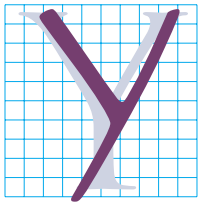
Figure 6.1 *Unsharp masking seeks to improve the apparent focus of the image, as at top right. Its trick is introducing artifacts that intensify transition areas but are too small to call attention to themselves. Below, enlarged versions of the original and the sharpened version show how the characteristic halos work their magic.*

6

Sharpening With a Stiletto

Unsharp masking, an artificial means of improving focus, is a powerful tool, especially for larger images. How much of it should you use? As much as you can get away with, of course. By choosing which channels to sharpen, you'll be able to get away with a lot more of it.



ou enter the boss's office under that most tense of circumstances: you are about to ask for a raise. It is possible that negotiations will ensue, so you have to be prepared with a number. How much more money should you ask for?

The stakes are all too clear. Ask for too little, and you may just get it; ask for too much, and you may get booted out of the office with nothing.

It's also clear that the amount you can get away with asking for is not fixed, but varies sharply depending on your technique. People who, during the meeting, tell the boss what a kind, sweet individual he is and what a joy to work with can, as a rule, ask for more than those who imply that, were it not for their own contribution, the boss's boss would realize what an incompetent dolt he is.

And it is also clear that it depends on the character of the boss. Should you mention that another company may make you an offer at a higher salary? Some bosses respond well to this type of thing. Others, like myself, are of the crabby variety, and are apt to suggest that, should you decide to leave, you not allow the door to hit you in the backside on the way out.

The fact is, you should ask for as much as you think you can get away with under the circumstances, but the circumstances are very much under your control. This is exactly analogous to unsharp masking.

There are at least as many strategies in the sharpening game as there are in playing office politics. Both games are rapidly evolving, as players think up new and better techniques. The options have become so bewildering that one chapter is no longer sufficient—after we go through the basics here, we will return to the topic in Chapters 17 and 18. Before

Figure 6.2 *Fleshtone images are dangerous because of the possibility of accentuating unwanted detail. Top, the original. Bottom left, when sharpened in RGB. Bottom right, sharpened only in the black of CMYK.*

we even start to discuss the options in the principal dialog, we'll try to set the agenda by answering the traditional journalistic questions: who, what, when, where, why, and how?

Who, What, and When?

The who involved is you. This chapter is important to you because its techniques make a decisive difference in believability, particularly of images output at a relatively large size.

The what is *unsharp masking,* henceforward known as USM, an artificial method of making images seem more in focus, as Figure 6.1B is in comparison to Figure 6.1A. Generally speaking, there's no such thing as an image that's too in focus, but there is such a thing as one that looks artificial. The function of this chapter is to show how to get focus without the artificial appearance.

The when is suggested by Figures 6.1C and 6.1D, which put the process under a microscope. USM does its thing by inserting attention-getting artifacts in areas of transition. Those artifacts, which are normally called *halos,* are painfully visible in Figure 6.1D, but of course we don't intend for viewers ever to see the image at that size. They will be looking at

Figure 6.1B, and our hope is that they'll fall for our scam because the halos are too small to perceive clearly.

When looking for a raise, as a matter of honor we try to squeeze the last tenth of a percent out of the company. With USM, it's the same thing. Brinksmanship is fun. We want to go as far as possible without triggering the telltale "Aha!" from the viewer who sees the obnoxious halos and knows when he's being taken.

It follows that sharpening needs to be done late in the correction process. The curving of Chapters 2–4 is highly effective at bringing out contrast—including in the artifacts of USM. It must therefore be done before we throw USM out onto the bargaining table.

There's no call to be doctrinaire and insist that USM be the very last step before we click OK in the print dialog. Mild correction after USM is acceptable. Gross changes ask for gross consequences.

Where?

USM is like color correction in LAB. There's a lot of room for differences in taste. I apply fairly drastic sharpening here to make sure that the effect is visible. You may think that I've gone too far, or not far enough, but you should be able to visualize how you could get the result you want.

That is, if there's no horrendous defect as the result of a stupid decision about where to sharpen. Figure 6.2B exemplifies just such a decision.

The skin of humans, even relatively young ones, is made not of alabaster, but rather of a flexible epidermoid integument, highly useful for insulation and in resisting injury, but somewhat unforgiving of acne scars, and entirely too prone to wrinkling.

Careless USM can age the skin more than 25 years of sunbathing. Figure 6.2B brings out impressive detail. This woman, not being a crocodile, would not want us to see it.

And yet, the original of Figure 6.2A seems too soft, especially in the hair. Note that even in the version with the reptilian skintone, the hair is not overfocused. The question is how to get such hair and at the same time a natural-looking, yet not overdetailed, skin.

If you're trying to get a raise, go to the person who can give it to you, not to some office politician who's liable to spread ugly rumors about you. It's the same way with USM. Half the battle has nothing to do with the settings, but with choosing where to apply them.

Here's the question you should always ask yourself: are all colors in this picture equally important for sharpening purposes, or is one more critical than others?

If there *is* a critical color, it's practically sure to be red or green. When blues are important, they're almost always skies or water, which are soft-looking by nature, not receptive to sharpening. Ditto purples, which are likely to be grapes, eggplants, or flowers. All of these objects should be smooth.

We occasionally find important yellow objects in an image, and every now and then one that's cyan. But these colors never dominate an image the way that green dominates Figures 6.1 and 6.3 and red dominates Figure 6.2. And once in a cyan moon we encounter clothing in one of these oddball colors, like the purple blouse of Figure 2.17.

Despite seeing three such images in a row, the fact is that most pictures aren't dominated by one color. The previous two chapters are a reasonable sample. They contain a dozen photos. The woman in Figure 5.7A and the image of Bryce Canyon in Figure 4.13 are both dominated by red. The shot of Yellowstone National Park in Figure 4.11 is dominated by blue but is the sort of moody image that doesn't require conventional sharpening. The other nine images are more typical, having no clear boss color.

Because these nine are typical, we would sharpen them in the typical way, using the

entire image as the target if we are in RGB or CMYK. If we're in LAB, we always sharpen the L channel only, because the A and B just contain color information, no detail.

Unless you're never planning to leave RGB at all, it's best to avoid sharpening there. Both other alternatives have slight technical advantages in certain cases. Not enough, in my view, to warrant moving out of RGB if you have no other reason to do so. In around half of the images I've tested, I see no difference at all, and in the others the differences are small enough that if you can make use of them, you probably don't need me to tell you what sorts of images they will show up in.

But it would be fair to say that the best technical overall sharpen is in the L, and CMYK is not far behind. So, if the ultimate destination of the file is CMYK, you shouldn't be considering RGB sharpening, not that the world will end if you do.

Disasters like Figure 6.2B occur not because people sharpen in RGB but because they don't realize they shouldn't be sharpening certain channels at all.

If we are headed for CMYK anyway, and if the image has only one important color, we should forget about RGB and LAB altogether.

A face is red. The two channels that create red are magenta and yellow. Those channels are much darker than the other two, so they are rich in detail—detail like wrinkles, pores, scars, blemishes, and hairs.

In addition to accentuating these features, sharpening overall also caused the illusion that the woman's face was sprayed with fine droplets of white paint. The pinkness of the skin is actually breaking up, because without magenta and yellow, there is no red. The artifacts of sharpening have created areas where the two channels are too light for the color to be believable.

The solution may have suggested itself in the last chapter. Refer back to Figure 5.7H. That's what a person's face looks like in the black channel. And that's why Figure 6.2C, which sharpens only the black and not the CMY, doesn't damage the skin. There isn't any skin in that channel that *could* be damaged.

This philosophy doesn't stop with the black. The key color in Figure 6.3A is green, which is constructed of yellow and cyan. But the green areas are separated into tiny leaves, not an unbroken stretch of color like a face. So we don't get a snowy appearance by sharpening overall, but I still don't recommend it. Figure 6.3B is sharpened in the L of LAB, while Figure 6.3C hits not just the black but the magenta. The dominating yellow and cyan are never touched, so the leaves cannot get much lighter than they were originally.

In spite of these more realistic, less obviously sharpened leaves, Figure 6.3C seems to show more detail than Figure 6.3B does, because I was able to use heavier sharpening settings, a major advantage of using weak channels. Sharpen the cyan and yellow, and color and/or darkness can change. Sharpen the magenta and black as hard as you like, and the leaves can never become any color other than green.

The analogous move with red objects is to sharpen both the black and the cyan. That's what I would recommend with the Bryce Canyon shot of Figure 4.13. Faces, however, are a category unlike any other in imaging, in that we actually would like to suppress detail in favor of a smoother appearance, particularly if the subject is a young person or an adult female. Cyan carries some facial detail and is therefore dangerous. Black does not. It does contain hair, eyes, eyelids, and eyelashes, all things that we are very interested in sharpening.

In fact, sharpening the black only is an effective conservative approach with almost any image. You can use big settings with little risk of disaster.

Before moving on, some reminders and other housekeeping matters.

