Photoshop Core

The first *part of Photoshop CS Savvy introduces you to the fundamental concepts of digital imaging. You'll see how Photoshop and digital image manipulation fit into the evolution of image technology. You'll explore Photoshop's newest features, its interface, its logic, and its techniques.*

Part I also covers the key techniques of selections, layers, painting, and transformation—fundamental processes you'll use on almost every image. You'll work with Photoshop's paint engine, learn about digital color, and address resolution issues.

The Foundations of Photoshop

Photoshop is the progeny of a lineage of artistic and technical methodologies that have evolved over the centuries. Painting, mosaic, photography, and printing have been the primary methods of producing two-dimensional images for many generations. The twentieth century saw the rapid emergence of new image technologies that extend and amplify the conventional ones. Photoshop combines these methods into a virtual interface that enables the user to experiment freely in a dynamic user-friendly environment.

This chapter will cover these topics:

- **Image technology defined**
- **The history of imaging, from prehistory to the present**
- **Painting, printing, collage, and photography**
- **The world of Photoshop and the Web**

Image Technology

Image technology is the method used to produce pictures. Since the first images were painted on the stone walls of caves with pigment extracted from natural materials, humans have invented new image technologies to visually express their ideas and experiences. The process of technical evolution was slow in preindustrial societies, so for thousands of years, techniques for creating images were primarily done by the skilled hands of artists and artisans. During and after the industrial revolution, however, image technology accelerated to the point that, today, we see new innovations on an almost daily basis.

The evolution of the visual image is due, in part, to the methods available to the artist. Artistic styles are an expression of the zeitgeist of the periods that produce them. As technology evolves, new ideas and visual idioms emerge that reflect the cultural ambiance of their times.

This idea was quite apparent in the twentieth century from the speed in which new technologies emerged. The obvious changes in aesthetic values can be observed decade by decade as cultural, political, and technological influences affected visual expression. Each decade of the twentieth century can be associated with distinct aesthetic styles that are part of the ongoing development of culture.

Figure 1.1

A mosaic from first-century B.C.E. Pompeii, The Defeated Persians under Darius (detail)

Mosaics

One significant milestone in the history of visual art was the ability to portray tonality. *Tonality* is the effect of changing light or color on an image. In the real world, we see a seamless continuum of blended color that defines our visual world in light and shadow, and produces a tangible, three-dimensional reality of color and form. Primitive artists made no attempt to express tonal differences, in part because the technology was unavailable to them.

If you think that tonal variations in digital images is a new phenomenon, however, think again. One of the first methods of simulating the effect of tonal variation was to place tiny individual units of slightly varied color next to each other. We see this technique commonly employed in mosaics from imperial Rome, such as the one in Figure 1.1. Each element of color is a separate glass or ceramic tile. The tiles, placed next to each other in a graduated sequence, produce the effect of varied tonality.

The mosaics of two thousand years ago are the predecessors of today's Photoshop images. Instead of tiles of glass, the digital artist uses squares of colored light called pixels (see Figure 1.2). Today's scanners can "see" and interpret color information from a continuous-tone image into these tiny units. When the image has been captured, we can, in Adobe Photoshop, select and change the color of pixels individually or in groups.

Painting

Creating images by applying color to a surface is one of the most basic forms of artistic expression; indeed, the history of the world can be viewed in the legacy of paintings that have been left behind by our talented predecessors. Throughout history, the technical and aesthetic qualities of painting have changed, various styles have emerged, and pictorial content has evolved.

Representational painting dominated the world for centuries. Paintings contained content that could be easily recognized, whether the subject matter was religious, historical, or descriptive. Then in the late nineteenth century, artists began to abstract the tangible realities that they observed to produce art filtered through their personal experiences. Within 50 years, abstraction led to the creation of a totally nonobjective idiom in styles such as the Abstract Expressionism of the 1950s and the Minimalism of the 1960s.

Still, the tradition of representation coexisted with abstract painterly forms, but it was reinvented time and again as it reflected the zeitgeist in which it was

Figure 1.2

A close-up of a digital image displaying its pixels
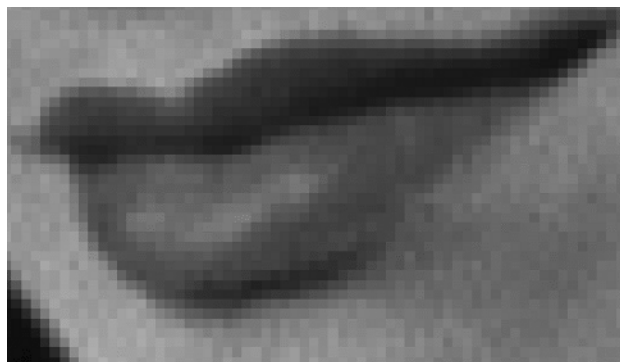
created. Pop Art of the 1960s, for example, introduced us to the idea that the objects and icons of popular culture could be assimilated and even elevated into the realm of "pure art." This concept was revolutionary because it changed the way we viewed the commonplace.

