# DIGITAL IMAGING

## Is it for you?

### by Jack and Sue Drafahl

Today's technology is changing at such a fast pace it is hard to keep up. Thanks to improvements in computer chip design photography has made the transitional step to digital. It's not a passing fad, it's here to stay. As we approach the century mark, digital is becoming the new photography.

So, why would you want to become part of this new extension of photography? You can put together composite images, add text, make t-shirts, create fancy postcards, repair old or new photos, and even put together your own newsletters with captioned photos. Your images can be sent to other family members via e-mail and they will see them in minutes, not days. You can produce a tremendous array of special effects, and you can use your computer as a digital darkroom, doing such things as changing contrast, making an image lighter or darker, dodging and burning, adjusting color balance, etc. The list of reasons goes on and on. The more you get into digital, the more you'll wonder how you ever got along without it.

Before we look at the different products and features of the digital world, we need to take a step back and look at the basics of the digital process. Once you see how each step works, the necessary hardware and software will make a lot more sense.

## THE DIGITAL PROCESS

Input—edit—output. That's all it boils down to. Everything in digital fits into one of these three areas. Digital input is the conversion of a photograph or real scene to electronic bytes of data. This can be accomplished using a digital camera, still video, or film or print scanner.

The editing part of digital photography is the fun part. This is where you sit in front of your computer and crop, color-correct, change, or do just about any thing you want to the image.

The output of the image is very much like the printing process, except there is no darkroom. Instead of an enlarger, you will be using a variety of printers, or you may generate a new negative or slide via a film recorder.

If you already have a computer, you can get into digital imaging for a few hundred dollars. Then, if you like it, you can expand, add more hardware, software, and become a full digital photographer.

## INPUT: PHOTO CD

The easiest way to get started in digital photography is with a Kodak Photo CD. You pick out the photos you want to edit—either negatives or slides. A Photo CD workstation operator scans your images into a computer and then writes them to a gold Photo CD. Once this is done, you can put your images away and work directly from the images on the Photo CD. Just pop the Photo CD into your computer's CD tray, and you're on your way. Most photo-editing programs have the means to utilize Photo CD images.

**Digital imaging allows you to produce a wide variety of special effects from your photos, in an environmentally friendly way—no darkroom, no chemicals. But special effects are only part of what digital can do for you. See text for details.**
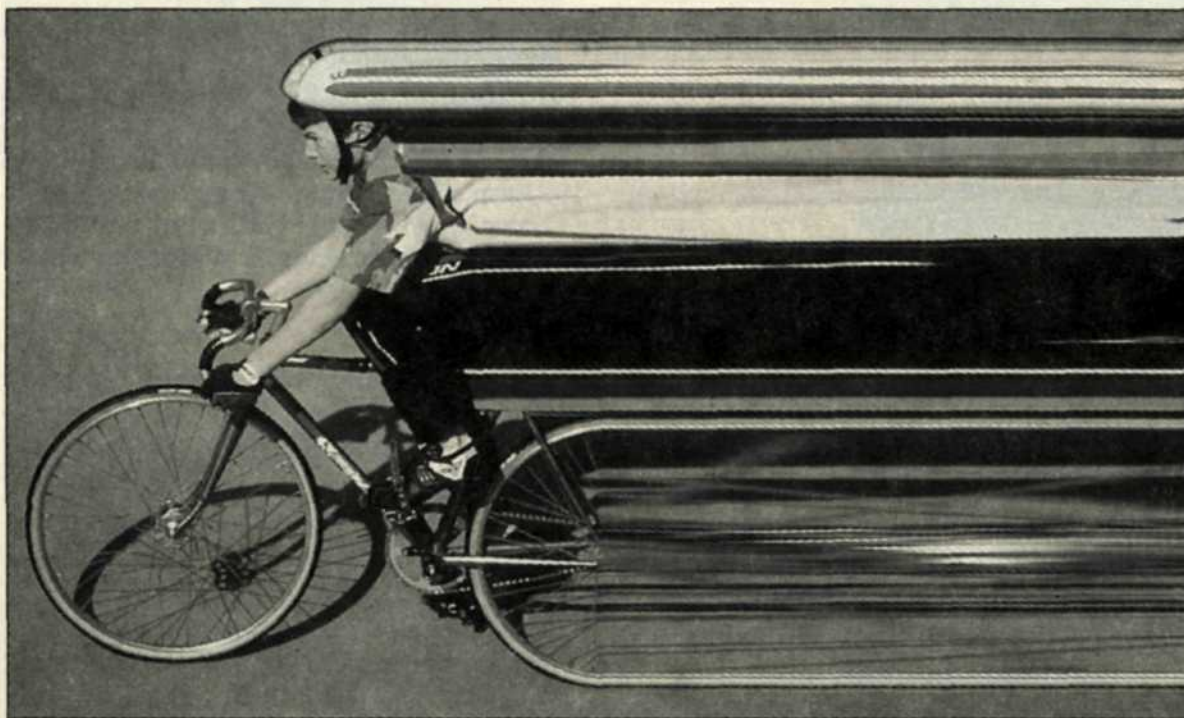
## ADOBE