- When I said that red is constructed of magenta and yellow, and green of yellow and cyan, did you agree instantaneously? If not, now might be a good time to go back and review Chapter 1. Visualizing how the channels look and interact is going to be more and more critical in subsequent chapters.
- That we have gotten a quarter of the way through a sharpening chapter without seeing *how* to sharpen an image is an extension of the philosophy of discussing channel structure in Chapter 1 before putting it to use in blending. Sharpening is a topic that could easily fill an entire book. If you want to get good at it, you need the where and why stuff before getting into the how.
- Because there are so many sharpening options, some rather esoteric, our study of it is split in two sections. This chapter gets us started with the basic command. In Chapters 17 and 18, we'll look at fancier options and discuss USM in conjunction with its close relative, the Image: Adjustments> Shadow/Highlight command. This is why I did not discuss how to sharpen Figures 6.2A and 6.3A if you do not wish to enter CMYK. It's doable, but would involve introduction of some topics that are best put off.

Figure 6.3 *Images dominated by a single color should be sharpened in the weak CMYK channels. Top, the original. Bottom left, sharpened in the L of LAB. Bottom right, sharpened in the magenta and black of CMYK.*

- Remember that sharpening is subjective, and I'm doing a lot of it to make sure you can see the impact. If you think that Figures 6.2C and 6.3C are oversharpened, then you can always lower the setting, or put them on a layer and lower the opacity. By contrast, Figures 6.2B and 6.3B have inherent defects that lowering opacity will help but not cure.

It would be reasonable to inquire at this point why photographers can't just get images in focus in the first place, so that we wouldn't have to unsharp mask them.

The brief answer is that they can't. The long answer involves throwing so many sharpening rocks at the gull of Figure 6.4 that you may accuse me of being the kind of guy who leaves no tern unstoned.

Why?

We have to sharpen for much the same reason that we have to color-correct: humans and cameras don't see things the same way. A flying bird does not blur into the sky, at least not for us. They are completely distinct entities: the bird ends and the sky begins with inconceivable suddenness.

The camera can't record this, for three reasons. First, we see in three dimensions. We perceive the sky as being several miles above the gull, but the camera captures a flat image in which both are on the same plane.

Second, a digital file consists of pixels, which are not infinitely small. In the enlarged half of Figure 6.4 we can already see them. They are too clunky to make a believable edge. And even if they were infinitely small, we'd still be stuck, because whatever our output method is, it probably can't address a space nearly as small as the pixels we currently use. For example, a rectangular space of around .0003 square centimeters is reserved for each halftone dot printed in this book. That sounds very small, and indeed it is small enough that we can't see the dots easily without magnification, but it's three or four times larger than a pixel.

And third, we see whatever we feel like seeing. If the bird doesn't have sharp edges, our imagination provides them. Cameras do not take quite such a creative view of reality.

So, something needs to be done to emphasize edges, transitions. The solution is to put halos around the edges. Painters have been doing it for centuries. And it's quite standard in the photographic studio. The model in Figure 6.2 wears eyeliner, a clear use of edge enhancement before we ever get into Photoshop, forgetting about the unsharp maskara that we add afterward. Lip pencils and eyeshadow serve the same purpose. The fact that women wear these cosmetics even when not posing for glamour shots is a strong indication that even if our capture and printing process were absolutely perfect, we'd probably need USM anyway.

How?

Finally, it's time to get down to specifics. To sharpen an image, we first, if we're not planning to do it overall, select our target channels. Then, Filter: Sharpen>Unsharp Mask. Up pops the dialog of Figure 6.5. We throw

Tip: Blurring the Black

Sharpening the black can be quite effective. So can the reverse process. One of the most common giveaways of poor technique comes when a retoucher, in an attempt to accentuate the foreground object, selects and blurs the background.

This usually results in the appearance that the foreground object has been cut out of the picture and pasted back in, yet the desire to occasionally defocus the background is so strong that Photoshop now includes a Lens Blur filter to assist in doing it.

If you've ever tried and been dissatisfied with that or another technique, try this one: take the file into CMYK and blur the black only. That's a pure play on focus without smooshing all the colors together the way that other options do.


Figure 6.4 *Sharpening is needed because photographs do not portray edges with as much definition as the viewer expects to see. The original, left, is not obviously out of focus, but in the enlarged version at right, the edges seem soft.*

in some random numbers because we don't know what they mean yet, and click OK.

Photoshop now, without telling us anything about it, produces for its own nefarious purposes a blurred version of the image. It compares it to the original, exaggerates any differences it may find between the two, trashes the blurred version, and there you have it.

After explanations like that, my wife is fond of saying that if you ask a silly question, you get a silly answer. I don't dare argue with *her,* but a student once made the same remark, which led to a bet that I could sharpen an image to publication quality using no filter other than Gaussian Blur.

The student lost. The image I did it with is Figure 6.1B. It took only 23 steps (which are listed in the folder for this chapter on the CD, if you care), and around five times as long as it would with the USM filter; and I could have gotten a better result by sharpening the magenta and black only, as in Figure 6.3B, and with all that it can't be denied that the image got sharper in a believable way.

With a new image and a couple of steps omitted, we can get an idea of how this seemingly ridiculous concept gets the job done. Figure 6.4 arrives in sRGB. To it, I applied Filter: Blur>Gaussian Blur, Radius 1.0 pixels. That produced Figure 6.6B.

Figures 6.6A and 6.6C, after some fancy blending and contrast-boosting commands, show the result of comparing Figures 6.4 and 6.6B. Figure 6.6A shows the area in which the original image is darker than the blurred version. Figure 6.6C shows the lighter areas—and the bird seems to have changed shape.

Work out for yourself why this is happening. The bird's top half is darker than the sky, but most of the bottom, especially the tail feathers, is lighter. The blurred version wipes out some of these distinctions in favor of areas that are neither particularly light nor dark.

Therefore, the tops of the wings are darker in the original than in the blurred version, but lighter in the area just above. So, there is a sharp line in Figure 6.6A just inside the tops of the wings, and one in Figure 6.6C just outside. In the white tail feathers, the opposite occurs. The original is *lighter* than the blurred version there, but darker in the surrounding sky. The blur, after all, darkened the sky above the bird but lightened it below. So this time, the line is on the inside edge in Figure 6.6C and on the outside in Figure 6.6A.

Now that we've found the differences between the original and the blurred version, we proceed to exaggerate them. The lines in Figure 6.6A show where the original already is darker, and since this difference must be exaggerated, the original must be darkened more. The lines in Figure 6.6C show lighter areas. In these areas the original must get lighter still.

In short, we will in effect be stamping Figure 6.6A into the original, creating dark halos inside the top of the wings and outside the white tail feathers. Then, we'll use the lines in Figure 6.6C to create the lighter halos. This procedure certainly will emphasize the transition areas.

In many areas of the world, copies of Photoshop are unavailable in the local language, so users have to cope with English.

They often can't figure out why the term *unsharp* is used to describe how to sharpen. If you've ever wondered about it yourself, Figure 6.6B is an unsharp version of the original. The unsharp version generates the masks that create the sharpening effect.

USM by the Numbers

Figure 6.7A shows what happens when we forget about this cockamamie blurred version and apply the settings of Figure 6.5 directly to the original. You should be able to see how the lines of Figures 6.6A and 6.6C have translated into light and dark halos.

The Amount setting is the maximum 500%. If we wish to use the same haloing in a more subdued manner, we reduce it. Figure 6.7B has an Amount of 200% but otherwise the same two settings as Figure 6.7A.

The enlarged version of Figure 6.7A shows much more blue noise in the bird's belly than was in the original image. This noise developed, or rather was aggravated, when it was eliminated.

Read that last sentence again. It appears to make the same quantity of sense as the value found in Figure 6.5 next to the setting we're about to discuss. It is nevertheless true. The original, Figure 6.4, had modest noise. Blurring it in Figure 6.6B wiped that noise out. The comparison between original and blurred version therefore found, and enhanced, differences—small ones, in comparison to the ones at the edges. But fine noise is visible in Figures 6.6A and 6.6C, and that noise was emphasized in the sharpened version of Figure 6.7A.

Figure 6.5 *The Unsharp Mask dialog.*

If the USM filter didn't exist and we had to try to establish our halos by blending Figures 6.6A and/or 6.6C into the original, we wouldn't have to worry. With each of the two, we'd open the Curves dialog and slide the lower left (highlight) point over to the right. That would be the end of the noise, which is light, but it would preserve the much darker halos that outline bird, eyes, and beak.

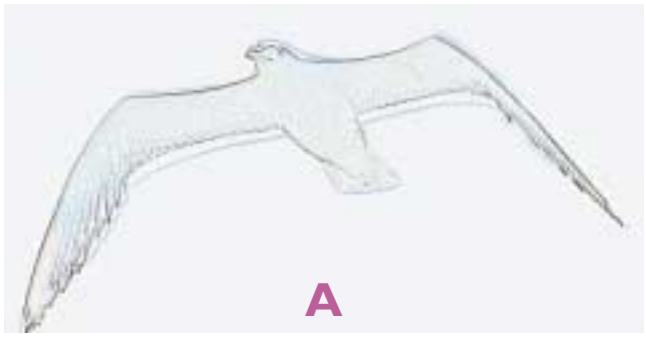
The Threshold setting of the USM filter does the same thing. A Threshold of 0 means the difference masks are used as is, noise and all. Higher numbers gradually exclude small differences, which often are noise. Figure 6.7C returns to 500% Amount, but with a 10 Threshold. It's approximately as sharp as Figure 6.7A, without the noisome noise.