Though the imagery has changed, the painter's tools have remained pretty much the same over the centuries. Paint, palette, knife, brushes, solvent, paper, canvas, panel, and easel have been around for quite some time, having seen few refinements throughout history. (Even the airbrush evolved from an air-driven breath atomizer that has been in use since the eighteenth century.) The concept remains the same: mix colors on the palette, adding solvent if desired, and apply them to the painting surface with a brush or knife. Only recently have methods of applying color to a surface been substantially transformed.

Photoshop is a virtual art studio. Through Photoshop's graphical user interface, you can apply color to an image as if you were painting. Instead of pigment, however, you are mixing colors and painting with light. Photoshop has numerous tools, operations, and filters that enable you to make a photographic image appear as if it had been painted in virtually any style and with any paint medium (see Figure 1.3; for a full-color reproduction of this image, see Figure C1 in the color section). You have 16,777,216 colors to choose from and brushes of almost any size or shape with which to apply the color.

Figure 1.3

A photograph altered to look like a painting by using Photoshop's brushes and filters

PHOTO BY CHRIS MOONEY

Impressionism

In the nineteenth century, in an attempt to revive what was perceived to be the glories of the classical civilization of the Greeks and Romans, much of what was being produced in the art world consisted of the representational, idealized images of the Neoclassic style. In the latter part of the century, the nature of European art shifted. The Impressionist movement emerged with a fresh new approach to painting. Artists such as Claude Monet, Paul Cézanne, and Mary Cassatt produced paintings that were explorations of the quality and nature of light and color.

The importance of the Impressionists' contribution to the way we perceive color cannot be overstated. One particular group of Impressionists, the Pointillists—and particularly Georges Seurat and Paul Signac (see Figure 1.4, which is also Figure C3 in the color section)—most influenced the digital art we practice today. The Pointillists worked extensively with color theory and how one color affects the colors around it. They applied paint to the canvas in units, or little dots, not unlike the pixels on a Photoshop document or the halftone dots on a color separation. They experimented with how the eye mixes adjacent colors. Placing dots of two opposite colors—red and green, for example—next to each other will produce gray when seen from a distance. The relative density of the dots affects the darkness and lightness of the perceived color and its tint.

Pointillism influenced the development of process printing, which uses four colors to produce full-color images. Figure 1.5 presents a close-up view of such a four-color picture (for a color view of this image, see Figure C4 in color section). In
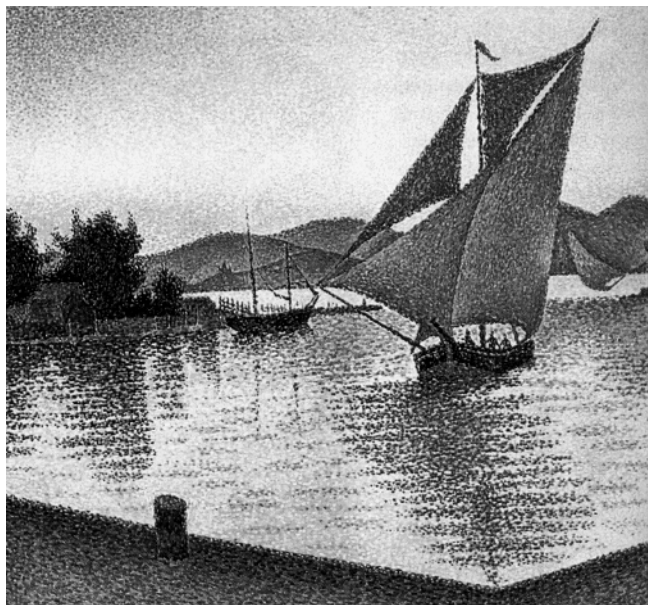

Figure 1.4

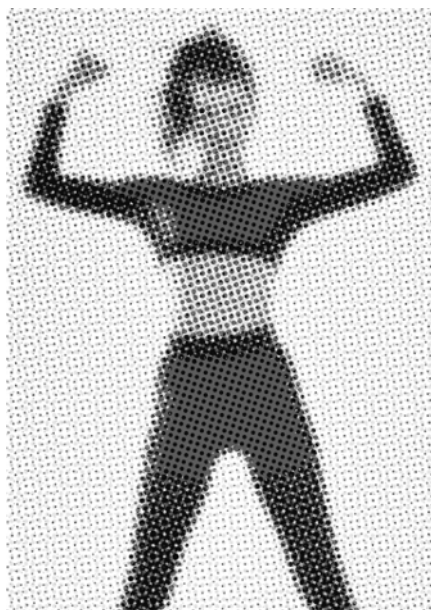**Paul Signac,** *The Port at Sunset***,** Saint-Tropez, Opus 236, 1892

Figure 1.5

Detail of a four-color process image

process printing, each color plate contains tiny dots of cyan, magenta, yellow, or black (CMYK). Like Pointillist painting, the densities of the colored dots on each plate influence the surrounding colors when the eye mixes them together.