● Adobe offers Photoshop, the industry standard photo-editing program, and PhotoDeluxe, a low-priced version for home users.

## AGFA

● Agfa markets the pro-level ActionCam and StudioCam digital cameras ($10,000) and several print scanners (with optional transparency adapters) ranging in price from $750 to more than $2000.

## APPLE

● Besides a full line of Macintosh computers ideal for digital imaging, Apple offers the QuickTake 150 digital snapshot camera (under $700 street price), the Color OneScanner (street price under $900), a quality print scanner for home use; and several good printers.

## CANON

● Canon makes pro-level digital cameras, and has just introduced several low-cost digital-imaging products: the PowerShot 600 (the highest-resolution digital camera under $1000), the CanoScan 300 and 600 color flatbed print scanners (both under $900), two MultiPASS fax machine-bubble-jet printers (the 800 and color C2500) and the NoteJetII-Icx, a notebook computer with built-in color printing and mono scanning.

## CASIO

● Casio offers three under-$1000 digital cameras: the QV-10, QV-30 and new QV-100. The QV-30 offers telephoto and wide focal lengths and a built-in 2.5-inch LCD panel for on-the-spot viewing.

## CHINON

● Chinon's ES-1000 and ES-3000 digital cameras both sell for under $1000. The ES-3000 has a 3X zoom lens, the under-$500 ES-1000 a fixed focal length of 6.5mm. Both utilize PC cards for expanded image storage, and both offer fully automatic operation.

## EPSON

● Epson makes ink-jet printers, scanners and the under-$500 PhotoPC digital camera aimed at business and home-computer users. With the look and feel of a standard 35mm film camera, the PhotoPC stores up to 16 screen-quality images, with optional PhotoSpan storage modules increasing this to up to 160 images. It accepts any 37mm video lens.

## FARGO

● Fargo makes pro-level dye-sublimation printers, but also offers the FotoFUN! thermal dye-sublimation printer (under $400) for home use.

## FUJI

● Fuji's digital products include consumer and pro-level cameras, the Fujix FV-7 Photo-Video Imager, the Fujifilm Print-It Personal Photographic Print Maker and higher-level printers.

## KODAK

● KOdak digital products include the Photo CD, three low-coast digital cameras (the $300 DC20, the DC40 and the DC50), high-end pro cameras based on Nikon N90 and Canon EOS-1N pro AF SLRs, the new $199 Digital Science Snapshot Photo Scanner 1, and the Kodak Picture Disk, which stores low-resolution images on a floppy disk.

Photo CD files come in five resolutions that range from 192x128 to 3072x2048 pixels. The first three low



**Kodak Photo CD is a convenient way to get your photos into your computer, if it has a CD-ROM drive. Many photofinishers can scan your images onto a Photo CD for a relatively low cost.**

resolutions are for preview, newsletters, or any application that doesn't need to be above computer-screen resolution of 640x480 pixels. The two higher resolutions are for making color prints or slides on a digital output device. You can have 100 images put on the Photo CD, all at once, or only a few at a time.

### INPUT: PRINT/FILM SCANNERS

If you want to bring pictures directly into the computer yourself, you can use one of three types of photo scanners. Flatbed scanners look and work very much like a photocopy machine. The photo is laid face down on a piece of glass and the cover is placed over the



**Storm's EasyPhoto Reader is a low-cost home scanner that puts your prints (up to 5x7 inches, color or black-and-white) into yur computer.**

top. A preview scan of the photo is made and displayed on the computer screen. Basic cropping, color correction, and exposure can be adjusted with this pre-scan. Once correctly adjusted, the scan is then saved to a computer file.