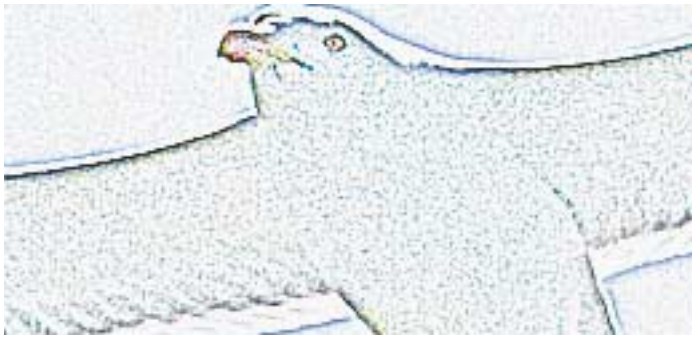
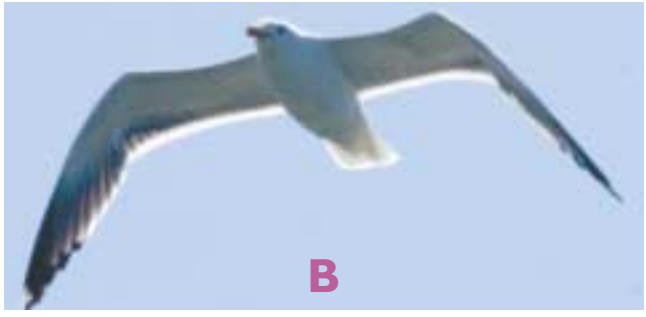
The other question in the USM dialog is, how blurry is the blurred version used for comparison? The answer affects the width, but not the intensity, of the sharpening halos.

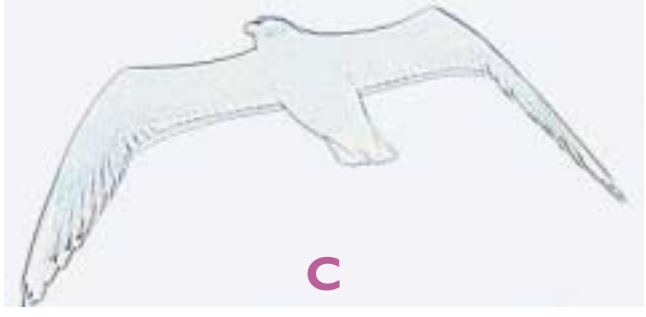
I created Figure 6.6B with a Gaussian Blur of Radius 1.0 pixels. This blur created areas where bird and sky met and became one. Those areas, neither bird nor sky, were very different than they were in the original, resulting in the clearly defined edges of Figures 6.6A and 6.6C.

Suppose that I had used a higher Radius, say 3.0, for the blur. The area that is neither bird nor sky would extend farther into both. The line of difference between original and blurred version would become wider.

The USM filter is based on a Gaussian Blur. The Radii of the two commands operate identically. Figures 6.7D, 6.7E, and 6.7F use the same Amount and Threshold settings as Figures 6.7A, 6.7B, and



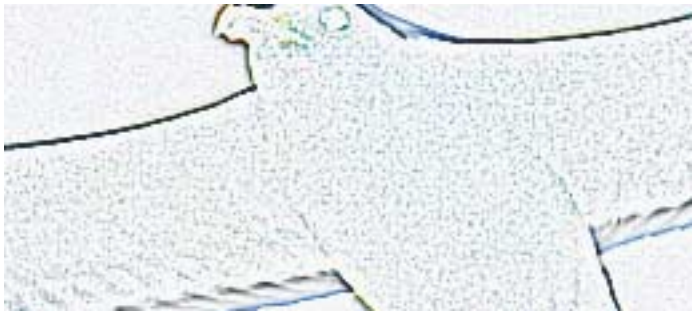


Figure 6.6 *The middle version, based on Figure 6.4, has been Gaussian Blurred at a Radius of 1.0 pixel. The top and bottom versions compare the before and after images. At top, with contrast greatly enhanced, are the areas in which Figure 6.4 is darker than the blurred version here. Bottom, the areas in which it is lighter.*

6.7C, but Radius has been increased to 3.0. The halos have widened to such an extent that we probably wouldn't accept these images. Sharpening should be hard to detect; we don't want the viewer to be conscious of the halos. The dark lines at the top and bottom of the gull in Figure 6.7F, which is the best of the three, are still too prominent in my view.

In Which Haloing Is Taken to the Max

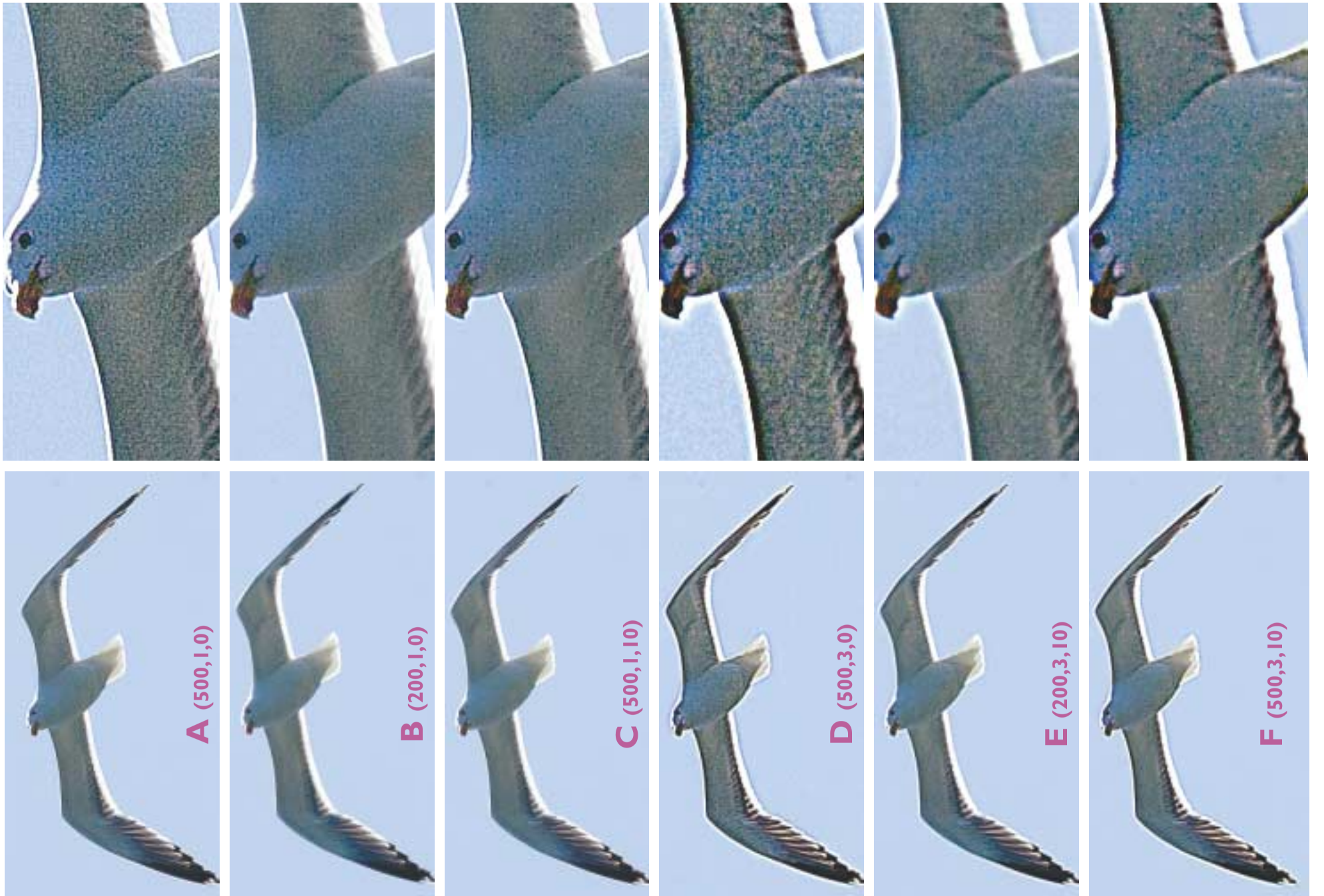
Having discovered that a 3.0 Radius is too much, it would seem like the last thing we need is an even higher setting. Going *much* higher, however, opens new opportunities.

This image clearly needs a Threshold of around 10, so we'll use that from now on. Figure 6.7G is at 500% Amount and the wildly extravagant 15.0 Radius, resulting in half a mile of white space between gull and sky.

The key to sharpening is to hide the halo. In Figure 6.7C we hid very light and dark halos by making them narrow. When halos are extremely wide, we can do the opposite: they can be hidden by drastically lessening their intensity.

In Figure 6.7H, Amount has been reduced to 50% from 500%. The horrific 15-Radius haloing of Figure 6.7G is now invisible to all but the most suspicious viewer.

