6.098 Digital and Computational Photography
6.882 Advanced Computational Photography

How to Take/Make Better Pictures

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MIT - EECS

Poisson image editing

- **Two aspects**
  - When the new gradient is conservative:
    Just membrane interpolation to ensure boundary condition
  - Otherwise: allows you to work with non-conservative vector fields and
- **Why is it good?**
  - More weight on high frequencies
    - Membrane tries to use low frequencies to match boundaries conditions
  - Manipulation of the gradient can be cool
    (e.g. max of the two gradients)
    - Manipulate local features (edge/gradient) and worry about global consistency later
- **Smart thing to do: work in log domain**
- **Limitations**
  - Color shift, contrast shift (depends strongly on the difference between the two respective backgrounds)

Other functionals

- **I lied, some people have used smarted energy functions:**
  Todor Georgiev's initial implementation of the Photoshop healing brush.

Plan

- **How can you improve?**
  - Critique
  - Look at good pictures
  - Be critiqued
  - Missions
  - Find something you like
- **20 tricks**
- **Composition**
  - Viewpoint
  - Rule of thirds
    - Harmonic analysis
  - Background, clutter
  - Gaze, saliency
  - Gestalt
- **Photos that "pop"**
- **Portrait**
  - Lighting
  - Makeup
  - Digital makeup

What do I know about good pictures?

- **Not much: amateur photographer, mostly birds and candid portraits**

Is there a science of aesthetic?

- **Well, that's an interesting question…**

Are there rules of aesthetic?

- **Well, that's an other interesting question…**

View it as a vocabulary to talk about pictures

- **It's like wine: you describe taste with lots of poetic and metaphorical words**
- **It does not matter if they're meaningful**
- **It gives you a support to think about it**

- **If you don't need it: good for you, ignore what I say**

Computational photography

- **When studying good photography principles & techniques, you might want to wonder:**
  - Can we automate ?
  - Can we facilitate? Provide easier manipulation tools?

  - What are the dimensions of variation, what "aspects," or "components" of images are important

How to improve?

Take pictures, critique your pictures

- **And get them critiqued**

Look at good pictures!

Copy photographs

Check out the web

Missions

- **Give yourself a theme, constraints**
- **Look at contests online:**
  - http://www.dpchallenge.com/
  - http://www.fredmiranda.com/
  - http://www.nyip.com/sub_idx_pgs/contestidx/wrldwide.php
- **Work with friends, critique**

Tips

Technical points

- **Know your equipment**
- **Understand the parameters**
  - Shutter speed, aperture, focal length, depth of field
  - Debrief your photos, look at the EXIF metadata
  - See Lecture 2 & Eric Chan's slides: http://people.csail.mit.edu/ericchan/tmp/photo-2005-11-11-ec.pdf
- **Check your exposure**
  - Histogram, blinking highlights
  - Unless you shoot HDR
- **Sharpness matters**
  - Choose the right shutter speed
  - Use a tripod
  - Image stabilization rocks
  - Focus on the appropriate thing
- **Optics matters**
  - Use a good lens
  - Put the hood on

42 advice

- **Collected from random books,**
- **Just guideline**
- **When you do an effect, exaggerate. No middle ground. In particular, if you break one of the advice after, do it frankly**

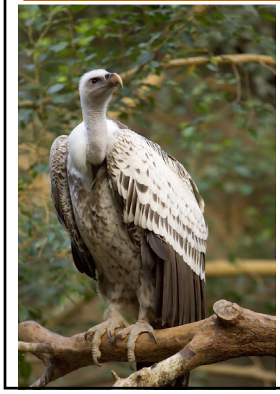
- **Don't just take photos, edit them, study what went well, what's wrong**

Composition

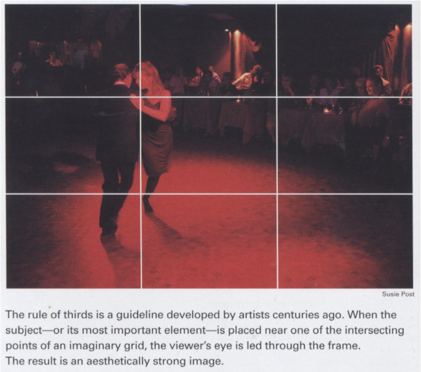
- **Find a center of interest**
- **Don’t center everything (e.g. rule of the thirds)**
  - Careful with autofocus
- **Change your viewpoint, move your feet!**
  - Get close (if you can’t get it good, get it big [John Shaw])
  - Try unusual viewpoints
- **Try different focal lengths**
  - Telephoto, wide angle
  - Focal length allows you to control the relative size of elements at different depth (moon in particular)
- **Careful what you cut off**
  - Sweep edges of frame
- **Build on lines and curves**
  - But careful with near-parallelism
  - Careful with converging perspective
- **Include framing elements**

Framing

Don’t center



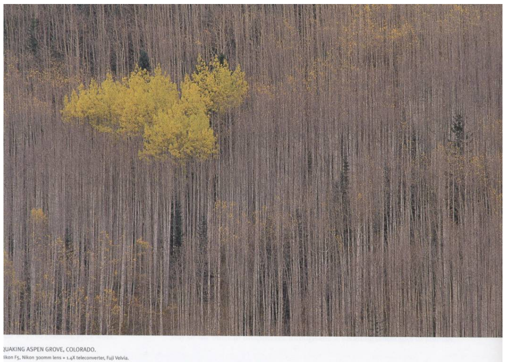
Rule of the thirds



Susie Post

The rule of thirds is a guideline developed by artists centuries ago. When the subject—or its most important element—is placed near one of the intersecting points of an imaginary grid, the viewer's eye is led through the frame. The result is an aesthetically strong image.

National Geographic Photography field guide

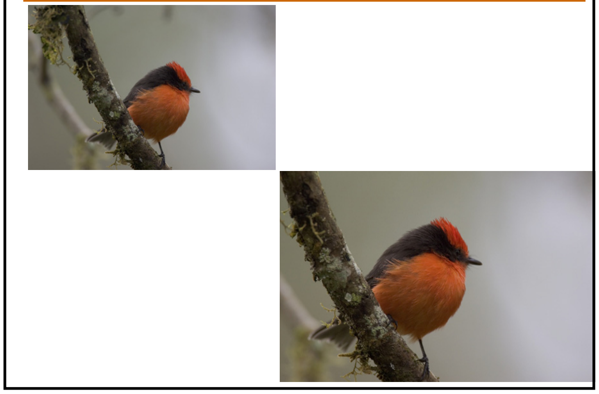


QUAKING ASPEN GROVE, COLORADO.

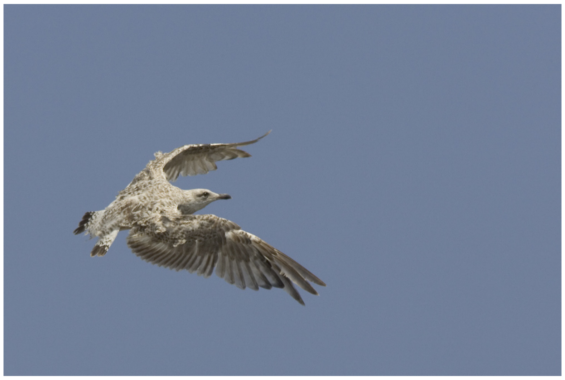
Nikon F5, Nikon 300mm lens + 1.4X teleconverter, Fuji Velvia.

Photo John Shaw

Don’t center: Crop

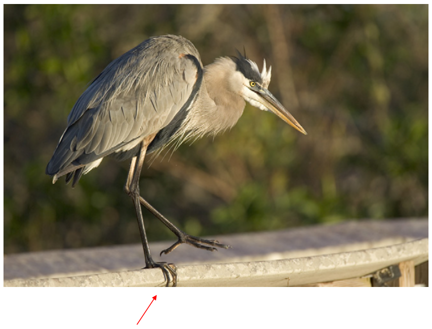


Don’t center, especially for motion

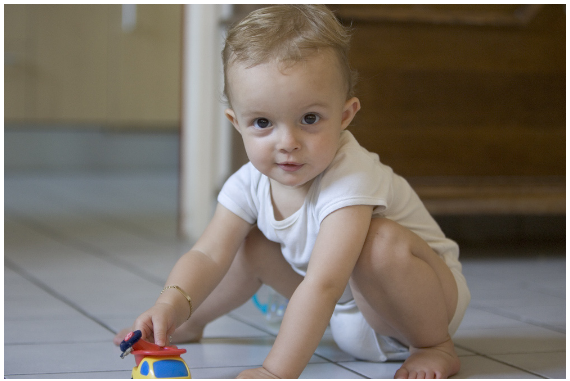


Sweep the frame to check for trouble

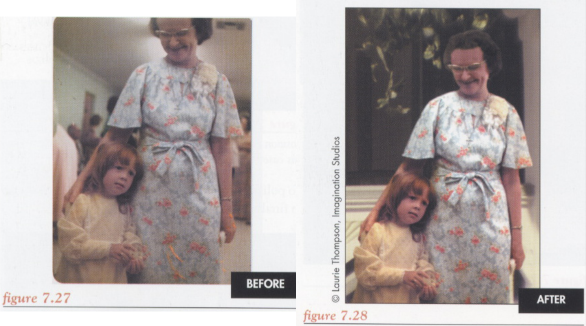
- Cropped element, distracting object, non-parallel line



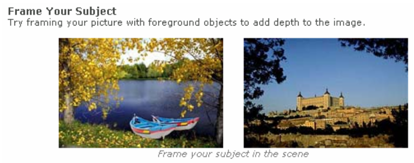
Careful with frame edges



Photoshop


BEFORE
figure 7.27
© Laurie Thompson, Imagination Studios
AFTER
figure 7.28

Frame your subject



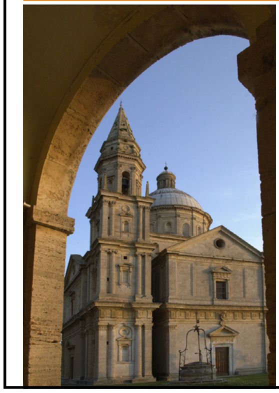
Frame Your Subject

Try framing your picture with foreground objects to add depth to the image.

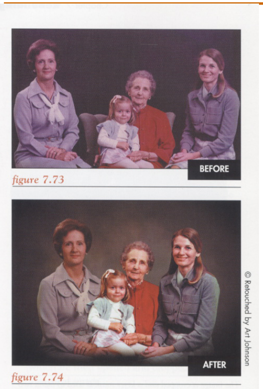
Frame your subject in the scene

http://www.fotofinish.com/resources/centers/photo/takingpictures.htm

Use natural frames



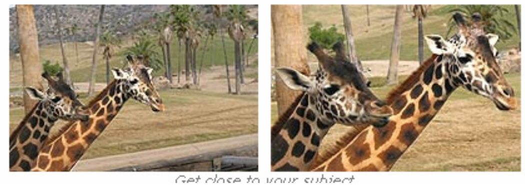
Tighten the composition (Photoshop)



Viewpoint, perspective, focal length

Get close

- Our eyes tend to “zoom” and forget how small the subject is
- or crop (but then you lose resolution)


Get close to your subject

http://www.fotofinish.com/resources/centers/photo/takingpictures.htm

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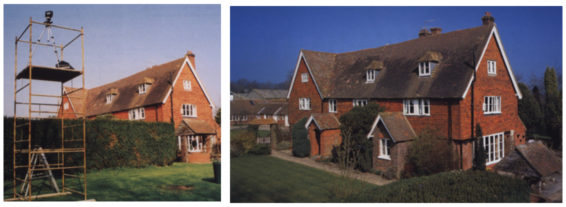
Viewpoint

- High viewpoint



Use unusual viewpoints

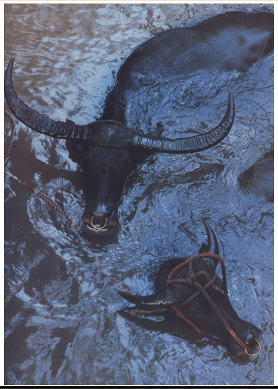
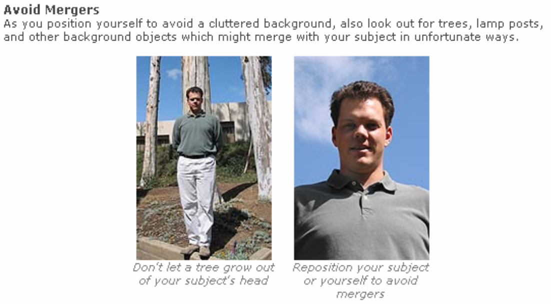


Photo National Geographic

Avoid accidental alignment


Avoid Mergers

As you position yourself to avoid a cluttered background, also look out for trees, lamp posts, and other background objects which might merge with your subject in unfortunate ways.