Another print scanner works like a FAX machine. You feed the photo into the scanner and it pulls it through as it scans the image into your computer.
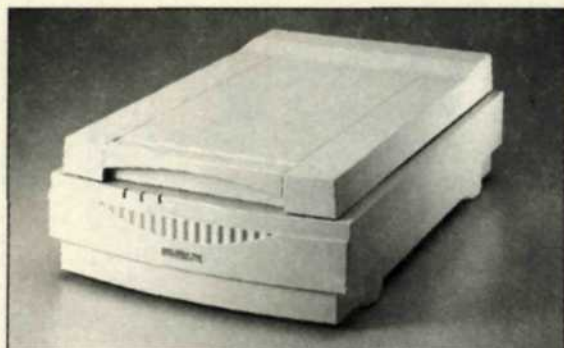
Nikon's Scantouch 110 is a high-quality home print scanner that can produce a 300 dpi 26MB color file in 23.6 seconds.



The Minolta QuickScan 35 is a quick and easy way to get images from your slides or negatives into your computer

Negatives and slides are imported into the computer system with a device called a film scanner. The film is loaded into a slide or negative carrier, and the image is then scanned into the computer system. Negative images are reversed on the preview screen, so you can see the final positive image. Some film scanners even have a device that allows you to scan bulk groups of slides.

## INPUT: STILL VIDEO

Still video images can either be taken with a video camera you already have, or a specially designed video camera system. Either camera is linked to the computer with a special circuit board called a video capture board. As the video images are projected on your computer screen, press a software control and you'll capture a single frame as a picture file. The



The Snappy Video Snapshot does what its name suggests—captures still images from video sources (TV, VCR, camcorder, etc.) so you can use them in your computer.



The Tamron Digital Fotovix IIIS-D provides an easy way to catalog your photos in your computer, and also serves as a video screen viewer and more.

resolution of a video image is low and only small prints can be output before you start to see pixelation and loss of quality. The low-cost Snappy Video Snapshot will capture video images for computer use. Tamron's Digital Fotovix is handy for creating digital databases of your photos.

## INPUT: DIGITAL CAMERAS

The digital camera captures images directly into the camera where it has a storage device. The images are then down loaded to the computer and the camera is ready to go again. Yes, we now have filmless cameras! Digital cameras are rated in three levels of image resolution—low, medium, and high.



Kodak's new DC20 is an under-$350 digital camera that offers fully automatic operation and can store 8 or 16 24-bit color images (depending on resolution).

The low resolution digital camera looks like a traditional compact 35mm camera but captures images in pixel resolution similar to that of a computer screen. You can print these images to 3½x5, but 5x7 images start to show pixelation. These images are great for screen viewing, proofing, sending over the e-mail, newsletters, t-shirts, or in an image database.



Kodak and Canon combined to produce the EOS * DCS 5, a $12,000 pro digital camera based on the Canon EOS-1N pro AF SLR body.

The medium resolution digital camera is still expensive, and is often used by professional photographers. These cameras are modified versions of 35mm SLR cameras already on the market and accept the same lenses and accessories.



Ricoh's RDC-1 lets you record and play back still photos and motion scenes, with or without sound, then use them in a variety of ways.

The high-resolution digital camera is still rare, and very expensive (Some over $30,000). The quality of the images shot on this camera is similar to a good 35mm color negative film and make excellent 8x10 enlargements. When technology allows manufacturers to make this camera at an affordable price, then the digital camera will be a dominate player in photography.

## EDIT: HARDWARE

Most photographers today have a computer that they use for games, word processing, billing, e-mail, newsletters, or to create lecture slides. Generally the home system lacks some necessary hardware and software to make it a good photo-editing computer. Here are some requirements for upgrading your system.

## METATOOLS

● MetaTools offers a variety of image-editing tools. Kai's Power Tools 3 extends the effects possible with Adobe Photoshop. Kai's Power GOO lets you distort images with ease. MetaTools also offers CD-ROMs with photos you can use for practice and projects.

## MINOLTA

● Minolta's QuickScan 35 scans slides and negatives into the computer. The Vectis VP-1 lets you import your Advanced Photo System photos into the computer. Minolta also offers a pro-level digital camera, the RD-175, and distributes Play's Snappy Video Snapsshot.