You should compare this version to the original, Figure 6.4. The impact of these wide, subdued halos is subtle, but it's there. I prefer this unusually sharpened version. I don't prefer it to Figure 6.7C, however. The effects are so different that what's happening in Figure 6.7H almost can't be called sharpening at all. It's not quite as effective as the normal low-Radius sharpening in this particular image, but it might be in other contexts.



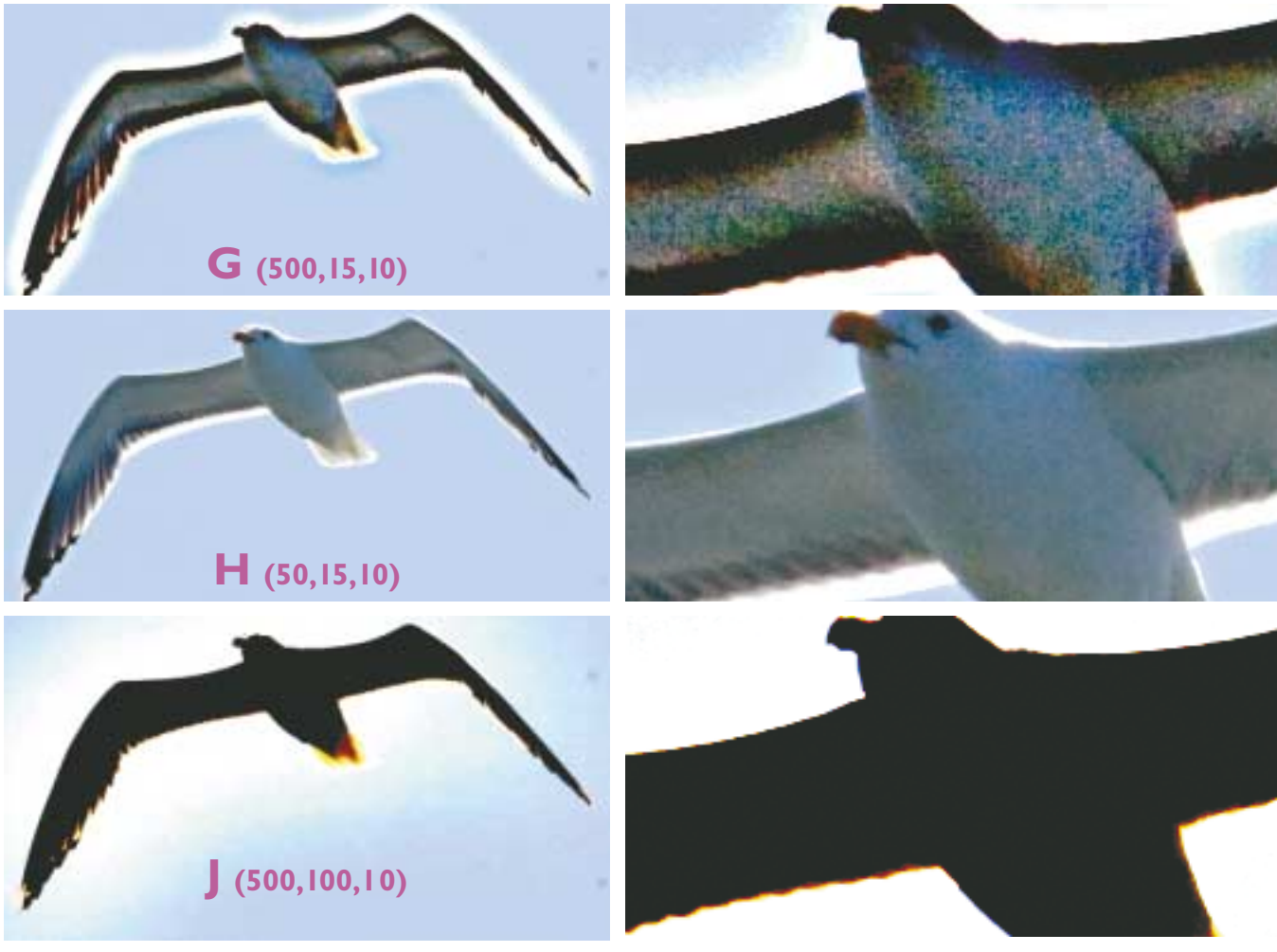
Before going there, though, let's look at the impact of an ultra-high Radius of 100.0 in Figure 6.7J. In a version that took a Gaussian Blur of 100.0 pixels on the chin, we wouldn't be able to see a bird at all. Hence, there's no haloing, but rather a general darkening of the bird and a wipeout of the surrounding sky. The result looks totally useless to the casual student and totally tempting to the Photoshop expert, who visualizes collages, selections, and layer masks where others see whites and blacks. But that can wait until Chapter 19.

Finalizing the Numbers

Now that we know how the numbers interrelate, we can start talking about right and wrong. Some of this is highly personal. I'm strongly of the view that most people don't sharpen their images enough (see box, page 139). There are, however, certain ideas that everyone would accept.

First, let's agree that the six versions from Figures 6.7A to 6.7F constitute a single group, and that Figures 6.7G, 6.7H, and 6.7J represent a radical alternative. The first group is traditional, similar but not identical to the sharpening that might have been gotten off drum scanners 15 years ago, or from process separation cameras 15 years before that. I call this *conventional* sharpening; the second group is *hiraloam*, for High Radius, Low Amount. Most images sharpen better conventionally; a smaller percentage takes to hiraloam the way seagulls take to fish. So the first decision is which general method to use.

Figure 6.7 *The impact of the changes in the USM settings. Opposite: version A is sharpened at 500% Amount, 1.0 Radius, 0 Threshold. B reduces Amount to 200%. C returns to 500% with a Threshold of 10. D, E, and F repeat A, B, and C except that Radius is set to 3.0. This page: high Radius sharpening. G uses values of 500%, 15.0, 10. H reduces Amount to 50%, and J uses values of 500%, 100.0, 10.*



We'll get back to that question later. Conventional appears to work better on this image, so let's stick with that for the moment.

It would be hard to construct a case for Figure 6.7A over 6.7C. Nobody likes random noise. This image requires a Threshold. Similarly, you could argue that the halos should be thicker than they are in Figure 6.7C, but it's tough to imagine that you would want to go as far as the 3.0 Radius of Figure 6.7F. As for Amount, that's up to you.

Different people are most likely to see eye to eye about Threshold, then about Radius, and are least likely to agree about Amount. That's the order I would suggest choosing the settings in.

Start the search by opening the image and View: Actual Pixels (also known as 100% magnification) so that your impression will not be warped by a Photoshop calculation that forces the picture to fit a strange monitor resolution. Don't go larger except for diagnostic purposes, because at a higher magnification, defects will show that are too small to appear on output. If you must go smaller, go to 50% magnification, which is more reliable than either 66.7% or 33.3%.

Beta reader André Lopes has a different perspective. He writes, "Most modern monitors have a resolution about 100 pixels per inch, more than the traditional 72 ppi but lower than the usual printing resolutions (normally 200 to 300 ppi in books and magazines). So, when we use 100% magnification in Photoshop, we see an image at least twice as big as the final printed version—and the halos become much more visible than they will really be.

"Instead of using a lower magnification, I usually recommend evaluating USM looking to the monitor from a greater distance. For example: we normally read a magazine or a book holding it about 16 inches away from our eyes. If the image on the monitor is three times larger, we look at it from a distance three times farther—about 50 inches in this case."

Whichever way you choose, commence hostilities by putting in values that are overkill for almost any image: 500% Amount, 5.0 Radius, 0 Threshold. Before reducing them, remind yourself that you are a tainted observer. Every year my doctor diagnoses herself with at least eight fatal diseases, because whenever a symptom shows up that might conceivably be associated with any of them, she imagines she has contracted it. Me, since I don't realize that a headache after obliterating most of a bottle of rum may indicate a brain tumor, I live a peaceful and worry-free life.

The same effect occurs here. You and I know what sharpening halos look like. Our clients generally don't. Pictures that look obviously sharpened to us don't to them.

Also, images look softer on output than they do on screen. Look again at Figure 6.6A. I don't defend its noisiness, but the correctly sized version is not all that terrible. Would you have predicted such a result from seeing all the noise in the enlarged version, or on a monitor?

If you are in a properly aggressive state of mind, you may now proceed to find the correct Threshold. At these extreme settings, it should be clear where you're sharpening noise and other detritus, if at all. The grainier the image, the higher the Threshold has to be. Sports photography probably needs at least a 15. Studio photography of something that doesn't move usually can get by with 0 or 1.

In their eternal search for mathematical verities, calibrationists have been known to suggest that the Radius should depend on the resolution of the scan. This is like saying that the larger a suitcase is, the heavier it will be. There is a kernel of truth there, but the fact is that the contents of the suitcase have a considerable impact, and that a small suitcase filled with lead weighs more than a

How Much Is Too Much? Readers, Author Duke It Out

Certain people appear to consider oversharpening an image as falling somewhere between arson and criminally negligent homicide on the scale of felonies. The phobia is particularly prevalent among professional photographers.