Don't let a tree grow out of your subject's head

Reposition your subject or yourself to avoid mergers

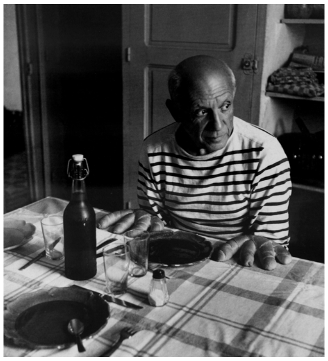
http://www.fotofinish.com/resources/centers/photo/takingpictures.htm

Avoid accidental alignment…

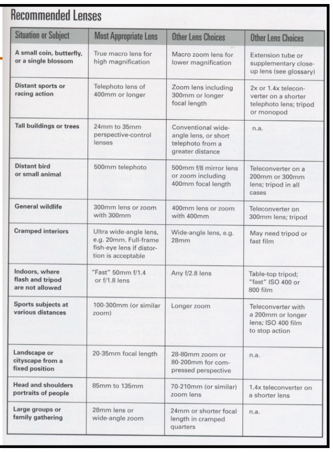
- Unless you mean it

Special effects

- In general, accidental alignments are bad



Lenses



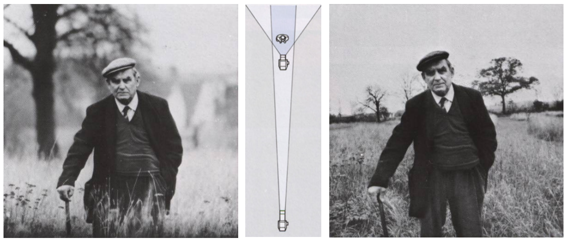
Recommended Lenses

Situation or Subject	Most Appropriate Lens	Other Lens Choices	Other Lens Choices
A small coin, butterfly, or a single blossom	True macro lens for high magnification	Macro zoom lens for lower magnification	Extension tube or supplementary close-up lens (see glossary)
Distant sports or racing action	Telephoto lens of 400mm or longer	Zoom lens including 300mm or longer focal length	2x or 1.4x teleconverter on a shorter telephoto lens; tripod or monopod
Tall buildings or trees	24mm to 35mm perspective-control lenses	Conventional wide-angle lens, or short telephoto from a greater distance	n.a.
Distant bird or small animal	500mm telephoto	500mm f/8 mirror lens or zoom including 400mm focal length	Teleconverter on a 200mm or 300mm lens; tripod in all cases
General wildlife	300mm lens or zoom with 300mm	400mm lens or zoom with 400mm	Teleconverter on 300mm lens; tripod
Cramped interiors	Ultra wide-angle lens, e.g. 20mm. Full-frame fish-eye lens if distortion is acceptable	Wide-angle lens, e.g. 28mm	May need tripod or fast film
Indoors, where flash and tripod are not allowed	"Fast" 50mm f/1.4 or f/1.8 lens	Any f/2.8 lens	Table-top tripod; "fast" ISO 400 or 800 film
Sports subjects at various distances	100-300mm (or similar zoom)	Longer zoom	Teleconverter with a 200mm or longer lens; ISO 400 film to stop action
Landscape or cityscape from a fixed position	20-35mm focal length	28-80mm zoom or 80-200mm for compressed perspective	n.a.
Head and shoulders portraits of people	85mm to 135mm	70-210mm (or similar) zoom lens	1.4x teleconverter on a shorter lens
Large groups or family gathering	28mm lens or wide-angle zoom	24mm or shorter focal length in cramped quarters	n.a.

National Geographic Photography field guide

Perspective vs. viewpoint

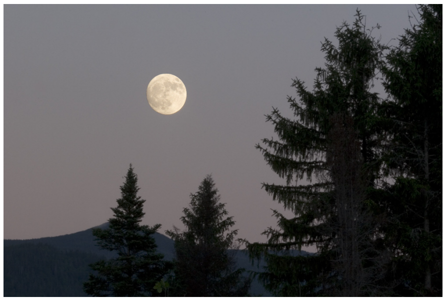
- Focal lens does NOT ONLY change subject size
- Same size by moving the viewpoint
- Different perspective (e.g. background)



Snapshot-**Perspective**-Speed, aperture-Filter-Lighting-Processing & Print-Make up-Retouching

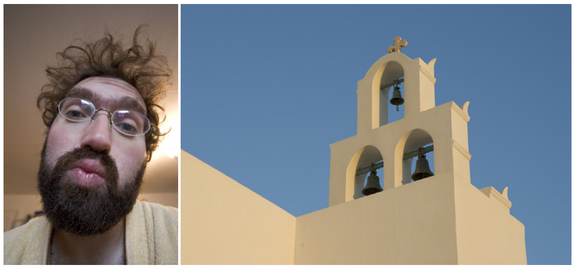
Focal length & composition

- With the focal length, you control the relatvie size of objects at different depths

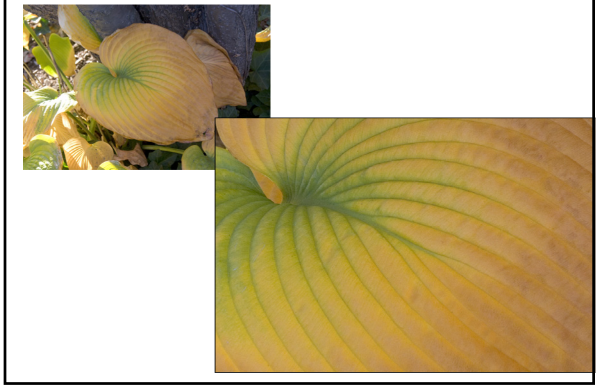


Try unusual focal length

- Wide angle for portrait
- Telephoto for landscape & architecture

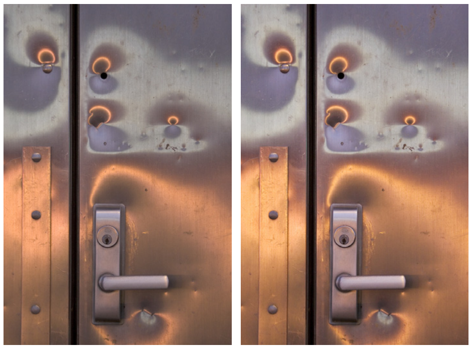


Isolate detail (crop)

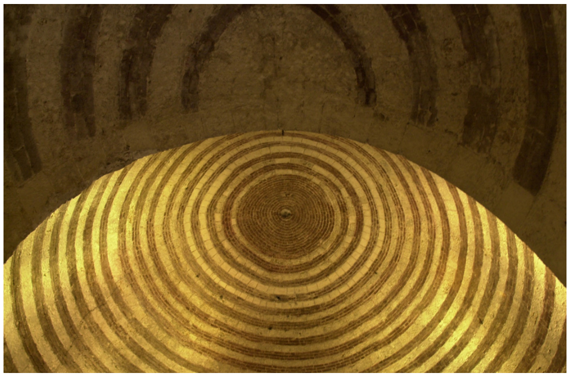


Isolate detail

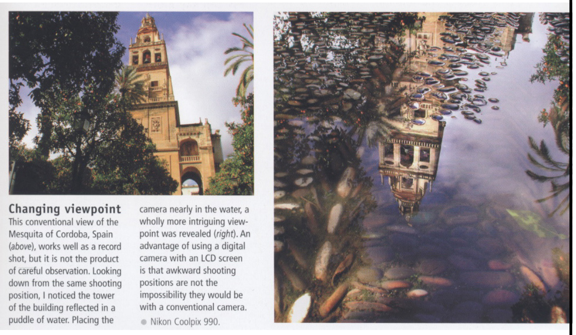
+ boost colors with curves



Detail/pattern



Play with reflections



Changing viewpoint
This conventional view of the Mesquita of Cordoba, Spain (*above*), works well as a record shot, but it is not the product of careful observation. Looking down from the same shooting position, I noticed the tower of the building reflected in a puddle of water. Placing the camera nearly in the water, a wholly more intriguing viewpoint was revealed (*right*). An advantage of using a digital camera with an LCD screen is that awkward shooting positions are not the impossibility they would be with a conventional camera.

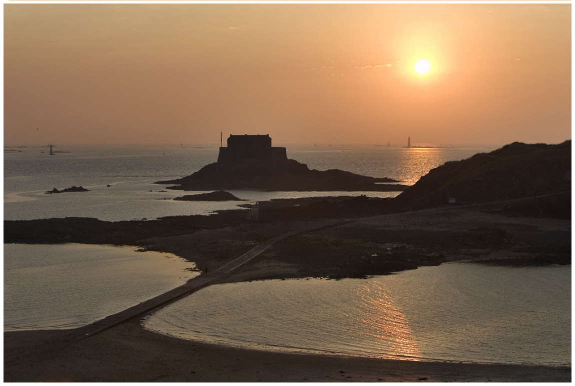
● Nikon Coolpix 990.

From Digital Photographer's Handbook

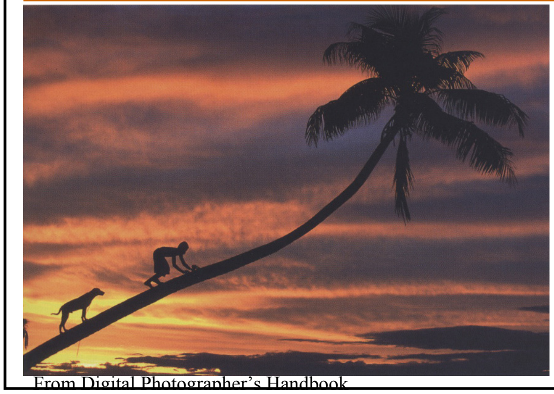
A little bit of geometry

- **Build on lines, curves, convergence, and repetition**

Build on lines

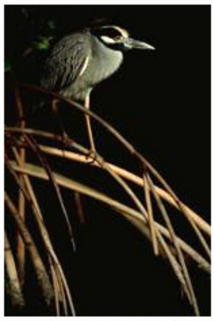


Build on lines and curves



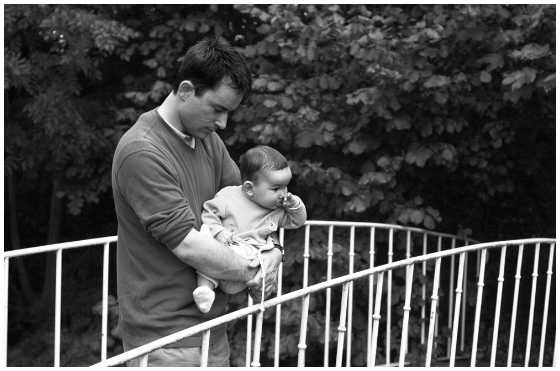
From Digital Photographer's Handbook

Build on lines and curves



Yellow-crowned night heron
© 1999, Joe and Mary Ann McDonald

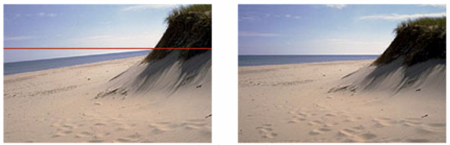
Build on lines and curves



Warning: near-parallelsim

- **In particular, keep horizon level**
- **Use crop with rotation to fix this**

Don't let lines unintentionally throw your photo off balance. When you shoot the horizon or a building, keep the straight lines level—unless you're shooting at a dramatic, intentional angle.