## NIKON

● Nikon offers pro-level digital cameras, excellent home- and pro-level print and slide scanners and the new Camera-on-a-PC-Card and Multi-Purpose AV Compact Camera, which are barely bigger than the PC card used to store the images you make with them.

## OLYMPUS

● Olympus produces two pro-level digital cameras, the Deltis VC-1000 and Deltis VC-1100, as well as the SYS.230 Personal Storage System, a great way to store transport your digital images.

## POLAROID

● Polaroid's digital products range from the PDC-2000 digital camera to three SprintScan 35 slide/negative scanners. The $299 PhotoPad scans color or B&W photos up to 4x6 inches.

## RICOH

● Ricoh's unique RDC-1 digital camera lets you record and play back still photos and motion scenes, with or without sound, and put them into your computer for manipulation, transmission on the Internet and output. Ricoh also offers a scanner.

## SONY

● Sony offers the DKC-ID1 under-$2000 digital camera, the DKC-5000 pro camera, the CSP-9411S recordable CD drive, the PC Cam video camera and a variety of excellent computer monitors.

## STORM

● Storm's EasyPhoto Reader and software make it easy and fun to scan prints up to 5x7 inches into your computer. Storm EasyPhoto software is also packaged with other manufacturers' products.

## TAMRON

● The Tamron Digital Fotovix IIIS-D looks much like a slide copier, and allows you to very quickly input your slides or negatives into the computer to produce a digital database of your images. The very handy unit can also record video frames and, via accessories, three-dimensional objects and microscope images.

## YASHICA

● Yashica offers an inexpensive digital camera, the DA-1. It stores up to 50 images on an ultracompact, highly affordable 2-inch disk.



The HP Pavilion Model 7130P PC comes with a built-in HP PhotoDrive and Storm EasyPhoto software—this computer has a built-in print scanner.

The speed of your computer will determine how long you have to wait to see the results of each edit. Most editing systems will not work properly on a computer slower than a 486-33 PC. If you do have a slower system, your patience will wear thin after only a couple of edits. A minimum of 32 megabytes of RAM (Random Access Memory) is usually required to run the editing program and hold the picture in memory. The price of RAM dropped over 200% in 1996 so larger blocks of RAM in your computer are now affordable. We highly recommend 100 megabytes if you plan to use Adobe Photoshop with full-resolution Photo CD images. You will also need a 24-bit color display to edit your images in full color. This is standard on most systems today, so you may already have this.
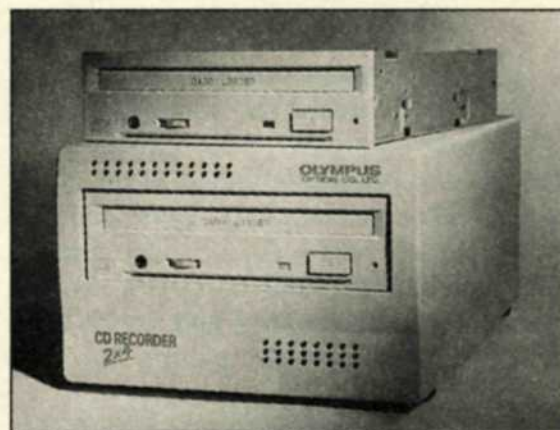


Olympus offers this under-$900 CD recorder-player that supports Photo CD and Video CD formats. It's a handy way to store your images.

With scanned images ranging from 1–36 megabytes, you will find yourself running out of image storage room very quickly. One solution is the addition of a second hard disk. The price of hard disks has also dropped, and a 1 gigabyte drive can now be picked up for less than $300. Unfortunately you will find that even a second large hard disk is only a temporary fix. Fortunately there are several types of removable hard disks, flopticals, zip drives, tape drives, which can hold up to several gigabytes of image storage.

The best and most reliable system is the CD writer. Just a few years ago these units cost over $20,000, but in just a short time they have dropped to below $1000. Up to 600 megabytes of information can be stored permanently on these inexpensive disks. The data on these CDs is supposed to last over 50 years and can be retrieved on any computer CD player.

If you are already on the Internet, you will have a FAX-Modem card installed in your computer. If you do not, you should seriously consider getting one. Once you are on the NET you can e-mail images and messages, look at new digital photo products, and even get technical support if you have problems. Wouldn't it be nice to scan in a picture of a child at a birthday party and drop it into the grandparent's e-mail so that they can see it almost immediately?