Photoshop is the ultimate color separator. It can configure and generate process-color separations, and separate Duotones, Tritones, Quadtones and spot colors. In addition, Photoshop has filters that enable you to simulate Impressionist and other painterly effects.

Printing

Another significant change in the ability to produce images came about a thousand years ago with the emergence of woodcuts, which were used to print textiles. In the early fifteenth century, the use of woodcuts and wood engraving began to take hold in Europe as a method of producing pictures (see Figure 1.6). At about the same time, Johannes Gutenberg introduced the concept of movable type technology. Printing gave us the capability to produce multiples of the same image—the first big step in mass communication.

Of course, the printed image has evolved over the past five hundred years; we've invented numerous methods of imprinting ink on paper, monochromatically or in full color. In the case of traditional offset printing, the process involves separating colors into their ink components and transferring the information to a piece of film and then to a metal plate. The plate is mounted on a printing press where ink is applied to it. The image is transferred (offset) to a rubber blanket mounted on a cylinder which in turn contacts the paper and imprints the image. The process is repeated for each color component.

Figure 1.6

A woodcut from a Venetian edition of the fables of Aesop, published in 1491

Photoshop software is used to prepare images for almost any commercial printing technique, including offset lithography, silk screen, and digital press. Artists even use Photoshop to create and transfer images for traditional copper or zinc intaglio printing.

The most direct method of printing a Photoshop image is to a laser or ink-jet printer, but Photoshop files can also be output to film recorders to generate color slides, to imagesetters to produce high-resolution color separations on film, or directly to the printing plate. Exciting new output technologies have appeared within the last few years to print super-sized ink-jet images and continuous-tone photographic prints.

Photography

When you think of how many centuries passed in which images were created exclusively by hand, you can appreciate how revolutionary the photograph was. A crude type of camera called a camera obscura, which was invented in the beginning of the fourteenth century, captured and projected light on a surface. However, it wasn't until 1826 that the first true photograph was taken. Early photographers needed special equipment and a broad knowledge of chemistry to produce photographs (see Figure 1.7). As a result of the scientific and technical discoveries of the 19th and 20th centuries, cameras became more efficient and easier to operate. Now, millions of still photographs are taken and processed every day.

A camera is very much like the human eye. Light rays enter a camera and are focused on a surface into an image. Film rests on the surface and is exposed, causing a chemical reaction. The exposed film is then bathed in certain chemicals in a process called developing. If the film is a negative, light passes through it onto a piece of photosensitive paper. The paper is developed, stopped, and fixed, producing a positive photographic image.

Figure 1.7

Lady Clemintina Hawarden, photograph of a model, 1860

Several tools, filters, and operations are specially designed to make the photographer feel right at home in the digital Photoshop environment. In fact, Photoshop is a virtual darkroom that includes tools to dodge, burn, saturate, enlarge, crop, mask, and, of course, correct and adjust color. New digital printers are available that focus laser light on photosensitive materials to produce continuous-tone color prints and transparencies.

As a result of the popularity of computer programs such as Adobe Photoshop, digital cameras have become a recent addition to photo technology. Digital cameras create pictures that can be transferred to a computer or television set. The digital camera's lens focuses light on a light-sensitive mechanism, either a charge-coupled device (CCD), or to the newer complementary metal-oxide semiconductor (CMOS) chip. The electronic pictures can then be stored on disks or opened in a computer graphics program. With additional equipment, electronic images can also be sent over telephone lines or printed on paper.

Collage

In the early part of the twentieth century, the artistic revolution in Europe was shocking the world with images that had never before been seen. Instead of representational content, the pictorial sources came from an abstraction of physical reality or the realization of a personal, inner reality. Cubists, Dadaists, and Surrealists changed the face and meaning of art.

Before World War I, the Dada movement produced works of anti-art that deliberately defied reason. Growing principally out of Dada, Surrealism flourished in Europe between the world wars as a visual art and literary movement. Surrealist images had a dreamlike quality—time, space, and matter were completely malleable. Compelled by the idea that rational thought and behavior had brought the world close to the brink of annihilation, the Surrealists created images that were anti-rational and anti-bourgeois. Surrealist painters such as Jean Arp, Max Ernst, Salvador Dalí, Paul Delvaux, René Magritte, André Masson, Joan Miró, and Yves Tanguy created new worlds where the nature of reality depended only on the artist's unlimited imagination.