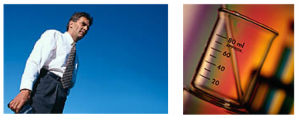
Keep the horizon level

http://www.fotofinish.com/resources/centers/photo/takingpictures.htm

Try unusual angles

Try Unusual Angles

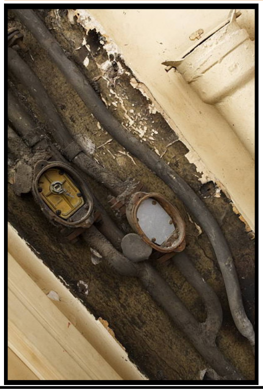
Be bold! Try turning your camera to 45 degrees before snapping a picture. Or instead of snapping it from eye level, kneel down or lie on the ground to get a more interesting shot.



Take a picture from an unusual angle

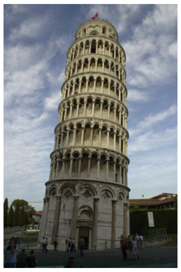
http://www.fotofinish.com/resources/centers/photo/takingpictures.htm

Unusual angles



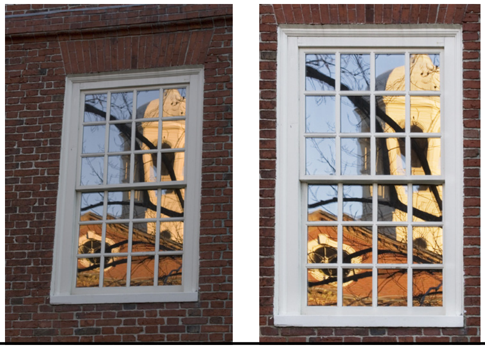
Avoid near-parallel lines…

- **Unless you mean it**

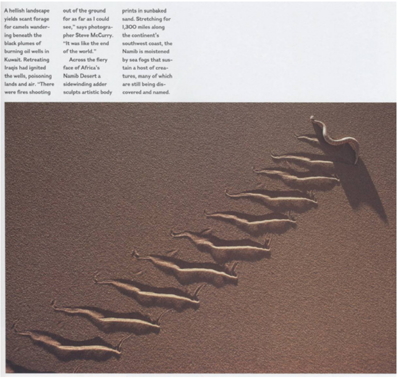


Correct perspective (perspective crop)

+ you control reflection and perspective independently



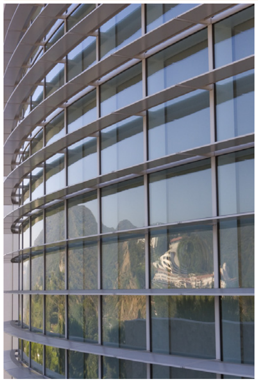
Look for patterns



A hellish landscape yields scant forage for camels wandering beneath the black plumes of burning oil wells in Kuwait. Retreating Iraqis had ignited the wells, poisoning lands and air. "There were fires shooting out of the ground for as far as I could see," says photographer Steve McCurry. "It was like the end of the world."

Across the fiery face of Africa's Namib Desert a sidewinding adder sculpts artistic body prints in sunbaked sand. Stretching for 1,300 miles along the continent's southwest coast, the Namib is moistened by sea fogs that sustain a host of creatures, many of which are still being discovered and named.

Look for patterns

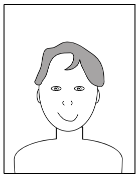


Background, clutter

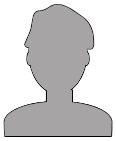
- **Pay attention to negative spaces**
  - Accidental alignments
  - Cluttered background
  - Sweep the edges of your frame
- **Manage depth of field**
- **Simplify composition**

Negative space

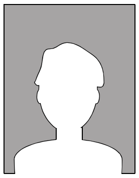
- **The ground defines the negative space**
- **Usually overlooked**
- **Fundamental for balance**
  - Also for typography



picture



figure

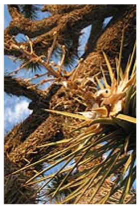


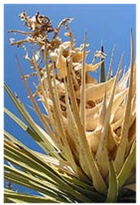
negative space

Avoid cluttered background

- **Again, move your feet**

Avoid Cluttered Backgrounds
Don't let a cluttered background overwhelm or obscure your subject. Move around, or lie down, to get a clear shot at your subject without the distractions.


A cluttered background can obscure your main subject


Reposition your subject or yourself

Photoshop

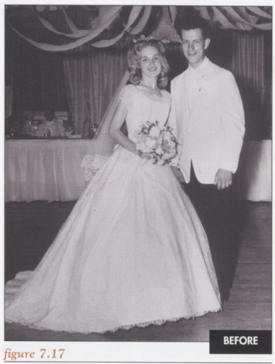


figure 7.17

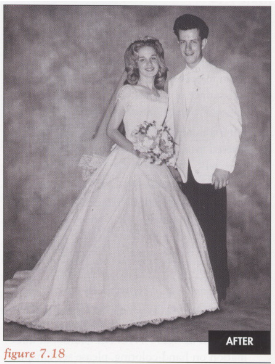


figure 7.18

© Laurie Thompson, Imagination Studios

Photoshop

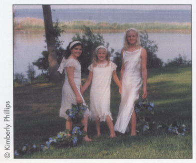

© Kimberly Phillips

figure 9.5
Examining the original image reveals distracting elements.

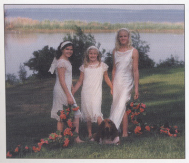
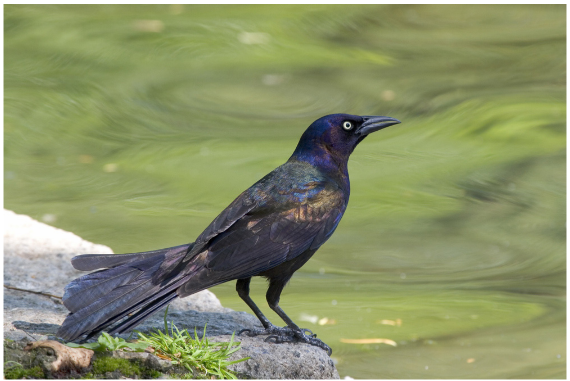
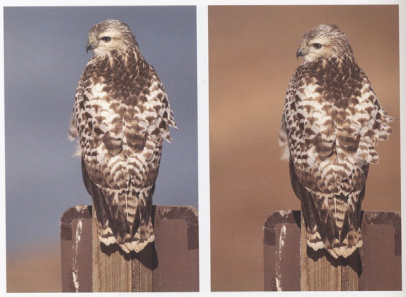


figure 9.6

Negative spaces (& Bokeh)



Making the Subject Pop



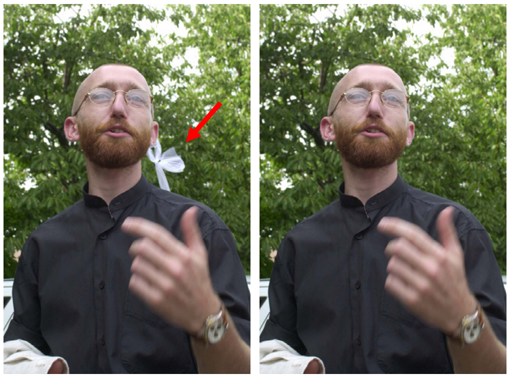
Photos above:
Swainson's Hawk.
Photos captured by D1H,
600mm f/4D ED-IF AF-S
with TC-14E,
on Lexar digital film.

creating one big, blue slate. Close observation may reveal a background reflection of whatever is immediately behind the water, which could be dark shrubs, trees, a bank, and even clouds. This changes the reflection, giving depth and

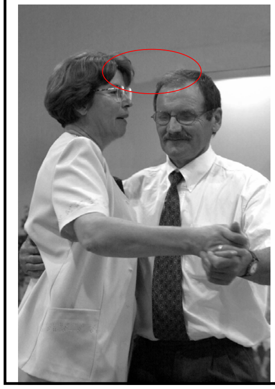
The contrary is true as well. The background can squelch a great waterfowl or shorebird photograph. The busy patterns of reflected reeds, tangles of cordgrass, or intertwined tree branches can interfere with a subject as effectively as the real

Photo Moose Peterson

Distracting background

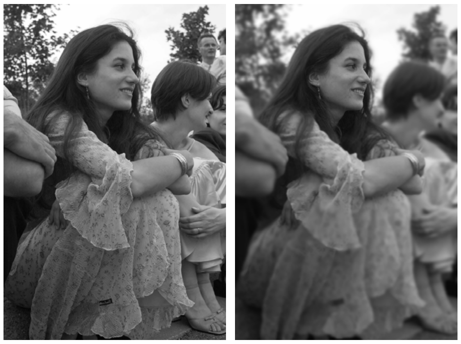


Get rid of exit signs

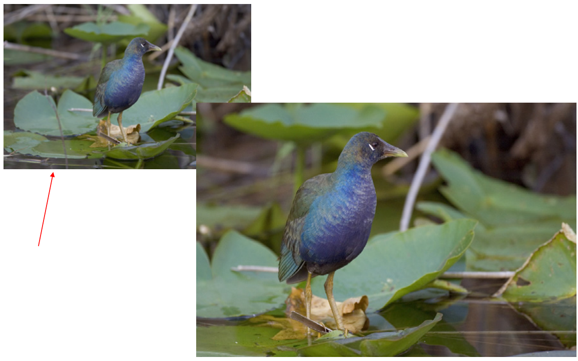


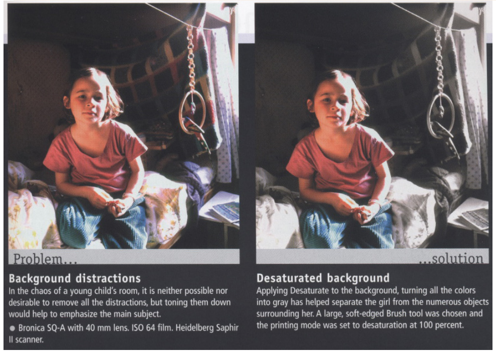
Isolate using blur

- **Don’t over-do it**



Simplify, crop, clone/healing brush





Problem…

…solution

Background distractions

In the chaos of a young child’s room, it is neither possible nor desirable to remove all the distractions, but toning them down would help to emphasize the main subject.

● Bronica SQ-A with 40 mm lens. ISO 64 film. Heidelberg Saphir II scanner.

Desaturated background

Applying Desaturate to the background, turning all the colors into gray has helped separate the girl from the numerous objects surrounding her. A large, soft-edged Brush tool was chosen and the printing mode was set to desaturation at 100 percent.

From Digital Photographer’s Handbook

Light & color

- **Avoid harsh light… unless you want to play with shadows**
- **Sunrise & sunset are best**
- **Avoid direct flash**
- **Cloudy days are great as long as the sky is not in the picture**
- **For sunny days, shade areas are best**

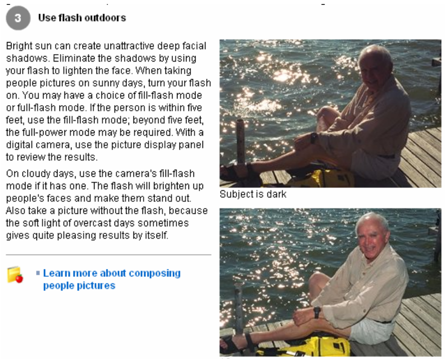
- **Use polarizers to reduce highlights, enhance colors**

Try black and white

It’s cool

It might address confusing/messy colors

Add fill-in



③ **Use flash outdoors**

Bright sun can create unattractive deep facial shadows. Eliminate the shadows by using your flash to lighten the face. When taking people pictures on sunny days, turn your flash on. You may have a choice of fill-flash mode or full-flash mode. If the person is within five feet, use the fill-flash mode; beyond five feet, the full-power mode may be required. With a digital camera, use the picture display panel to review the results.

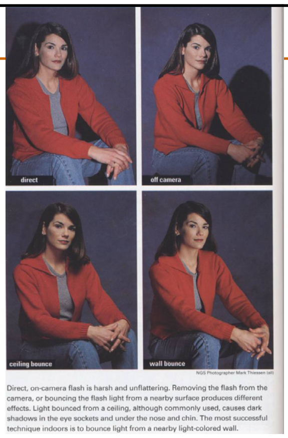
On cloudy days, use the camera's fill-flash mode if it has one. The flash will brighten up people's faces and make them stand out. Also take a picture without the flash, because the soft light of overcast days sometimes gives quite pleasing results by itself.