## EDIT: SOFTWARE

The main type of software you will be using is a bitmap, or photo quality, editing program. These programs look for all types of bitmap files such as Photo CD, Targa, Tiff, BMP, GIF, or JPEG and load it into your computer memory. In the software itself you'll find dozens of
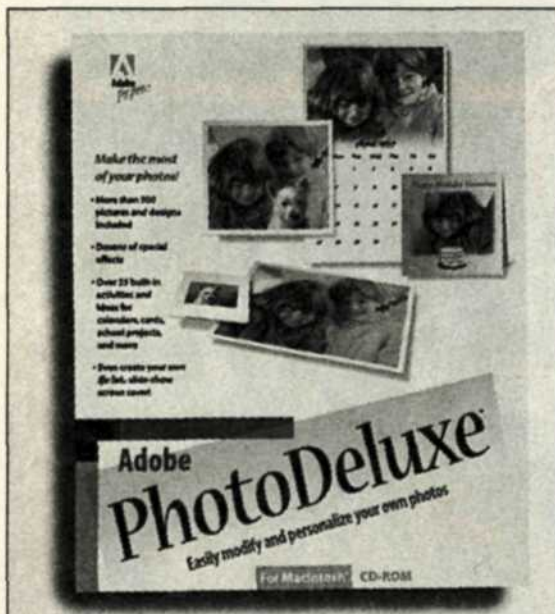


**Adobe PhotoDeluxe is a low-priced, easy-to-learn version of the most popular pro image-editing software, Adobe Photoshop. It guides you through 25 projects, and lets you do your own thing, too.**

editing tools to correct exposure, color balance, gamma, contrast, saturation, grain, sharpness (yes, you can increase sharpness), and cropping. The best part of these editing tools is that you can immediately see the correction. If you don't like your correction, you can press the "Undo" key and it backs up one step.

Additional editing tools called Plug-ins are available from other software manufactures. These added features give you unlimited versatility when editing an image. You can now mix photos together, repair damaged photographs, add text, create t-shirt designs and make business cards or advertising literature for your business.

If you plan on scanning and editing lots of images, you may want to consider an image database program. These programs read each scanned picture into memory, create a thumbnail image, and then create a picture database. If you want to edit a picture, just go to the database, double click on it, and it opens into your editing program.

One important feature that should be in your software program is a JPEG file compression routine. This file format is designed for photography and can compress files from 32 megabytes down to less than 5 megabytes. You may hear that this option loses data, but after extensive testing, we have found no difference between the compressed and uncompressed files. The obvious advantage is that you can store many more compressed images than uncompressed.

## OUTPUT: LASER PRINTERS

One of the first photo quality output devices on the market was the laser printer. At first the images were only black and white, but more recently the resolution has increased and there is now color output. The drawback to color laser printers is that a dot pattern is formed in the process and uneven printing occurs when an image has a lot of dark area.

## OUTPUT: INKJET PRINTERS

The inkjet printer is very much like a printing press in that it adds different layers of ink to the paper as it passes through the machine. Smaller machines usually make one pass for each color, while the larger machines will coat the paper in one pass. Special inkjet papers are available and usually run around $1 for each 8.5x11 sheet. Inkjet printers come in many sizes from mini print to large digital mural prints.

## OUTPUT: DYE-SUBLIMATION PRINTERS

One of the highest quality digital printing devices on the market is the dye sublimation printer. Its complex internal operation uses cyan, magenta, yellow and black dyes located on a roll in the printer. As special paper passes under the print head, the dyes are forced into the paper. The paper makes a pass for each color dye on the roll. These printers are restricted in size because of the rolls of dyes and the special paper can be quite expensive. The advantage is that you can print a high quality images in your home without a darkroom or enlarger.

Fuji's new Fujifilm Print-It Personal Photographic Print Makerprints high-quality 24-bit color images from digital



**Fuji's environmentally friendly NC-2 Print It Personal Photographic Print Maker produces high-quality color images from digital files or video in less than two minutes via a unique process, and costs less than $700.**



**Fargo's FotoFUN! thermal dye-sub printer lets you output your digital files (that is, your computer photos) in high-quality color very easily.**

or video in less than two minutes, via Fuji's unique Thermo-Autochrome process, which creates a color image in response to heat—there are no ink cartridges or other disposable supplies.