In deciding whether you've gone too far, trusting your instincts can be dangerous. You're a biased observer, because you know how sharpening works and have sensitized yourself to its artifacts. But you have to put yourself in the position of someone who doesn't realize that it's all a digital fraud. You detect the halos in Figure 6.7H because you've seen them in more obvious form right above. Would a casual observer know that Figure 6.7C has sharpening artifacts without having seen the difference masks of Figure 6.6?

Taste in sharpening is quite personal, but there is one reliable test. Whenever a photographer accuses me of oversharpening, I always ask whether any clients have ever rejected any of his images for being too sharp. The response is always an indignant "Certainly not"—almost as decisive as the "Yes" when asked whether they ever reject images as too soft.

Clients complain, sometimes because of an authentic difference of opinion and sometimes because we did poor work, but even if these were nonfactors, they would complain from time to time anyway, because they want to be a part of the creative process. Occasional complaints are inevitable, but if a professional finds that they follow a pattern, corrective action is needed. In 2005, I saw the following interesting online quote from the proprietor of a lab that serves photographers.

"Sharpening is actually a factor in returned prints, the current topic that consumes me. I know photographers live in fear of oversharpening and halos, but I must say that in nearly a million prints shipped, I don't have a record of any being returned for oversharpening (although I've been expecting them in the case of people with shiny skin and on-board flash). In critical portraits, my experience is you can go soft on the sharpening of the skin but the customer expects the eyes and lips to be sharp…We've received roughly 1,000 returned prints for too little sharpening and the customer always concludes our printers aren't good. That means another 9,000 prints were disappointing in terms of sharpness, but the customer didn't complain."

Worrying about oversharpening in a world that doesn't like soft images is like worrying about using LAB to boost colors in a world that hates drabness. If nobody ever complains that your colors are too loud and garish, they aren't loud and garish enough. If nobody ever says that your images are oversharpened, you need bigger numbers in the USM dialog.

The above remarks were unpopular with some of the beta readers. André Dumas, who is a photographer, termed it "a gross simplification of the subject."

He said, "If we are in fact talking about oversharpening, the question should be: has any client ever rejected an image because he didn't like the way it looked? The answer is Yes! And could it be that the image has been sharpened too much and what the client saw was something that he could not quite define but his reaction was: 'I don't know why…but I just don't like it'? Again the answer is Yes!

"Fear of oversharpening is not a phobia; it is a valid concern that good photographers have for very good reasons. My motto, when in doubt undersharpen, you will never kick yourself for it, but oversharpening is gross and will put you to shame."

Beta reader André Lopes, who is a production consultant, not a photographer, adds, "Another point to consider here, especially for retouchers with little experience in using USM: undersharpened images look slightly out of focus, and clients normally blame it on the photographer. Oversharpened images are an undoubted error in retouching and clients will blame it on you."

To the foregoing sentiments, I say fiddle-dee-dee. We are, of course, infinitely tasteful ourselves, but few professionals have gotten rich by assuming that unknown clients are similarly sophisticated. If the clients are consistently dissatisfied, I say move in a different direction.

The point about beginning retouchers is well taken. Experienced retouchers, like me, have had so much practice blaming photographers for our own foulups that we have little doubt we can fob it off again.

larger one filled with clothes. And so it is with images, even if we set aside the obvious point that certain photographs have more grain than others of the same size, and thus cannot be sharpened as much.

Imagine that Figure 6.2 was a woman shown from the waist up, rather than in a tight closeup of the face. One need not be Einstein to realize that this would present an entirely different sharpening problem, because the size of the detailing would not match, even if the two images themselves were of identical resolution.

Before wheeling out a big Radius, we have to be sure that there is nothing in what we are sharpening that has subtle detail, of which big Radii are the enemy.

Small and subtle are not the same thing. An eyelash is small, but not subtle. The variations in the leaves of Figure 6.3 are subtle, but they are not small.

The character of the image, therefore, plays a much bigger role in determining the best Radius than resolution does. Ask yourself, is there fine detail or not?

A person's hair or eyelashes, a wine bottle, the bubbles in a glass of soda: these things want a wide Radius. The bark of a tree, the skin of a fruit, a field of grass, fabric, the grain in wooden objects, all have subtle detail that a large Radius would kill.

Where both kinds of detail appear, we are forced to go with the least common denominator and choose a narrow Radius. Or we need to find a channel that does not have subtle detail. In a face, that's the black.

So, with the woman of Figure 6.2, I was able to use a Radius of 4.0 in the black channel, because as a practical matter, the black contains only the eye area and the hair. And the Amount? 500%, what else. In spite of the horrific oversharpening of Figure 6.2B, Figure 6.2C has more dramatic eyes. If you hit the ball accurately enough, it doesn't matter how hard you hit it.

And as for Amount, as the ancient Romans remarked, de gustibus non est disputandum, which means, if you think 500% was too much, just put in whatever number you like, click OK, and get on with your life.

Shapen, Not Blurred

Back to the question of when to use hiraloam in preference to—or as an adjunct to—conventional. The answer is straightforward: if you see a lot of clearly defined edges, think conventional. If not, think hiraloam.

Two sea pictures illustrate. In each, the original is at left, a conventional sharpen at center, and a hiraloam version at right.

To recapitulate: conventional USM typically employs Radii of .8 to 2.5. Amount settings vary, but values as high as the maximum, 500%, are by no means unheard of.

The hiraloam alternative is a much higher Radius—say 10 to 25. Such an enormous blur will cause devastation unless accompanied by a drastic reduction in Amount—say, to 50% or, rarely, 100%. The result is almost a shaping, not a sharpening. The effect can be pleasing—sometimes. It isn't in Figure 6.8C. All detail in the light areas of the boats has been sunk by a tsunami of lightening. The masts have been improved somewhat, but still, one could easily argue that Figure 6.8A, the original, is better.

The conventional sharpening, Figure 6.8B, has no such problem. It has merrily found, and emphasized, the 25 billion or so edges that litter this image, causing the desired appearance of better focus.

Figure 6.8D is a different story. There's no highlight to blow out, no shadow to plug, and nothing that looks like it needs to have a crisp edge. So, none of the factors that caused hiraloam to make a hash of Figure 6.8C are present. Figure 6.8E, the conventional sharpen, makes the water look grainier, but I like Figure 6.8F better, because it has added shape: the rolling shadows in the waves are

darker, the reflections in the water lighter, all without loss of detail.

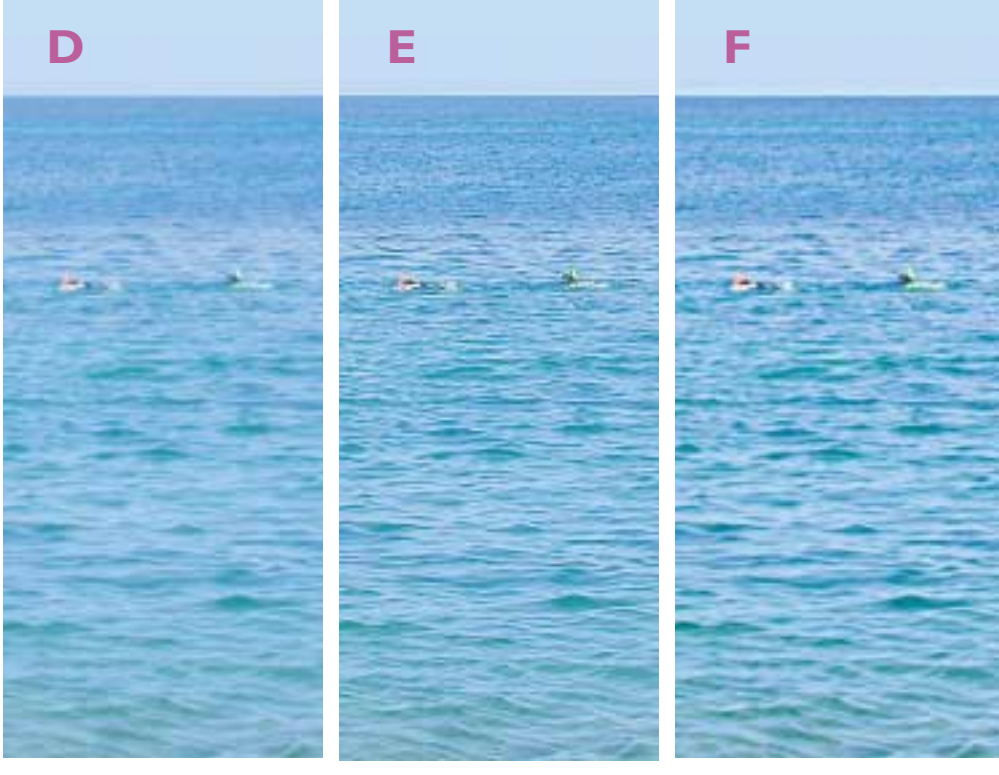
If we tried this shaping method on the palm leaf picture of Figure 6.1, it would lose to conventional again, but not as badly as in Figure 6.8C: the leaves would get lighter and there would be a pleasing darkening of the background surrounding them, but there wouldn't be any of the gain in snap in the leaves themselves.

That's usually how it is. Images where shape-sharpening is unequivocally better are rare, but they happen. Going back to the dozen images used in the last two chapters, only one is a clear case where hiraloam would be better—the Yellowstone sunset of Figure 4.11A.