- Learn more about composing people pictures

Subject is dark

After

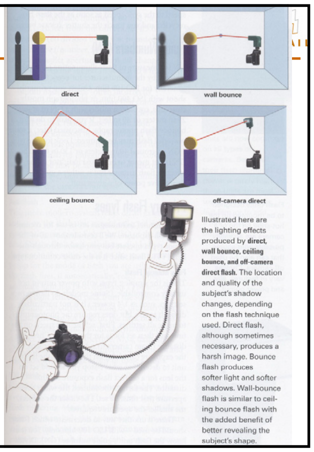
http://www.kodak.com/eknec/PageQuerier.jhtml?pq-path=317&pq-locale=en_US


direct
off camera
ceiling bounce
wall bounce

NGS Photographer Mark Thiessen (all)

Direct, on-camera flash is harsh and unflattering. Removing the flash from the camera, or bouncing the flash light from a nearby surface produces different effects. Light bounced from a ceiling, although commonly used, causes dark shadows in the eye sockets and under the nose and chin. The most successful technique indoors is to bounce light from a nearby light-colored wall.

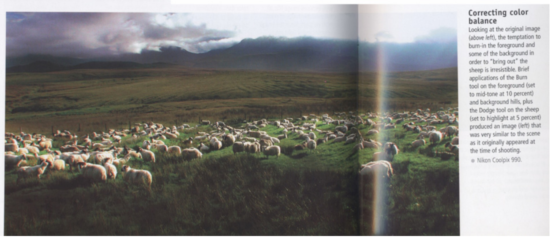
National
Geographic
Photography
field guide



Illustrated here are the lighting effects produced by **direct, wall bounce, ceiling bounce, and off-camera direct flash.** The location and quality of the subject's shadow changes, depending on the flash technique used. Direct flash, although sometimes necessary, produces a harsh image. Bounce flash produces softer light and softer shadows. Wall-bounce flash is similar to ceiling bounce flash with the added benefit of better revealing the subject's shape.

National
Geographic
Photography
field guide

Paint light



Correcting color balance

Looking at the original image (*above left*), the temptation to burn-in the foreground and some of the background in order to "bring out" the sheep is irresistible. Brief applications of the Burn tool on the foreground (set to mid-tone at 10 percent) and background hills, plus the Dodge tool on the sheep (set to highlight at 5 percent) produced an image (*left*) that was very similar to the scene as it originally appeared at the time of shooting.

- Nikon Coolpix 990.

From Digital Photographer's Handbook

Correct blown highlights

- **Selection based on luminance + curve**

Correct blown highlights

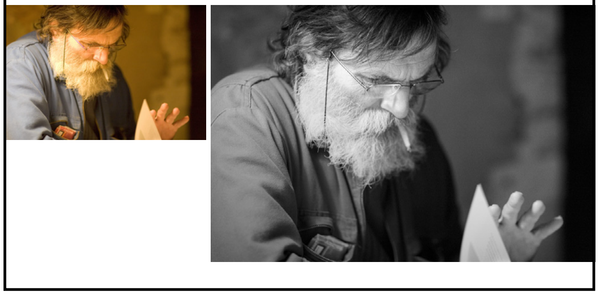
- **Selection based on luminance + curve**

Correct tonal balance

Correct tonal balance

Try black and white

- **Tons of options in Photoshop**
  - Gradient map, saturation, color channels, Lab, channel mixer



Color theory

- http://luminous-landscape.com/tutorials/colour_theory.shtml

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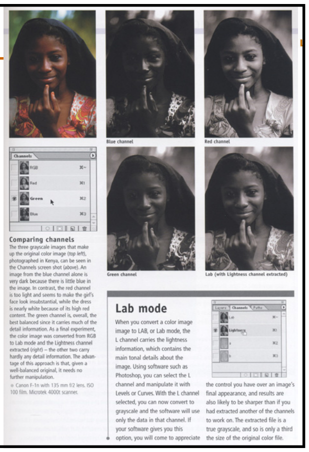


Blue channel

Red channel

Green channel

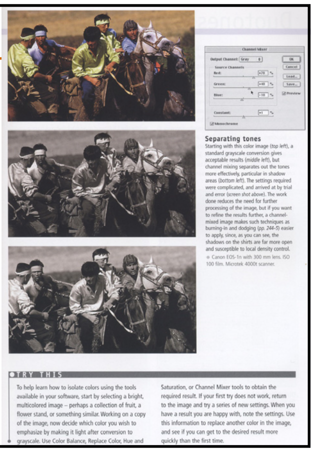
Lab (with Lightness channel extracted)

Comparing channels
The three grayscale images that make up the original color image (*top left*), photographed in Kenya, can be seen in the Channels screen shot (*above*). An image from the blue channel alone is very dark because there is little blue in the image. In contrast, the red channel is too light and seems to make the girl's face look insubstantial, while the dress is nearly white because of its high red content. The green channel is, overall, the best balanced since it carries much of the detail information. As a final experiment, the color image was converted from RGB to Lab mode and the Lightness channel extracted (*right*) – the other two carry hardly any detail information. The advantage of this approach is that, given a well-balanced original, it needs no further manipulation.

Canon F-1n with 135 mm f/2 lens. ISO 100 film. Microtek 4000t scanner.

Lab mode

When you convert a color image image to LAB, or Lab mode, the L channel carries the lightness information, which contains the main tonal details about the image. Using software such as Photoshop, you can select the L channel and manipulate it with Levels or Curves. With the L channel selected, you can now convert to grayscale and the software will use only the data in that channel. If your software gives you this option, you will come to appreciate the control you have over an image's final appearance, and results are also likely to be sharper than if you had extracted another of the channels to work on. The extracted file is a true grayscale, and so is only a third the size of the original color file.



Output Channel: Gray

Source Channels

Red: +70 %

Green: +40 %

Blue: -10 %

Constant: +1 %

☑ Monochrome

☑ Preview

Separating tones
Starting with this color image (*top left*), a standard grayscale conversion gives acceptable results (*middle left*), but channel mixing separates out the tones more effectively, particular in shadow areas (*bottom left*). The settings required were complicated, and arrived at by trial and error (*screen shot above*). The work done reduces the need for further processing of the image, but if you want to refine the results further, a channel-mixed image makes such techniques as burning-in and dodging (*pp. 244–5*) easier to apply, since, as you can see, the shadows on the shirts are far more open and susceptible to local density control.

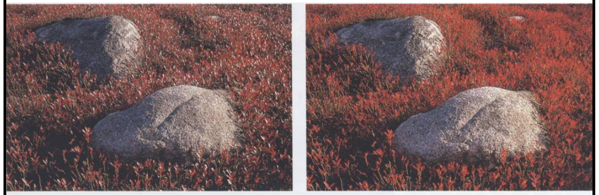
Canon EOS-1n with 300 mm lens. ISO 100 film. Microtek 4000t scanner.

TRY THIS

To help learn how to isolate colors using the tools available in your software, start by selecting a bright, multicolored image – perhaps a collection of fruit, a flower stand, or something similar. Working on a copy of the image, now decide which color you wish to emphasize by making it light after conversion to grayscale. Use Color Balance, Replace Color, Hue and Saturation, or Channel Mixer tools to obtain the required result. If your first try does not work, return to the image and try a series of new settings. When you have a result you are happy with, note the settings. Use this information to replace another color in the image, and see if you can get to the desired result more quickly than the first time.

Polarizers make colors more vivid

- **by reducing glare, especially in vegetation**



BLUEBERRY FIELDS, MAINE.
Nikon F5, Nikon 35–70mm lens, Fuji Velvia.

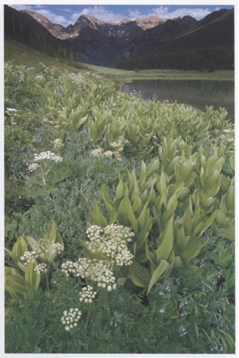
Polarizers remove glare, and autumn blueberry leaves are exceptionally shiny. I took a photo without my polarizer, then added it for the second shot. What a difference the polarizer makes in this comparison.

Photo John Shaw

Landscape:

- Try telephoto, isolate detail
- Add a foreground focus
- Manage dynamic range

Landscape: put a foreground object



COW-PARSNIP BELOW SLATE MOUNTAIN, EAGLES NEST WILDERNESS, COLORADO.
Nikon F5, Nikon 20–35mm lens, Fuji Velvia.

In this photograph, I placed a 2-stop ND across the very top of the frame.

Photo John Shaw

Landscape: put a foreground object

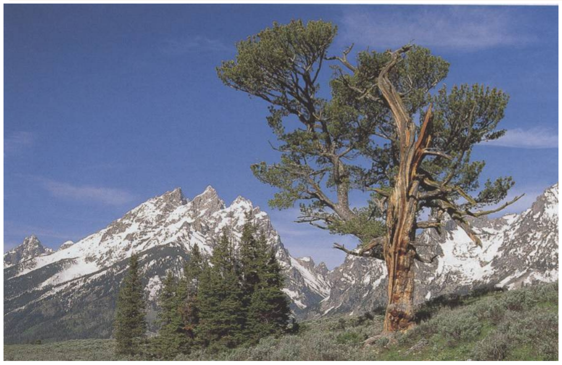


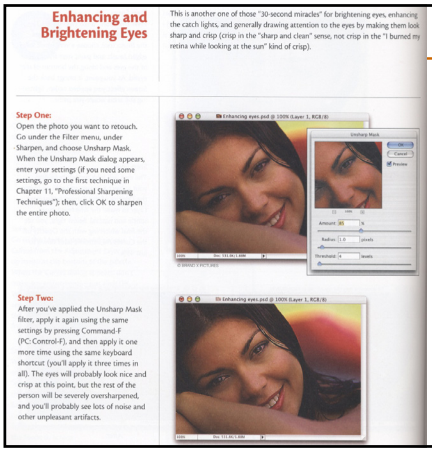
Photo John Shaw

Photo John Shaw

Portrait (and animal)

- Exploit shallow depth of field
- Make sure the face is illuminated
  (flash, post-process with photoshop)
- Focus on the eyes
- Shoot at eye level (unless you want a dramatic effect)
- Be patient, work with your subject, take lots of pictures
- Don't ask people to look at the camera
- Ask your subject to do something silly to relax them. Take the picture afterwards.

Shallow depth of field

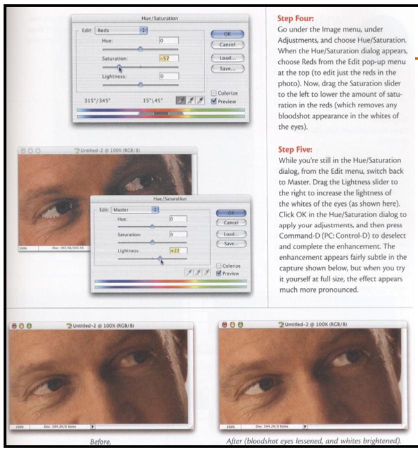


Enhancing and Brightening Eyes

This is another one of those "30-second miracles" for brightening eyes, enhancing the catch lights, and generally drawing attention to the eyes by making them look sharp and crisp (crisp in the "sharp and clean" sense, not crisp in the "I burned my retina while looking at the sun" kind of crisp).

Step One:
Open the photo you want to retouch. Go under the Filter menu, under Sharpen, and choose Unsharp Mask. When the Unsharp Mask dialog appears, enter your settings (if you need some settings, go to the first technique in Chapter 11, "Professional Sharpening Techniques"); then, click OK to sharpen the entire photo.

Step Two:
After you've applied the Unsharp Mask filter, apply it again using the same settings by pressing Command-F (PC: Control-F), and then apply it one more time using the same keyboard shortcut (you'll apply it three times in all). The eyes will probably look nice and crisp at this point, but the rest of the person will be severely oversharpened, and you'll probably see lots of noise and other unpleasant artifacts.



Step Four:
Go under the Image menu, under Adjustments, and choose Hue/Saturation. When the Hue/Saturation dialog appears, choose Reds from the Edit pop-up menu at the top (to edit just the reds in the photo). Now, drag the Saturation slider to the left to lower the amount of saturation in the reds (which removes any bloodshot appearance in the whites of the eyes).