## OUTPUT: FILM RECORDER

A film recorder works very much like a printer, except that the image prints onto film not paper. A 35mm, 70mm, 4x5, or 8x10 film back attaches to the unit and the image is projected on a special black & white CRT (Cathode Ray Tube) in the unit. As the different colors are sent to the device, a color filter wheel revolves and projects the red, green and blue parts of the image onto film. Most photographers will not have direct access to one of these devices as the good ones are very expensive.

## OUTPUT: SERVICE BUREAU

When you first start into digital imaging, you will probably not have all the equipment necessary and should depend on your local digital lab or service bureau. Think of a service bureau as the digital photo lab that has all the toys you would like to have! They usually have a variety of scanners, editing computers, laser printers, big inkjet printers, dye-sublimation printers, and high quality film recorders. Service bureaus allow you to enter the digital world without the pocketbook crunch of investment. To find a service bureau, look in the Yellow

Pages under Computer Graphics, Slides, Photography Labs and Service Bureaus. Make sure you ask about price, file types they require, hidden costs, file transport devices, and if they have samples to review. Once you see their results, you can then decide how much you want to do yourself and how much to send to the service bureau.

## TAKING THE DIGITAL PLUNGE

You will find mixed feelings among photographers regarding digital photography. Those who do get into digital, view it as an extension of the photographic process. Those against digital consider it a threat to the creative process. Photography has had controversy throughout history, but each time new technology has won out. The wet plate gave way to flexible film, viewfinders to SLR, black-and-white to color, and now silver to digital. We think you're going to love it! ❏



SAN DIEGO ZOO
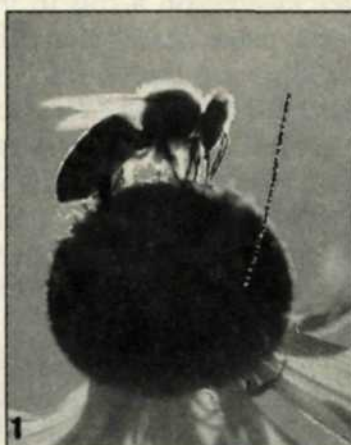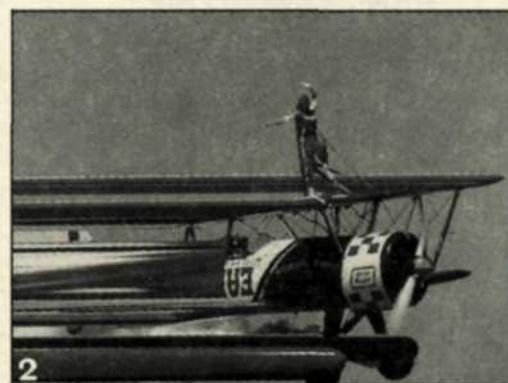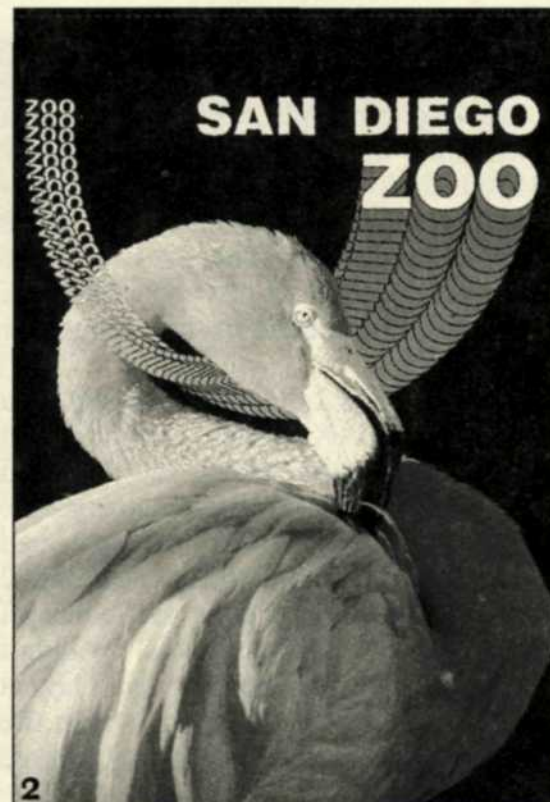
Here's a sampling of things you can do with image-editing software once your images are in the computer. You can place a jet plane against a more-interesting sky, repair scratched images, replace a busy background with a complementary one, add text and add special effects—and a lot more. All photos by Jack and Sue Drafahl.