Sharpening fanatics, however, look for the best of both worlds. Which method is better for the flags of Figure 6.9A?

To answer, we look for hard edges, which are good for conventional, and large areas of similar color, which are good for hiraloam. This image has a little of both. Where clouds meet sky, the edge is indistinct, and conventional sharpening has nothing to offer. Hiraloam is apt to make the

Figure 6.8 *Above center, conventional sharpening works well in emphasizing well-defined edges. But below center, with no real edges apparent, it simply makes the water look grainy. The right-hand versions use hiraloam sharpening; the originals are at left.*



sky darker overall, which is good. But where whites meet reds in the Canadian flag (and similarly in all other flags), the transition is a crisp and immediate one. That calls for conventional USM. Yet the three nearest flags have relatively large blocks of similar color. To get a believable ripple, hiraloam would be better.

Figure 6.9B is conventional USM, done in RGB at settings of 450%, 1.0, 12. The hiraloam competition is in Figure 6.9C, at 50%, 20.0, 12. Both add considerable pop to the original, but in very different ways. Choosing between the two is like choosing between good color and good contrast, or between the spaghetti and the sauce. Successful sharpeners are swinish. We want both.

If you want to combine the two methods, the conventional USM has to come first, as hiraloam may bring out noise just enough for low-radius sharpening to notice it. Also, we need slightly lower settings for each than if they were applied by themselves, as to some extent the two reinforce one another. The result should be something like Figure 6.9D, which combines the crisper flags of Figure 6.9B with the better sky of Figure 6.9C.

Sharpening can be carried to extremes. With an infinite amount of time, you can test a cascade. You might try an *ultra*-high Radius sharpen, say a 100.0 Radius coupled with a 20% Amount, and then do hiraloam and then do conventional. It works sometimes. However, being aware of blending possibilities provides a bigger bang for the buck.

Beware of Presharpening

Applying USM to an image that somebody else has already tried to sharpen can be a frustrating experience. Artifacts of the first sharpening may be pronounced enough that they can't be excluded even with a high Threshold.

The somebody else who does this is nowadays quite likely to be a machine. If you are acquiring images through a camera manufacturer's module or through Camera Raw, light sharpening may be being applied by default. Check for it, and turn it off!

So Much for Newton's Third Law

The introduction of blending modes comes at a fortuitous time. The end of our discussion of the seagull of Figure 6.7 was really the end of the first part of this book. Further adventures lie ahead. They're important, but what got us up to this point is indispensable.

Let's jump ahead, and talk about how we will correct the original shown in Figure 21.1A. Inasmuch as the book has but 20 chapters, it is problematic to steal a glance at something in the 21st, but discuss it we must. How do we propose to correct an image we've never seen of an unknown subject that was shot when we were not present?

I can answer this.

We will try to make it look more like what a human would have seen if the human was in the position the camera was. We will seek out the lightest and darkest significant points and set them to the most extreme values that our process can hold. We will place the most important parts of the image in steep parts of the curve; we will consider whether RGB, CMYK, or LAB is the place to do the work; and we will make an intelligent decision about sharpening.

These rules will be as true for Figure 21.1A as for any other image we have worked on or ever will. If we don't follow them, we can't possibly produce professional work. People who do follow them will beat us every time.

From now on, we'll be looking at methods that work some of the time, but not always. Many of them involve blending, a topic that

Figure 6.9 *(opposite) Different styles of sharpening the original, top. Second from top, a conventional sharpen with a 1.0 Radius. Third from top, an alternate version with a Radius of 20.0 and a low Amount of 50%. Bottom, a version combining the middle two.*

will take us through the next several chapters. Here's a first foray into it.

For every action, said Newton, there is an equal and opposite reaction. While this is good physics, it's bad unsharp masking.

USM compares the original to a blurred copy of itself. Those parts where the original is darker (see Figure 6.6A) are made darker still. Areas where the original is lighter (Figure 6.6C) are lightened more. That equal and opposite reaction needs to be squashed.

In Figure 6.9B, conventional sharpening placed a dark halo in the red areas of the Canadian flag and a light one in the adjoining sky. The two are equally evil. Black lines in a red flag look bad, and so do white ones in a blue sky.

To its left, though, the flag of the province of Ontario sings a different song. Its dark blue can swallow a black line a lot easier than the sky can quaff a white one.

It turns out that there are many such cases, probably even the majority of images, where dark halos are more palatable than light ones. It happens practically any time that a relatively dark object butts a medium-dark one. The concept is so vital to image quality that by 1986, every commercial drum scanner was able to use its massive (for those days) 16K of RAM to control the two kinds of halos on the fly, without going through the shenanigans that Photoshop requires of us two decades later.

The barrel cactus of Figure 6.10A is an example. We can forget about hiraloam; this image is full of well-defined edges, particularly at the business end of those spines, you may take it from someone who once fell into such a cactus in an effort to evade a conversation with a rattlesnake.

Dark halos around these spines are a good thing—they make them stand out. Light halos on the inside are bad, as they wipe out the characteristic dark red.

I offer Figure 6.10B, which required several steps, as a reasonable response. Figures 6.10C, 6.10D, and 6.10E are examples of things to avoid.

Disk space and RAM permitting, it's a good idea to make subjective edits like USM on a separate layer. You can always decide later that you've gone too far, and reduce the layer's opacity. I, in fact, generally go too far *deliberately,* reasoning that I can always reduce the opacity but I can't increase it beyond 100% if I decide that it isn't sharpened enough. We don't ever want to be in the position of having to sharpen conventionally twice, because sharpening an artifact can be deadly.

For the following procedure, the extra layer is not a recommendation but a requirement.

- Layer: Duplicate Layer.
- Give the new layer a stiff jolt of conventional USM. Hiraloam is irrelevant because light hiraloam halos are not usually objectionable, but light conventional ones often are.

Stumbling Blocks: Too Much, Too Soon

•When to sharpen. Generally, one saves sharpening for last, but this rule isn't firm. The reason to avoid sharpening early is that a later curve may exaggerate the halos too much. However, if you think the image needs just minor tweaks, it won't hurt to sharpen beforehand.

•Doesn't sharpening change the highlight/shadow values? Halos can indeed be lighter than normal highlights and/or darker than normal shadows. This means nothing. We choose highlights and shadows not because they are literally the lightest and darkest points of the image but because they are the lightest and darkest *significant* points. A sharpening halo can't be considered significant detail.

•Luminosity blues. Running a couple of chapters ahead, several readers have tried to sharpen a single channel and then use Edit: Fade>Luminosity to avoid color shifts. This is a sensible idea that doesn't happen to work. Instead, sharpen the channel(s) on a new layer set to Luminosity.

For this image I chose robust values of 450%, 1.2, 2. This produced Figure 6.10C, with the predicted dark halos around the spines and deterioration of the color and detail inside them.

The Layers palette has a mode indication to the left of the opacity setting. The default setting is Normal, which means that we see the top layer, not the bottom. The bad news is that there are 22 other possible settings as of Photoshop CS2; the good news is that a dozen of them will be referred to in this book as frequently as *Principia Mathematica,* which is to say, not at all.

Two of the useful ones are Darken and its sister Lighten. They are misnamed; Darken should really be called Don't Lighten. It works exactly as Normal does, except that no pixel is allowed to get lighter. So,

- Set the mode of the top layer to Darken.

The only difference between the two layers is the sharpening halos. The dark halos, being darker than the bottom layer, are preserved, but you may kiss the light halos good-bye, inasmuch as the bottom layer cannot be made lighter anywhere.

We are now at Figure 6.10E. The light halos are completely gone, so the image looks unnaturally dark.

- With the top (Darken mode) layer still active, make another duplicate layer.

The top two layers are now identical sharpened versions, both set to Darken mode. The overall appearance of the image is unchanged.

- Change mode of the top layer from Darken to Lighten (in this instance, changing to Normal would produce an identical result). Doing so doesn't lighten the dark halos, which are the same on the top two layers. It does restore the light halos that were disallowed in the middle layer by Darken mode. Overall appearance has now reverted to that of Figure 6.10C.
- Change opacity of the top (Lighten mode) layer to 50%.

Lightening and darkening have now been separated onto two independently controllable layers. I left Figure 6.10B as is, but could have tweaked the opacity of both sharpening layers further. Another possibility is to use not just different opacities but different sharpenings on the lightening and darkening layers. If the lightening half of the sharpening needs (in effect) a lower Amount, it probably could use a lower Radius as well.

Figure 6.10D is another advertisement for keeping channel structure in mind. It was prepared exactly as above, except all work was done in RGB, whereas Figure 6.10B was converted to CMYK before sharpening. The RGB version isn't bad, but the CMYK seems deeper. Without all this layering, RGB and CMYK sharpening would give almost identical results.

Inkjet and Other Printers

All but the noisiest images improve with judicious sharpening. The form of output, though, determines how much to use. This chapter has assumed offset printing. Here are three common variants, in order of poorest to best print quality.