Step Five:
While you're still in the Hue/Saturation dialog, from the Edit menu, switch back to Master. Drag the Lightness slider to the right to increase the lightness of the whites of the eyes (as shown here). Click OK in the Hue/Saturation dialog to apply your adjustments, and then press Command-D (PC: Control-D) to deselect and complete the enhancement. The enhancement appears fairly subtle in the capture shown below, but when you try it yourself at full size, the effect appears much more pronounced.

Before.

After (bloodshot eyes lessened, and whites brightened).

Glasses highlight

- Clone brush

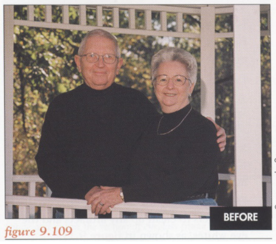


figure 9.109

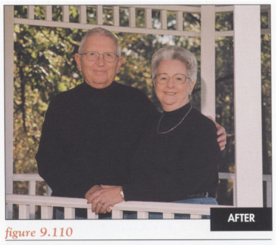
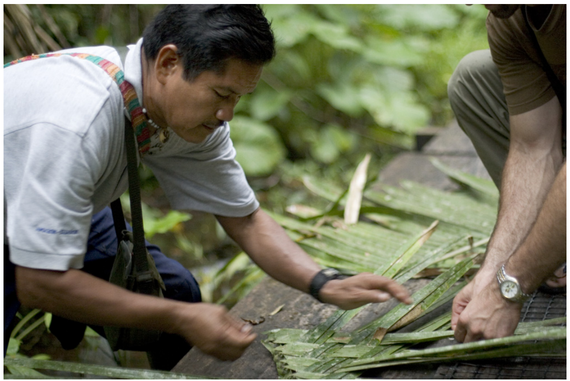
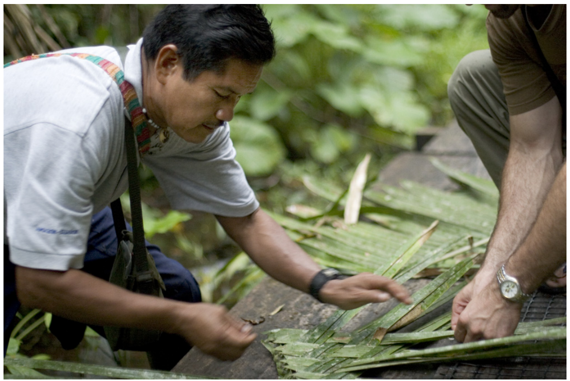


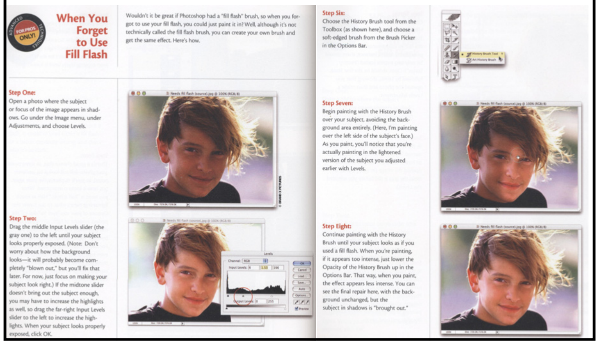
figure 9.110

Add fill in light on faces



Add fill in light on faces





When You Forget to Use Fill Flash

Wouldn't it be great if Photoshop had a "fill flash" brush, so when you forgot to use your fill flash, you could just paint it in? Well, although it's not technically called the fill flash brush, you can create your own brush and get the same effect. Here's how.

Step One:
Open a photo where the subject or focus of the image appears in shadows. Go under the Image menu, under Adjustments, and choose Levels.

Step Two:
Drag the middle Input Levels slider (the gray one) to the left until your subject looks properly exposed. (Note: Don't worry about how the background looks—it will probably become completely "blown out," but you'll fix that later. For now, just focus on making your subject look right.) If the midtone slider doesn't bring out the subject enough, you may have to increase the highlights as well, so drag the far-right Input Levels slider to the left to increase the highlights. When your subject looks properly exposed, click OK.

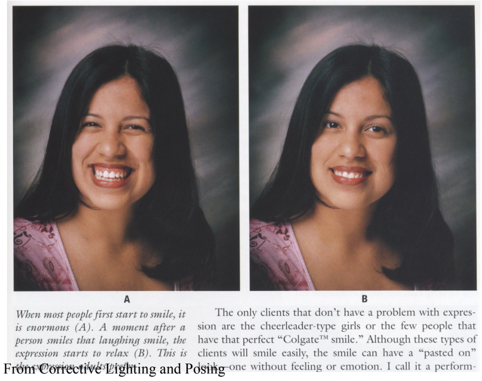
Step Six:
Choose the History Brush tool from the Toolbox (as shown here), and choose a soft-edged brush from the Brush Picker in the Options Bar.

Step Seven:
Begin painting with the History Brush over your subject, avoiding the background area entirely. (Here, I'm painting over the left side of the subject's face.) As you paint, you'll notice that you're actually painting in the lightened version of the subject you adjusted earlier with Levels.

Step Eight:
Continue painting with the History Brush until your subject looks as if you used a fill flash. When you're painting, if it appears too intense, just lower the Opacity of the History Brush up in the Options Bar. That way, when you paint, the effect appears less intense. You can see the final repair here, with the background unchanged, but the subject in shadows is "brought out."

They don't need to look at you

Make them be silly… and wait



A

B

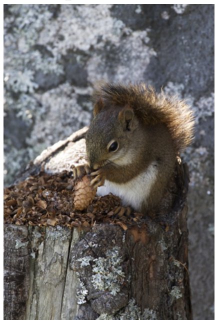
When most people first start to smile, it is enormous (A). A moment after a person smiles that laughing smile, the expression starts to relax (B). This is the expression adults prefer.

The only clients that don't have a problem with expression are the cheerleader-type girls or the few people that have that perfect "Colgate™ smile." Although these types of clients will smile easily, the smile can have a "pasted on" look—one without feeling or emotion. I call it a perform-

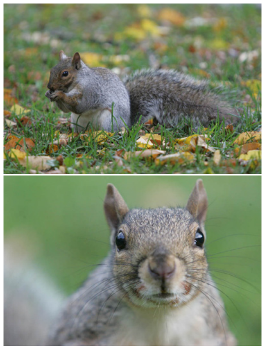
From Corrective Lighting and Posing

Shoot at eye level

- **Important for small animals and kids**



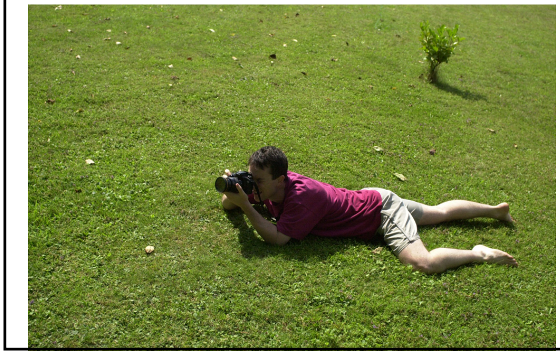
Not good



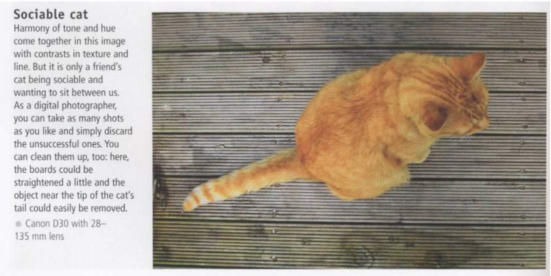
Better

Shoot at eye level

- **Get low!**



Or not



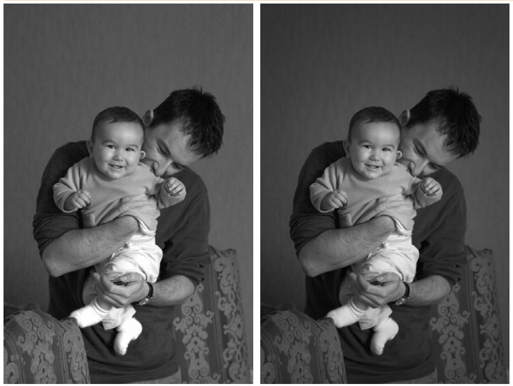
Sociable cat

Harmony of tone and hue come together in this image with contrasts in texture and line. But it is only a friend's cat being sociable and wanting to sit between us. As a digital photographer, you can take as many shots as you like and simply discard the unsuccessful ones. You can clean them up, too: here, the boards could be straightened a little and the object near the tip of the cat's tail could easily be removed.

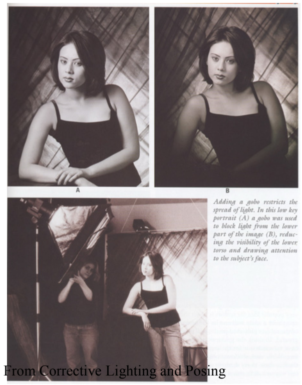
● Canon D30 with 28–135 mm lens

From Digital Photographer's Handbook

Add vignetting



Vignetting



Adding a gobo restricts the spread of light. In this low key portrait (A) a gobo was used to block light from the lower part of the image (B), reducing the visibility of the lower torso and drawing attention to the subject's face.

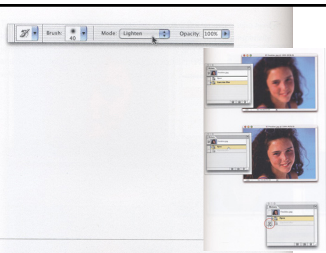
From Corrective Lighting and Posing

Play with reflections

Hardcore Photoshop for portrait

- Vie before/after

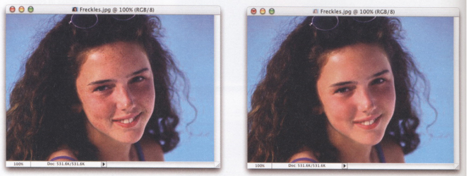
Step Six:
To keep from simply painting in a blurry version of our photo, go up to the Options bar and change the History Brush's Blend Mode to Lighten. Now when you paint, it affects only the pixels that are darker than the blurred state. Ahhh, do you see where this is going? Now, you can take the History Brush and paint over the acne areas, and as you paint, you'll see them diminish quite a bit (as shown below). If they diminish too much, and the person looks "too clean," press Command-Z (PC: Control-Z) to undo your History Brush strokes, then go up to the Options bar and lower the Opacity of the brush to 50% and try again.



Step Three:
Go under the Window menu and choose History to bring up the History palette. This palette keeps track of the last 20 things you've done in Photoshop. If you look in the list of steps (called "History States"), you should see two States: The first will read "Open" (this is when you opened the document), and the second will read "Gaussian Blur" (this is where you added the blur).

Step Four:
Click on the Open State to return your photo to what it looked like when you originally opened it (as shown here). The History palette also works in conjunction with a tool in the Toolbox called the History Brush. When you paint with it, by default, it paints back to what the photo looked like when you opened it. It's like "Undo on a brush." That can be very handy, but the real power of the History Brush is that you can have it paint from a different state. You'll see what I mean in the next step.

Step Five:
In the History palette, click in the first column next to the State named "Gaussian Blur." If you painted with the History Brush now, it would paint in what the photo looked like after you blurred it (which would do us no good), but we're about to fix that.



Before. *After.*

Chapter 9 **Portrait Retouching**

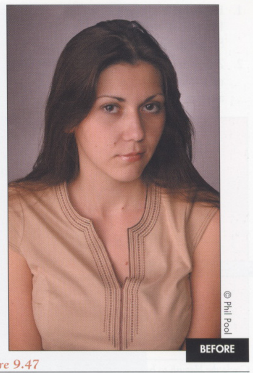


figure 9.47

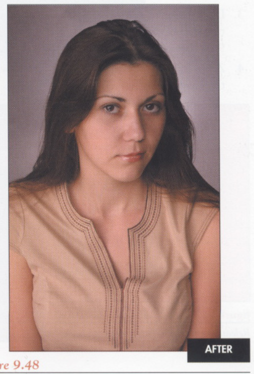
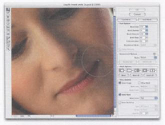
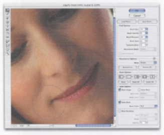


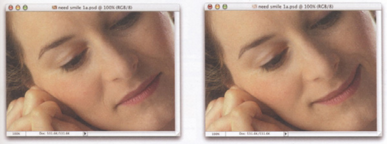
figure 9.48



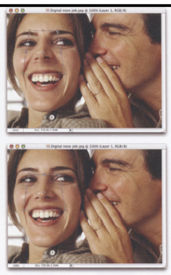
Step Three:
Press the Left/Right Bracket keys on your keyboard to adjust the brush size until it's about the size of the person's cheek. Place the brush near the corner of the mouth (as shown here), click and "tug" slightly up. This tugging of the cheek makes the corner of the mouth turn up, creating a smile.



