some seemingly wild predictions about the coming switch to digital photography. For instance, on page 8, it says:

> ``*It is not unlikely that within the next ten years the conventional camera we all use today will be replaced by a* digital *camera that takes photos on a floppy disk that is `processed' in a normal personal computer with the type of software presented in this book.''* [1988]

Today, this change has come to pass, although floppy disks have also become a thing of the distant past now. In the book we also calculated that a resolution of roughly 20 Megapixel should suffice to record all the information that is available on a standard 35mm negative, and sufficient to generate superb photographic prints. Todays professional digital cameras have far surpassed this standard. At this point, conventional photography, practiced with chemicals in dark rooms, has become history, practiced only as a curiosity by some die-hard fans.

Gerard Holzmann, Murray Hill, January 2003
(with updates October 2011 and a few more in May 2018)

Online versions of some earlier papers describing pico

- Pico Draft Tutorial, written 22 January 1985.
- Pico Tutorial, an AT&T Technical Memorandum from October 1985.
- Pico Paper, as it appeared in the AT&T Technical Journal, in March 1987. The article also landed the cover for that issue.

Table of contents book

Quotes from some reviews

"A true cutting-edge book, which provides its readers with a glimpse into the future of photography."

Prentice Hall, July 1988

"A thought provoking book [...] chances are that photography will never be quite the same."

History of Photography, March 1989

"Some of [the book] is amazing. I wonder if photographs will be courtroom evidence any longer."

Byte, October 1988

"The images are sometimes disturbing, sometimes funny, and always intriguing."

The Boston Globe, August 1988

"You can learn how to creatively distort, mask, and merge your 35mm digitized negatives using just a few simple lines of C. [...] Hot stuff!!"

Unix Review, November 1988

"A unique and quite strange book about what you can do to photos on a PC."

Photo District News, March 1989

"A how-to guide for turning a computer into a digital darkroom."

Bell Labs News, August 1988