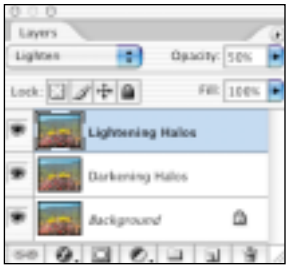
- **Newspaper printing** is so inherently low-contrast that it calls for a heavier hand with USM, especially in the Amount field. Newsprint doesn't facilitate bright whites or rich blacks, so halos are less visible.
- Treatment of **large-format printers** depends on the use of the product. If it will be viewed at a distance, sharpening can be quite heavy. But if it also may be viewed closely (for example, if it is posted at a bus stop), you may wish to reduce the Radius.
- Inkjet and other **photo-quality printers** produce a softer look than offset, so in principle they can be sharpened more. However, they also support whiter whites and darker blacks. This combination suggests a slightly higher Radius, and lower Amount, than you would use for offset printing.

And, of course, if somebody else will correct the file after you're done with it, you shouldn't sharpen at all.

A Few New Wrinkles

USM offers extraordinary opportunities both to improve believability and to mess up the image beyond recognition. Its dangers can be finessed, provided we are willing to treat unsharp masking as a stiletto, not a shotgun. Photoshop can do everything we need, but sometimes requires kludgy two- or three-step operations that would not be necessary with a better implementation.

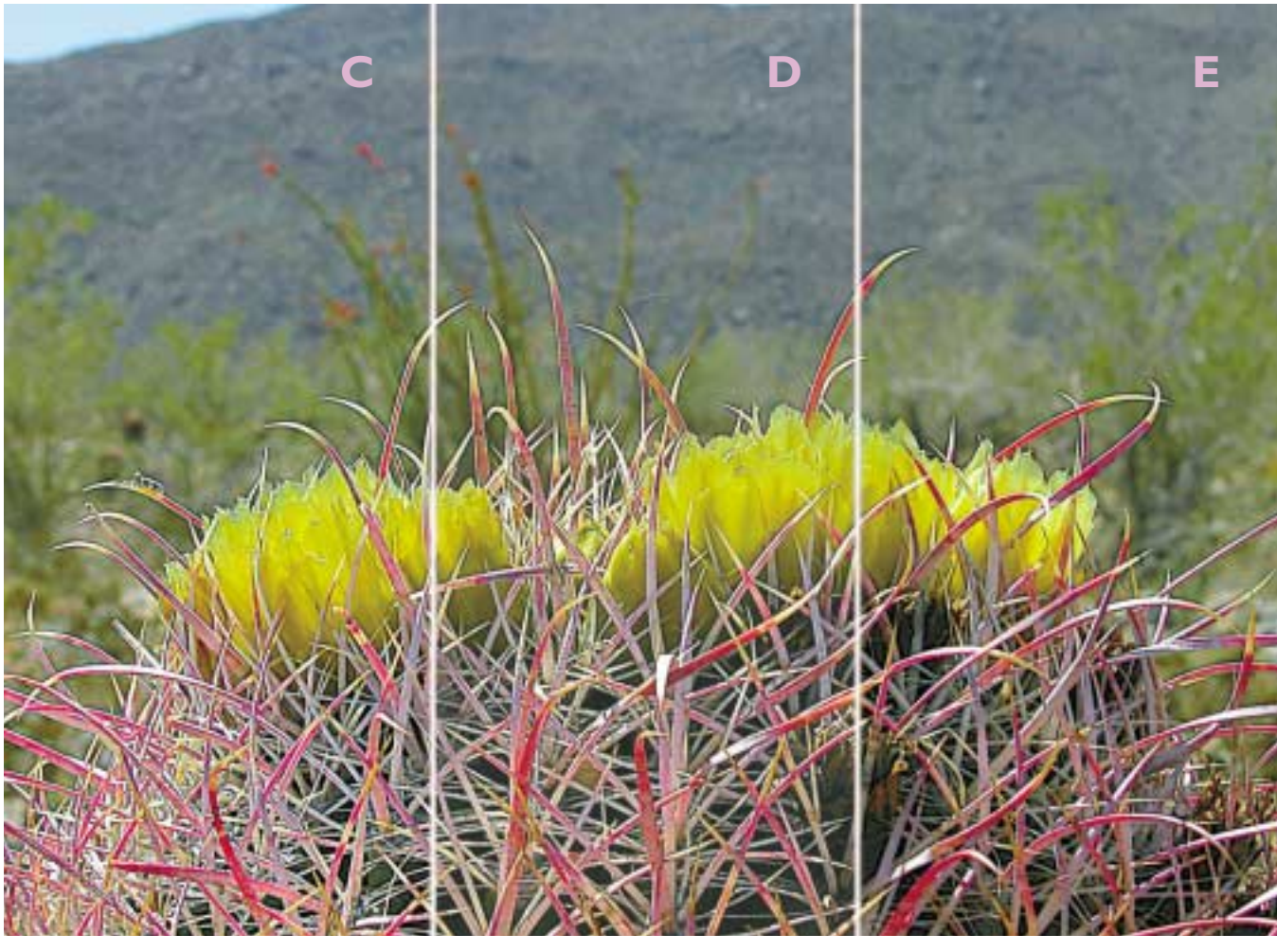
To put everything in, as it were, better focus, let's return to the cause of the worst catastrophe of the chapter. As noted back then, facial images, particularly those of women, are a real minefield, because any detail we bring out in the skin is likely to be something that the model wants us to see about as much as love handles or varicose veins. Figure 6.2B proved the point.



And yet a certain amount of USM is clearly wanted. Check out Figure 6.11 for an illustration of how makeup artists and drum scanner operators think alike.

There are two distinct faces and two distinct styles of sharpening going on in both, the two kinds discussed in this chapter. The whites of the eyes are of course lighter than skin, so they need a dark halo. It would also be nice to get a light halo inside the eye, but the cosmetics industry hasn't yet figured out how to accomplish that; give them time and they'll probably do it with Botox.

Figure 6.10 *Opposite top, the original. Opposite bottom, a version sharpened by emphasizing darkening more than lightening halos. Below, C uses the same sharpening settings as version B, but with no reduction of light halos. E is the same image with the light halos removed completely. D is an RGB repetition of the steps done in CMYK to produce version B.*



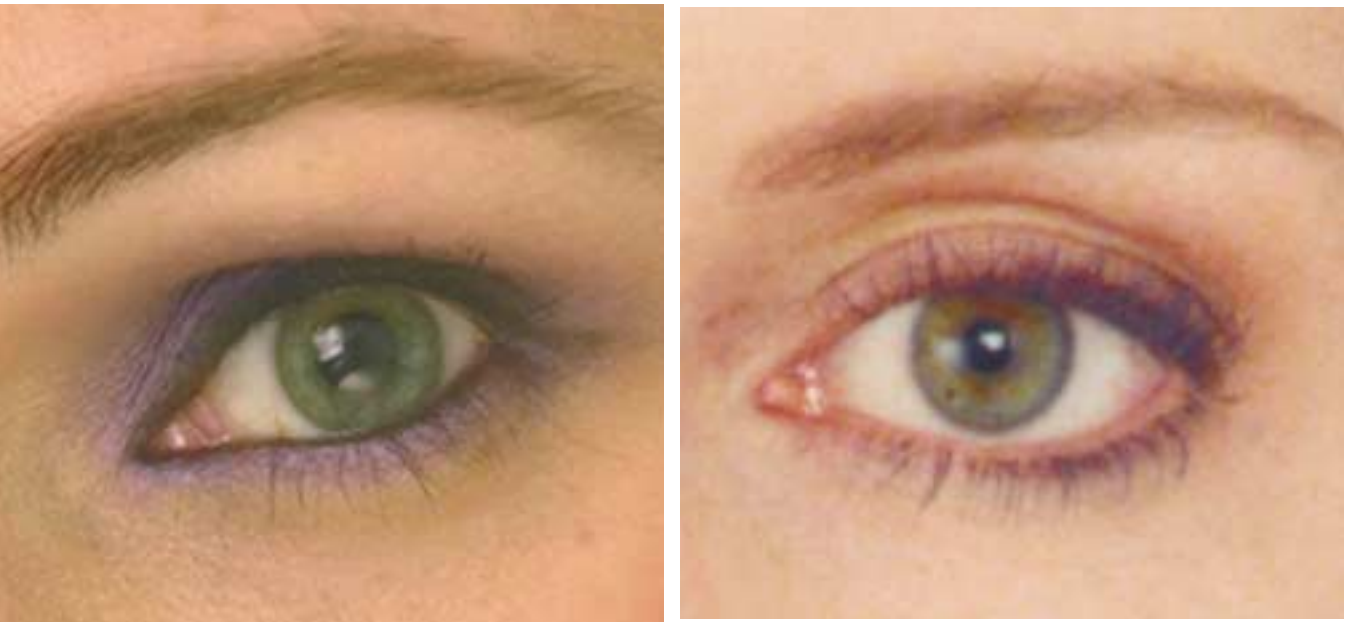


Figure 6.11 *Makeup applied to studio models parallels the use of USM. As the eyes are lighter than their surroundings, dark halos are desirable at their outside edges. The strong, relatively narrow application of eyeliner and mascara emulates conventional sharpening. The subtler, much wider haloing of the eye shadow has the same goals as hiraloam sharpening.*

Eyeliner and mascara correspond to conventional sharpening. They accentuate the edge with a pronounced, nearly black, narrow line. Halos created by eye shadow, however, are much subtler and much wider. They accomplish exactly what hiraloam sharpening is supposed to.