Step Four:
Repeat the "tug" on the opposite side of the mouth, using the already tugged side as a visual guide as to how far to tug. Be careful not to tug too far, or you'll turn your subject into the Joker from *Batman Returns*. Click OK in Liquify to apply the change, and the retouch is applied to your photo (as shown).

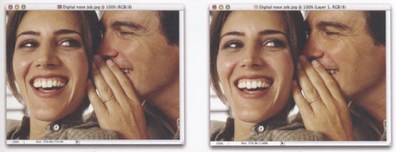

need smile 1a.psd @ 100% (RGB/8)
need smile 1a.psd @ 100% (RGB/8)

Before. *After.*

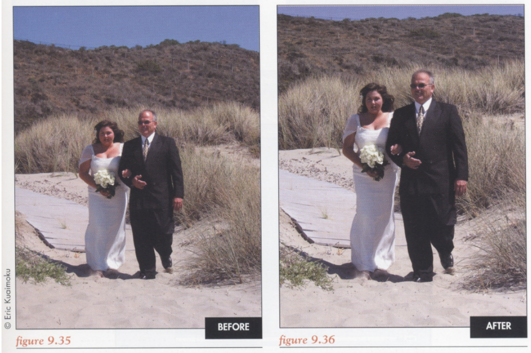

Digital nose job.jpg @ 100% (Layer 1, RGB/8)

Step Four:
Press Command-T (PC: Control-T) to bring up the Free Transform bounding box. Hold Shift-Option-Command (PC: Shift-Alt-Control); then, grab the upper-right corner point of the bounding box and drag inward to add a perspective effect to the nose. Doing this gives the person a pug nose, but you fix that in the next step.

Step Five:
To get rid of the "pug-nose" effect, release all the keys, then grab the top-center point (as shown) and drag straight downward to make the nose look natural again, but now it's smaller. When the new size looks about right, press Return (PC: Enter) to lock in your changes. If any of the old nose peeks out from behind the new nose, click on the Background layer and use the Clone Stamp tool to clone away those areas: Sample an area next to the nose, and then paint (clone) right over it. Below, see the difference our 30-second retouch made in the image.


Digital nose job.jpg @ 100% (RGB/8)
Digital nose job.jpg @ 100% (Layer 1, RGB/8)
Before
After

Hardcore Photoshop for portrait


BEFORE
AFTER

© Eric Kuaimoku

figure 9.35 figure 9.36

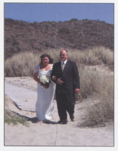


figure 9.37

Selecting the entire left side of the image avoids potential artifacts.

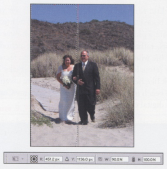


figure 9.38

Dragging a Free Transform handle to narrow the selected area.

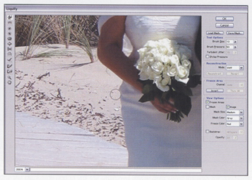
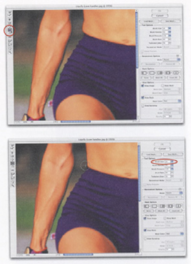

Liquify
OK
Cancel

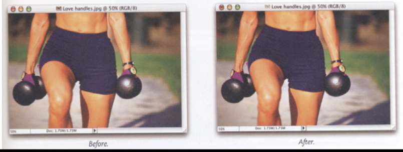
figure 9.39

The Liquify filter's Warp tool pushes pixels forward as you drag.

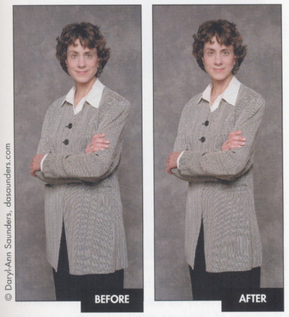


Step Three:
Get the Push Left tool from the Toolbar (as shown here). It was called the Shift Pixels tool in Photoshop 6 and 7, but Adobe realized that you were getting used to the name, so they changed it, just to keep you off balance.

Step Four:
Choose a relatively small brush size (like the one shown here) using the Brush Size field near the top-right of the Liquify dialog. With it, paint a downward stroke starting just above and outside the love handle and continuing downward. The pixels shifts back in toward the body, removing the love handle as you paint. (Note: If you need to remove love handles on the left side of the body, paint upward rather than downward. Why? That's just the way it works.) When you click OK, the love handle repair is complete.


Love handles.jpg @ 50% (RGB/8)
Love handles.jpg @ 50% (RGB/8)
Before.
After.

Photoshop tailor


BEFORE
AFTER

© Daryl-Ann Saunders, dasaunders.com

figure 9.15 figure 9.16

ch9_tailor.jpg

What's your additional favorite tip?

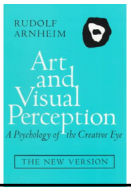
42 Photoshop advice

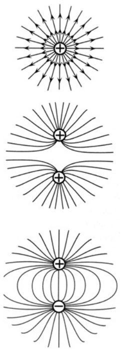
- **Shoot RAW, edit in 16 bits**
- **Try Lab, you might like it**
- **Use layers: not destructive, flexible**
  - There are very smart ways to create masks
  - E.g. copy the luminance, invert it, threshold it, blur it
  - http://luminous-landscape.com/tutorials/masking.shtml
- **Crop**
  - Avoid centered subject, simplify composition
  - Rotate when important lines are oblique
- **Manage contrast and brightness**
  - Use the curve and layer masks http://luminous-landscape.com/tutorials/command_primer.shtml
  - Highlights and shadow
  - HDR local adaptation
- **Correct colors and white balance**
- **Manage focus of attention**
  - Blur/sharpen
  - A tad of saturation/desaturation
  - Edge burning, vignetting
- **Remove distracting elements**
  - Clone brush, healing brush
- **Minor face makeup**
  - Remove harsh shadows
  - Red eye
  - Reduce wrinkles with the healing brush. Do it on a separate layer, partial opacity
- **Correct perspective keystone**
  - Use the perspective crop
  - http://luminous-landscape.com/tutorials/perspective.shtml
- **Try black and white**
- **Whatever you do, do it less**
  - Opposite of previous page (it's too easy to exaggerate with digital)
- **Soft focus vs. Gaussian blur http://luminous-landscape.com/tutorials/glow.shtml**
- **Improve the sky http://luminous-landscape.com/tutorials/white_sky_blues.shtml**

Gestalt

Context: Gestalt psychology

- **Early 20th century**
- **Inspired by field theory in physics**
- **Holistic philosophy of vision**
  - "spontaneous" organization
  - Opposed to unconscious inference
- **Has been integrated recently into modern framework**
- **Very popular in design**





Prägnanz

- **"Goodness"**
- **"Simplest" possible figure or organization**

- **Has recently been related to information theory (simple in terms of amount of information required to encode it)**

Overview

- **After low-level vision,
  we only know local frequency content, edges**
- **Need to organize the image**
  - Segment by region, find structure

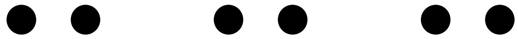
Prägnanz

- **Cornerstone of Gestalt**
- **"Goodness"**
- **"Simplest" possible figure or organization**
- **Things are organized spontaneously and assumed to be in the simplest configuration**

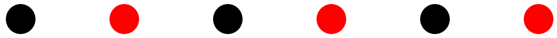
- **Has recently been related to information theory (simple in terms of amount of information required to encode it)**

Grouping

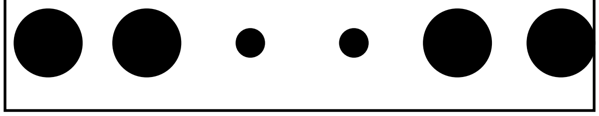
- **By Proximity**



- **By Color**

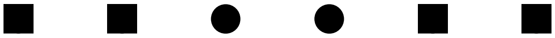


- **By size**

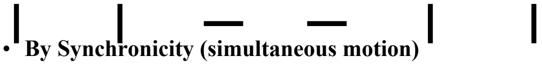


Grouping

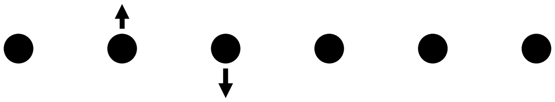
- **By Shape**



- **By Orientation**

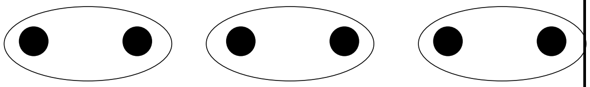


- **By Synchronicity (simultaneous motion)**

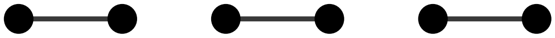


Grouping

- **By Region**

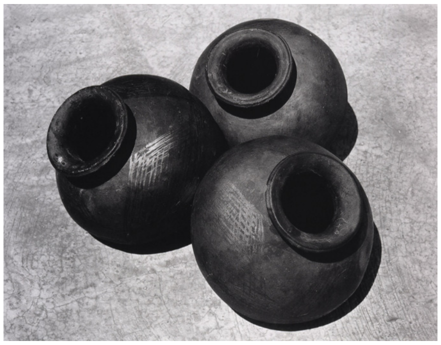


- **By connectedness**



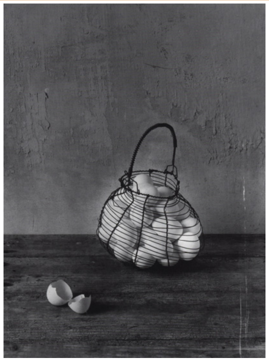
Grouping and photo

Edward Weston



Grouping and photo

Jean-Pierre Sudre

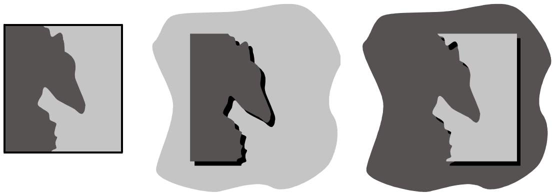


Plan

- Grouping
- **Figure-ground**
- Completion and illusory contours

Figure-ground

- **What is in front (figure), and behind (ground)?**
- **There has to be one figure and one ground**
- **Related to occlusion and thus to depth**
- **Less attention is dedicated to the ground**

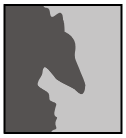


Picture Dark=figure Light=figure

Redrawn after [Palmer 99]

Figure-ground

- **The shape with the best “Prägnanz” is the figure**
- **Can be bimodal: we switch from one interpretation to the other**
  - Visible on brain imagery
- **But only one at a time**



Picture

Redrawn after [Palmer 99]

Figure-ground painting

- **Vassarely**

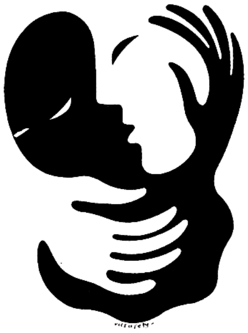


Figure-ground pun

- **Rubin vase**

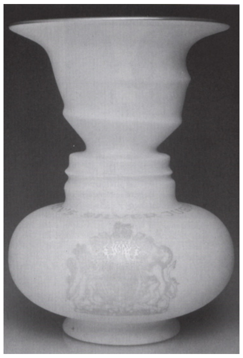


Figure-ground transition

- **+grouping**

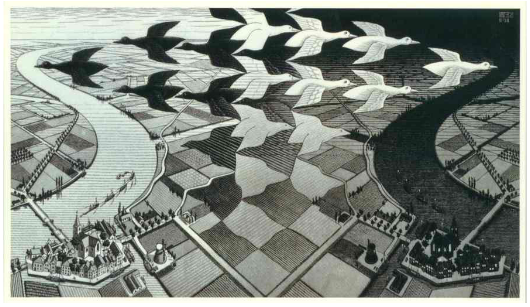


Figure-ground simplification

- For depth enhancement
- The contrast at the occlusion edge is enhanced
- The figure is easier to extract