Hand in hand with this new aesthetic freedom came new image technologies. For artists concerned with the free association of images and the meaningful relation of unrelated objects, collage was the technique of choice. The recycling of printed graphics and text in the form of collage was developed to accommodate the Surrealists' need to create the visual non sequitur. For the first time, printed images from multiple sources were combined to produce a new pictorial reality. The Surrealist Max Ernst created a book called *Une semaine de bonté* (*A Week of Kindness*), a pictorial novel consisting entirely of recycled engravings from newspapers, magazines, and catalogs. This novel was a technical and aesthetic tour de force when it was published in 1933. It epitomized and refined the absurdist viewpoint of the Surrealists and the freedom and creativity in which they pursued their artistic vision.

Photomontage

New movements in art and graphic design blossomed in Europe in the 1920s and 1930s as a result of the instability brought about by the aftermath of World War I, the Great Depression, and the Russian Revolution. Constructivism, New Typography, Streamline, and Dada recycled photographic images, typography, and graphics as collage elements in a new process called photomontage.

Radical magazines and newspapers from the period, for example, *Simplicicimus, Der Knuppel,* and *Arbeiter-Illustrierte Zeitung* (*AIZ,* or *Worker's Illustrated Times*), published photomontage images as satirical cartoons to promote a socialist or anti-fascist political agenda. *Photomontage* is a collage of photographs that are carefully cut and pasted together to create a new visual reality. Often, type and other graphic elements are incorporated into the composition. These images synthesized the seamless pictorial realities of multiple photographic images into biting political metaphors and clever visual puns. Traditional

cut-and-paste photomontage was an art form derived from the Cubist, Dadaist, and Surrealist movements, but was displayed in the commercial venue of magazine publications. It was the predecessor of the digital composite images we see in many of today's advertisements.

The ability to combine photographs, text, and graphics from multiple sources is one of Photoshop's strongest features. Images can be collected from a scanner, digital camera, or Photo CD, and be composited, superimposed, positioned, scaled, flipped, rotated, and distorted. In Photoshop, almost any effect is possible; the only limitation is your imagination.

The Web

Recently, the world has been transformed by a powerful new invention. This new communication technology is as revolutionary as the telephone and as ubiquitous as the automobile. Within a few years, it has embedded itself deeply in our lives and has affected how we communicate and how we do business. The World Wide Web (see Figure 1.8) is by far the most accessible communication medium in which to publish images or text. As a research tool, the Web gives us instant access to every conceivable form of information. The Web is the ultimate technical manifestation of democracy in that it embodies the essence of free speech and freedom of the press. Being the most unregulated of all publishing mediums, anyone can publish anything at any time.

Figure 1.8
An Adobe Web page

The Web has changed the nature of how we handle pictures. Images can be transmitted electronically and downloaded, making access to them almost instantaneous, even at a distance. Many art museums and libraries have placed digital files of their entire archives online, making them accessible to everyone. If you need a picture of a particular subject, the first and last place to look is now the Web.

Many tools and functions introduced with recent upgrades of Photoshop have been devoted to Web publishing. Methods for choosing, optimizing, and saving files in the appropriate format have been seamlessly integrated into the program, eliminating all guesswork. The Color Picker offers the choice of Web-compatible hexadecimal colors. ImageReady, which is bundled with Photoshop, empowers you to create dynamic Web pages that can include slices, hypertext, rollovers, and animations. This latest version of ImageReady provides new features like the ability to save documents in Flash (SWF) format, and a new Tables palette.

Photoshop

The introduction of new artistic idioms into our culture not only affects the world of art galleries and museums; it influences advertising, architecture, industrial design, and fashion. As new styles appear on the scene through commercial vehicles, they become an integral part of our everyday lives. The same is true of new image technologies: as new ones are introduced, they become embedded into the production cycle of our economy.

In our contemporary culture, images are everywhere. Pick up a book, magazine, or newspaper, and images dominate the layout. Take a walk or drive, and you'll see images on billboards, signs, and the sides of buildings. These pictures are the result of the work performed by artists, designers, illustrators, and photographers. The legacy of image technology is the primary influence on the images we see today. Its evolution has given us the foundation to create and manipulate images to visually communicate ideas in personal, commercial, or artistic venues.

Never in the history of art have we seen anything quite like Adobe Photoshop. Never has one single tool, studio, or machine combined so many powerful methods of working with images. Photoshop is the culmination of the development of image technology over thousands of years. It is a revolutionary new way of visually communicating ideas. It unites the vision of the artist with the technology of the moment. Since its first release, it has been the world's most popular imaging software, because it endows its users with so many possibilities for the creation and development of images for any form of publication. Photoshop presents those possibilities in the elegant, user-friendly environment of the virtual art studio, darkroom, or print shop, where images can be created and edited in almost any conceivable size, content, or configuration.