In spite of the presharpening makeup, we still use USM on the black to try to accentuate the eyes even further. When working with a man's face, and we'll end this chapter with one, we sharpen even more. A certain amount of roughness is acceptable in a man's face. Also, men do not give us a head start by wearing eyeliner, mascara, and eyeshadow, at least not right now, but again, just give the cosmetics industry time.

This color-corrected image arrives in CMYK. The procedure with faces should be hiraloam first, conventional to the black channel next; discussion of what to do if you can't use CMYK to be deferred.

I reiterate an earlier suggestion that the easiest way to find the proper Threshold and Radius is to work on a wildly exaggerated version. For hiraloam purposes, the final

Other Sharpening Filters

Photoshop features half a dozen sharpening filters other than the workhorse USM. The most interesting by far is Image: Adjustments>Shadow/Highlight, which was introduced in Photoshop CS. Most see this command as a method of opening shadow and/or highlight detail, but, as we will see when we give it serious study in Chapter 18, it has much in common with USM.

The filters Sharpen, Sharpen More, and Sharpen Edges, found along with USM under Filter: Sharpen, are greasy kid stuff. Non-beginners should stay away.

In the same subcategory is Smart Sharpen, introduced in Photoshop CS2. It grafts pieces of the Shadow/Highlight command onto the existing USM filter. The Amount and Radius are there, but the critical Threshold field is inexplicably missing, leaving a filter of limited utility. The real need is for independent control of light and dark halos throughout the range. USM is arguably Photoshop's most important filter, so it's hard to accept that it lacks a major capability that has been standard in the printing industry for 20 years.

Some people also sharpen by creating a new layer, applying Filter: Other>High Pass, and setting the layer to Overlay mode. At typical Radius settings for this filter, the result is substantially the same as with hiraloam USM. In addition to requiring extra steps, High Pass sharpening lacks a Threshold. Also, it's hard to pick the correct Radius because we can't exaggerate the Amount setting as in Figure 6.7G. Therefore, if you use this particular kludge, you should switch to straight hiraloam.

Amount is likely to be between 25% and 75%, but if we set it to the obscene 500% we'll be able to see a lot more of what's happening. To that, I add a 5.0 Radius. Figures 6.12A–C now test the impacts of Thresholds of 0, 10, and 20.

This man's skin has several natural red spots. It also features whiskers. No Threshold is going to be high enough to exclude them. However, we don't want to accentuate wrinkles and pores, as Figure 6.12A does. Figure 6.12B is a lot more like it. Figure 6.12C makes the whole face look unnaturally soft in comparison to the rest of the overly sharpened image. I judge that the truth should lie somewhere in the middle. Aggressive sharpeners tend to be lucky in print, so I tempted fate with my final choice.

With the Threshold thus locked into 13, Figures 6.12D–F present Radii of 25.0, 50.0, and 75.0. Figure 6.12D gives the man bags under his eyes and not much else. The huge Radius of Figure 6.12F lightens almost the entire face. We're trying to add shape. Figure 6.12E seems just about right. Two settings down, only the easy one to go.

In finalizing a hiraloam Amount, we key on the areas that may be lightened excessively. Here, we pay special attention to the teeth, the whites of the eyes, the end of the nose, and the top of the forehead. These are all understandably blown out in Figure 6.12E; our job is to make sure the final setting undoes that peccadillo. I chose an Amount of 45% to go with the 50.0 Radius and 13 Threshold. We have reached Figure 6.13B. Note that there appears to be no damage to the skin.

Figure 6.12 *Before sharpening a face, use 500% Amount to evaluate how high to set Threshold (three trial settings at right) and, after finalizing it, Radius (below).*

On the other hand, while it's shadowed the eyes attractively, it doesn't add the digital eyeliner and mascara we want. For that, the black is needed, but before getting to it we need a duplicate layer—that is, two copies of this hiraloam version on top of one another.

Ordinarily one works on the top layer; this time, although Photoshop offers other ways to do the same thing, the easiest way is to work on the bottom. So, in the Layers palette, click the bottom layer to activate it, and also click off the eye icon on the top layer so that what you're doing on the bottom won't be hidden by the top layer.

On this bottom layer, activate only the black, with the keyboard shortcut Command–4 or by clicking black in the Channels palette. You may also wish to click the CMYK eye icon to be able to watch the composite picture change during the time that you are only permitted to work on the black.

For this conventional sharpen, I found that a Threshold of 5 was needed to avoid giving the man a serious five-o'clock shadow. I used a 3.0 Radius, which is thick for conventional USM, and 500% Amount. That puts us at Figure 6.13C.

Darkening halos are preferable to lightening ones not just in overall sharpens of cacti, but in maneuvers with the black. You have to like what's happening to the eyes in Figure 6.13C, but the hair is problematic. If you agree with me that the black sharpen has made certain areas weirdly light, then it's time to activate the top layer, on which is a copy of Figure 6.13B. We set it to Darken mode, meaning that all the darkening being done below is retained, while all lightening is disallowed. Then we cut the opacity to 50%, bringing back half of the lightening. That's Figure 6.13D. We might have tried the same maneuver, or some equivalent, back in the last sharpening of hair, Figure 6.2C.

Location, Location, Location

In large images, judicious USM is every bit as potent as the other big weapons in the retoucher's arsenal: appropriate highlights and shadows, good allocation of contrast, and careful use of the black plate.

In smaller images, the various USM options aren't as important. Small images do need sharpening, don't get me wrong, but the exact setting won't make or break quality the

Review and Exercises

- ✓ In Figure 6.3B, the version sharpened in the L of LAB, the leaves did not change color. Can you explain, though, why they are so much *lighter* than the leaves of either of the other versions?
- ✓ What is the normal reason for deciding to sharpen only one or two channels in CMYK, rather than doing an overall sharpen in any convenient colorspace?
- ✓ What is the difference between conventional sharpening with a high Radius setting, and hiraloam sharpening? What are the principal dangers of each?
- ✓ Open a dozen or so random images from your own collection. Make a chart, and for each one say whether you would sharpen conventionally, hiraloam, both, or not at all. For those you would sharpen conventionally, state whether you would do so overall, in single channels, and/or with darkening halos emphasized more than lightening ones. Add up the results and see which method seems most common. Is there anything unusual about the types of images you work with that would suggest that other people might use other methods more frequently?

Figure 6.13 *Above left, the original. Above right, with hiraloam sharpening applied based on the results of Figure 6.12. Below left, after duplicating the hiraloam version to a new layer, heavy conventional USM is added to the black channel only. Below right, the original hiraloam version is applied to the hiraloam/black version at 50% opacity, Darken mode.*

way it will in large ones. Yet, almost all existing documentation illustrates the USM options with images the size of postage stamps.

The thumbnail approach is common because it's expensive to print large color pictures in books and magazines. I have that limitation here, too—note the excruciatingly tight crops to make everything fit—but it's just too hard to see the detail otherwise. Remember, if these images were printing larger, the sharpening defects would be even more evident than what you see here.

Also, unlike most other areas of color correction, here we really have to rely on the monitor to figure out whether our sharpening settings are sufficient or whether we have gone overboard. That's a tall order, since the phosphors of a monitor don't correspond to the realities of either desktop printers or presses. We have to make the best of it, though, by being resolution-savvy. First of all, we should view the image in Photoshop at 100%. Lower magnifications are unreliable on most monitors; higher ones cause needless ulcers by seeming to display defects that will not be visible in print.

More important, though, if our file departs from the normal rules of resolution, we need to make an adjustment for it in our minds. Normal resolution, experts agree, is between 1.5 and 2 times the screen ruling, times the magnification percentage. This book, for example, uses a 150-line screen, so normal resolution for my digital file is between 200 and 266 pixels per inch. The images here are all around 240, and I am printing them all at 100% magnification. If I were printing one at 75% magnification, that would result in a higher effective resolution (240/.75=320).

When resolution is higher than normal, or if output is to an inkjet printer, the printed image will appear markedly softer than it will on the monitor. When resolution is lower than normal, the printed image will appear harsher. Be warned! If, as so many people do, you scan at 300 pixels per inch regardless of the screen ruling, your monitor will be lying to you about how effective your USM is.

Above all, in USM, be greedy at all times. Remember the strategy of asking for a raise. There's no fixed limit. The best amount of sharpening is the largest one you can get away with.

The Bottom Line

The Unsharp Mask filter adds apparent focus by introducing artifacts that the viewer interprets as crisper transitions. Careful control of the filter's settings is essential to avoid making the artificiality of the procedure obvious.

The sharpening approach is determined not by size or resolution but by the character of the image. Images dominated by a single color should be sharpened in their light channels rather than overall. Objects that don't have strong edges should be sharpened with a high Radius, low Amount (hiraloam) setting.

Images in this chapter are sharpened aggressively so that you can see what the technique does. In all likelihood you would want to reduce these settings somewhat in real work. When disk space and RAM permit, it's advisable to do the sharpening on a layer so that its intensity can be adjusted after the fact.