KEANU REEVES LAURENCE FISHBURNE
MATRIX

Figure ground simplification

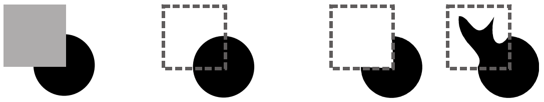
- Using rim-lighting (a.k.a. back-lighting)
- See notes on limitations p.27

Closure & Negative space

- George Seurat
- Negative space are enclosed in the picture frame

Visual completion

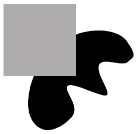
- We complete the occluded part with the simplest shape (best “Prägnanz”)
- Related to continuation and closure


Picture
Simplest interpretations
Other possible interpretations

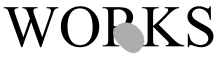
Redrawn after [Palmer 99]

Visual completion

- With no context



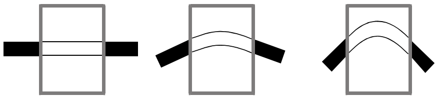
- With context



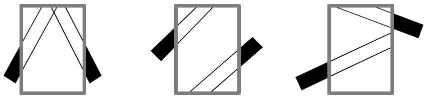
Redrawn after [Palmer 99]

Relatable edges

- Completion can occur along relatable edges



Relatable Edges



Unrelatable Edges

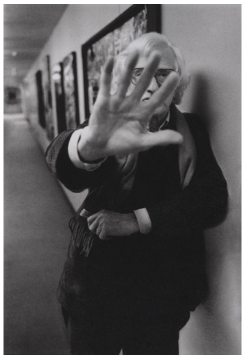
Redrawn after [Palmer 99]

Visual completion

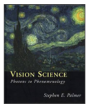
- **Greg Brown (mural)**

Completion

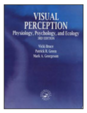
- **Marc Riboud**
- **Completion is challenged**



Further reading



Vision Science, from photons to phenomenology
Stephen E. Palmer, MIT Press, 1999
- Excellent reference on all aspects of vision
- Introduces modern theories of Gestalt and visual organization



Visual Perception: Physiology, Psychology And Ecology
Vicki Bruce, Patrick R. Green, Mark Georgeson, M.A. Georgeson, Psychology Press, 1996
- Very good introduction to vision following three approaches, include Gestalt

Cognition and the Visual Arts
Robert Solso, MIT Press, 1996
- Introduction to visual perception and relation with the visual arts

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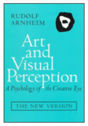
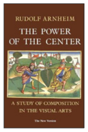
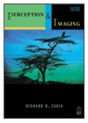
Further reading



Art and Visual Perception: A Psycholohy of the creative eye
Rudolph Arnheim, U. of California Press, 1954
- Seminal work on the relation between psychology and art history

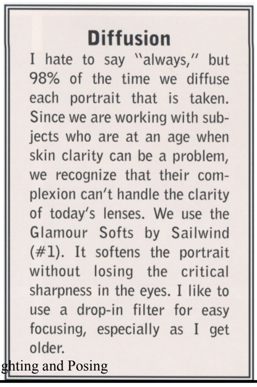


The Power of the Center : A Study of Composition in the Visual Arts
Rudolph Arnheim, U. of California Press, 1988
- Art history, on composition and picture layout



Perception and Imaging
Richard D. Zakia, Focal Press, 1997
- More a design manual based on Gestalt principles

Portraits

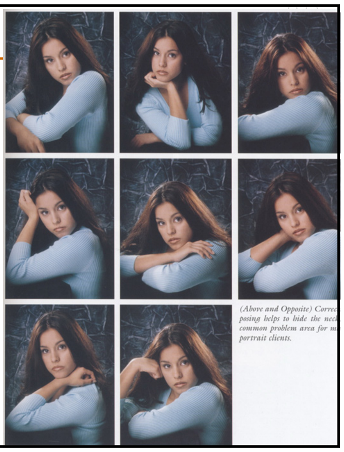


Diffusion

I hate to say "always," but 98% of the time we diffuse each portrait that is taken. Since we are working with subjects who are at an age when skin clarity can be a problem, we recognize that their complexion can't handle the clarity of today's lenses. We use the Glamour Softs by Sailwind (#1). It softens the portrait without losing the critical sharpness in the eyes. I like to use a drop-in filter for easy focusing, especially as I get older.

From Corrective Lighting and Posing

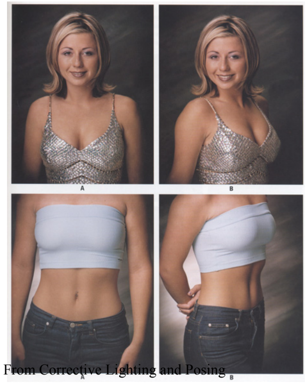
Pose: chin



(Above and Opposite) Correc
posing helps to hide the nec
common problem area for m
portrait clients.

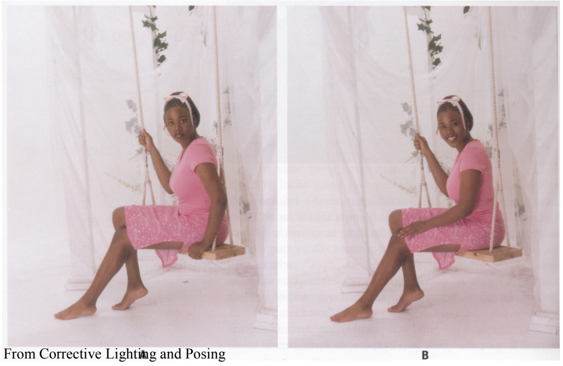
From Corrective Lighting and Posing

Pose: waist



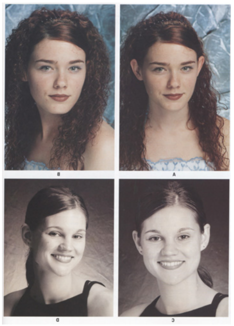
From Corrective Lighting and Posing

Arm position

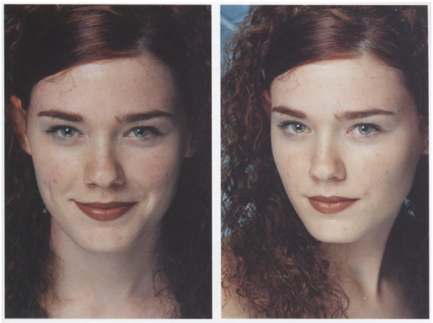


From Corrective Lighting and Posing

Pose: ears



From Corrective Lighting and Posing



Turning the face toward the main light and directing the eyes back at the camera reveals more of the white of the eye, making the eyes look larger.

In most the cases, the problem is simply a matter of the main light having been positioned too high. Control with corrective lighting requires more skill, more time and more concentration. You must position and re-position each light,

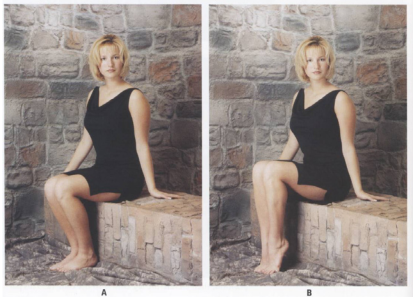
From Corrective Lighting and Posing

---

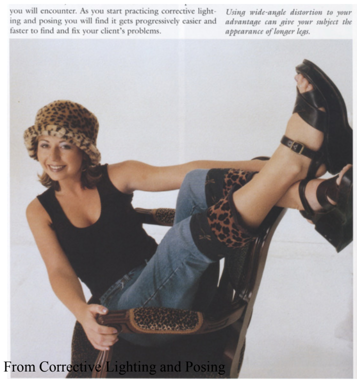
thin and toned as possible. Again, this isn't a problem for most men, because only athletic men normally ask to take a photograph in clothing that shows their legs or thighs. Women, however, are often told they should wear dresses, tight skirts and pants—even when it would be in their best interest not to.

When posing female subjects in a full length pose, I always have the person sitting or laying down. Unless a person is very tall and thin, she will always look better posed in

With feet flat on the floor, legs don't look their best (A). Lifting the heel flexes the calf and thigh muscles, making the legs appear longer and firmer. This can be accomplished by wearing high heels, or simply lifting the heel into the same position as if the subject were wearing high heels (B).



From Corrective Lighting and Posing

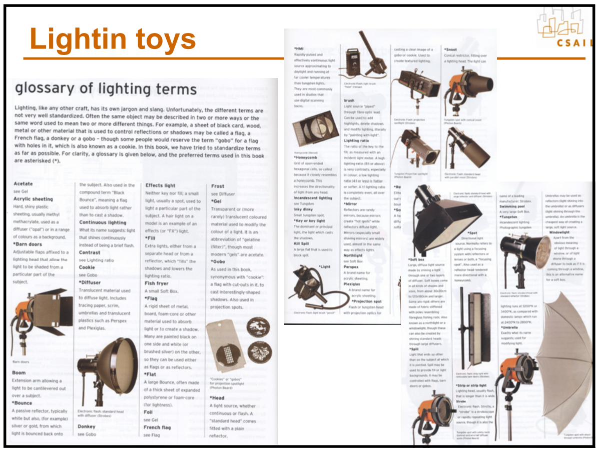


you will encounter. As you start practicing corrective lighting and posing you will find it gets progressively easier and faster to find and fix your client's problems.

Using wide-angle distortion to your advantage can give your subject the appearance of longer legs.

From Corrective Lighting and Posing

Lightin toys



glossary of lighting terms

Lighting, like any other craft, has its own jargon and slang. Unfortunately, the different terms are not very well standardized. Often the same object may be described in two or more ways or the same word used to mean two or more different things. For example, a sheet of black card, wood, metal or other material that is used to control reflections or shadows may be called a flag, a French flag, a donkey or a gobo – though some people would reserve the term "gobo" for a flag with holes in it, which is also known as a cookie. In this book, we have tried to standardize terms as far as possible. For clarity, a glossary is given below, and the preferred terms used in this book are asterisked (*).

Acetate
see Gel

Acrylic sheeting
Hard, shiny plastic sheeting, usually methyl methacrylate, used as a diffuser ("opal") or in a range of colours as a background.

***Barn doors**
Adjustable flaps affixed to a lighting head that allow the light to be shaded from a particular part of the subject.

Barn doors

Boom
Extension arm allowing a light to be cantilevered out over a subject.

***Bounce**
A passive reflector, typically white but also, (for example) silver or gold, from which light is bounced back onto the subject. Also used in the compound term "Black Bounce", meaning a flag used to absorb light rather than to cast a shadow.

Continuous lighting
What its name suggests: light that shines continuously instead of being a brief flash.

Contrast
see Lighting ratio

Cookie
see Gobo

***Diffuser**
Translucent material used to diffuse light. Includes tracing paper, scrim, umbrellas and translucent plastics such as Perspex and Plexiglas.

Electronic flash: standard head with diffuser (Strobex)

Donkey
see Gobo

Effects light
Neither key nor fill; a small light, usually a spot, used to light a particular part of the subject. A hair light on a model is an example of an effects (or "FX") light.

***Fill**
Extra lights, either from a separate head or from a reflector, which "fills" the shadows and lowers the lighting ratio.

Fish fryer
A small Soft Box.

***Flag**
A rigid sheet of metal, board, foam-core or other material used to absorb light or to create a shadow. Many are painted black on one side and white (or brushed silver) on the other, so they can be used either as flags or as reflectors.

***Flat**
A large Bounce, often made of a thick sheet of expanded polystyrene or foam-core (for lightness).

Foil
see Gel

French flag
see Flag

Frost
see Diffuser

***Gel**
Transparent or (more rarely) translucent coloured material used to modify the colour of a light. It is an abbreviation of "gelatine (filter)", though most modern "gels" are acetate.

***Gobo**
As used in this book, synonymous with "cookie": a flag with cut-outs in it, to cast interestingly-shaped shadows. Also used in projection spots.

"Cookies" or "gobos" for projection spotlight (Photon Beard)

***Head**
A light source, whether continuous or flash. A "standard head" comes fitted with a plain reflector.

***HMI**
Rapidly-pulsed and effectively continuous light source approximating to daylight and running at far cooler temperatures than tungsten lights. They are most commonly used in studios that use digital scanning backs.

***Honeycomb**
Grid of open-ended hexagonal cells, so called because it closely resembles a honeycomb. This increases the directionality of light from any head.

Incandescent lighting
see Tungsten

Inky dinky
Small tungsten spot.

***Key or key light**
The dominant or principal light, the light which casts the shadows.

Kill Spill
A large flat that is used to block spill.

***Light** brush
Light source "piped" through fibre-optic lead. Can be used to add highlights, delete shadows and modify lighting, literally by "painting with light".

Lighting ratio
The ratio of the key to the fill, as measured with an incident light meter. A high lighting ratio (8:1 or above) is very contrasty, especially in colour; a low lighting ratio (4:1 or less) is flatter or softer. A 1:1 lighting ratio is completely even, all over the subject.

***Mirror**
Reflectors are rarely mirrors, because mirrors create "hot spots" while reflectors diffuse light. Mirrors (especially small shaving mirrors) are widely used, almost in the same way as effects lights.

Northlight
see Soft Box

Perspex
A brand name for acrylic sheeting.

Plexiglas
A brand name for acrylic sheeting.

***Projection spot**
Flash or tungsten head with projection optics for casting a clear image of a gobo or cookie. Used to create textured lighting.

***Snoot**
Conical restrictor, fitting over a lighting head. The light can

***Soft box**
Large, diffuse light source made by shining a light through one or two layers of diffuser. Soft boxes come in all kinds of shapes and sizes, from about 30x30cm to 120x180cm and larger. Some are rigid; others are made of fabric stiffened with poles resembling fibreglass fishing rods. Also known as a northlight or a windowlight, though these can also be created by shining standard heads through large diffusers.

***Spill**
Light that ends up other than on the subject at which it is pointed. Spill may be used to provide fill or light backgrounds. It may be controlled with flags, barn doors or gobos.

***Spot**
Directional light source. Normally refers to a light using a focusing system with reflectors or lenses or both, a "focusing spot". Also used as a reflector head rendered more directional with a honeycomb.

***Strip or strip light**
Lighting head, usually flash, that is longer than it is wide.

Strobe
Electronic flash. Strictly, a "strobe" is a stroboscope or rapidly repeating light source, though it is also the name of a leading manufacturer: Strobex.

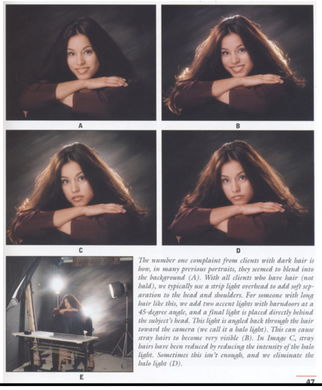
Swimming pool
A very large Soft Box.

***Tungsten**
Incandescent lighting. Photographic tungsten lighting runs at 3200°K or 3400°K, as compared with domestic lamps which run at 2400°K to 2800°K.

***Umbrella**
Exactly what its name suggests; used for modifying light. Umbrellas may be used as reflectors (light shining into the umbrella) or as diffusers (light shining through the umbrella). An umbrella is the cheapest way of creating a large, soft light source.

Windowlight
Apart from the obvious meaning of light through a window, or of light shone through a diffuser to look as if it is coming through a window, this is an alternative name for a soft box.

Hair lighting



The number one complaint from clients with dark hair is how, in many previous portraits, they seemed to blend into the background (A). With all clients who have hair (not bald), we typically use a strip light overhead to add soft separation to the head and shoulders. For someone with long hair like this, we add two accent lights with barndoors at a 45-degree angle, and a final light is placed directly behind the subject's head. This light is angled back through the hair toward the camera (we call it a halo light). This can cause stray hairs to become very visible (B). In Image C, stray hairs have been reduced by reducing the intensity of the halo light. Sometimes this isn't enough, and we eliminate the halo light (D).

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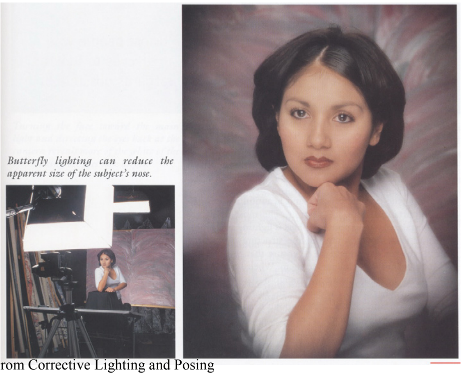
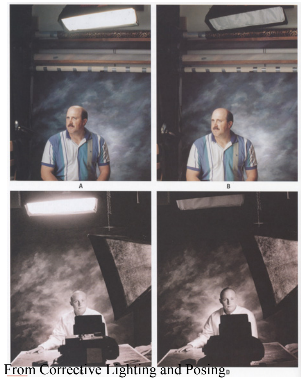
From Corrective Lighting and Posing

Lighting & nose

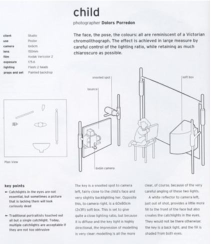


Butterfly lighting can reduce the apparent size of the subject's nose.

From Corrective Lighting and Posing



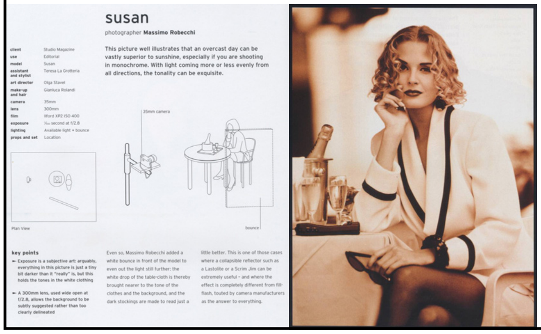
From Corrective Lighting and Posing



child

photographer **Dolors Porredon**

The face, the pose, the colours: all are reminiscent of a Victorian chromolithograph. The effect is achieved in large measure by careful control of the lighting ratio, while retaining as much chiaroscuro as possible.



susan

photographer **Massimo Robecchi**

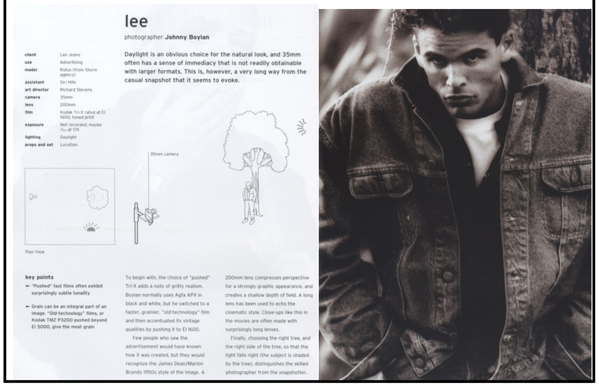
client	Studio Magazine
use	Editorial
model	Susan
assistant and stylist	Teresa La Grotteria
art director	Olga Stavel
make-up and hair	Gianluca Rolandi
camera	35mm
lens	300mm
film	Ilford XP2 ISO 400
exposure	1/500 second at f/2.8
lighting	Available light + bounce
props and set	Location

This picture well illustrates that an overcast day can be vastly superior to sunshine, especially if you are shooting in monochrome. With light coming more or less evenly from all directions, the tonality can be exquisite.

key points

- **Exposure is a subjective art: arguably, everything in this picture is just a tiny bit darker than it "really" is, but this holds the tones in the white clothing**
- **A 300mm lens, used wide open at f/2.8, allows the background to be subtly suggested rather than too clearly delineated**

Even so, Massimo Robecchi added a white bounce in front of the model to even out the light still further: the white drop of the table-cloth is thereby brought nearer to the tone of the clothes and the background, and the dark stockings are made to read just a little better. This is one of those cases where a collapsible reflector such as a Lastolite or a Scrim Jim can be extremely useful – and where the effect is completely different from fill-flash, touted by camera manufacturers as the answer to everything.



lee

photographer **Johnny Boylan**

client	Lee Jeans
use	Advertising
model	Rufus (from Storm agency)
assistant	Siri Hills
art director	Richard Stevens
camera	35mm
lens	200mm
film	Kodak Tri-X rated at EI 1600; toned print
exposure	Not recorded; maybe 1/500 at f/11
lighting	Daylight
props and set	Location

Daylight is an obvious choice for the natural look, and 35mm often has a sense of immediacy that is not readily obtainable with larger formats. This is, however, a very long way from the casual snapshot that it seems to evoke.

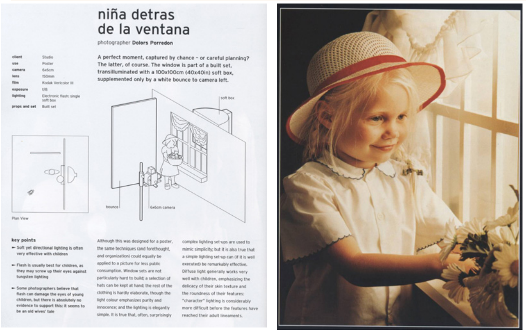
key points

- **"Pushed" fast films often exhibit surprisingly subtle tonality**
- **Grain can be an integral part of an image. "Old-technology" films, or Kodak TMZ P3200 pushed beyond EI 5000, give the most grain**

To begin with, the choice of "pushed" Tri-X adds a note of gritty realism. Boylan normally uses Agfa APX in black and white, but he switched to a faster, grainier, "old-technology" film and then accentuated its vintage qualities by pushing it to EI 1600.

Few people who saw the advertisement would have known how it was created, but they would recognize the James Dean/Marlon Brando 1950s style of the image. A 200mm lens compresses perspective for a strongly graphic appearance, and creates a shallow depth of field. A long lens has been used to echo the cinematic style. Close-ups like this in the movies are often made with surprisingly long lenses.

Finally, choosing the right tree, and the right side of the tree, so that the light falls right (the subject is shaded by the tree), distinguishes the skilled photographer from the snapshotter.



niña detras de la ventana

photographer **Dolors Porredon**

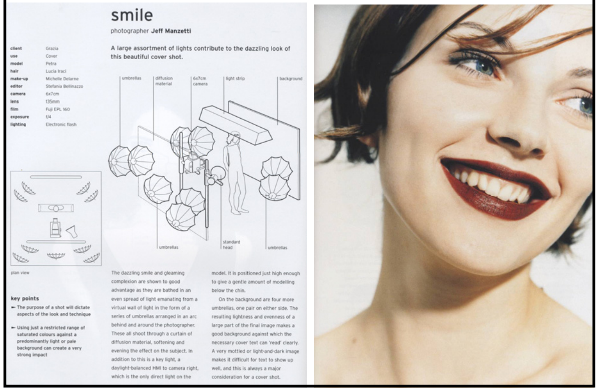
client	Studio
use	Poster
camera	6x6cm
lens	150mm
film	Kodak Vericolor III
exposure	f/8
lighting	Electronic flash: single soft box
props and set	Built set

A perfect moment, captured by chance – or careful planning? The latter, of course. The window is part of a built set, transilluminated with a 100x100cm (40x40in) soft box, supplemented only by a white bounce to camera left.

key points

- **Soft yet directional lighting is often very effective with children**
- **Flash is usually best for children, as they may screw up their eyes against tungsten lighting**
- **Some photographers believe that flash can damage the eyes of young children, but there is absolutely no evidence to support this: it seems to be an old wives' tale**

Although this was designed for a poster, the same techniques (and forethought, and organization) could equally be applied to a picture for less public consumption. Window sets are not particularly hard to build; a selection of hats can be kept at hand; the rest of the clothing is hardly elaborate, though the light colour emphasizes purity and innocence; and the lighting is elegantly simple. It is true that, often, surprisingly complex lighting set-ups are used to mimic simplicity; but it is also true that a simple lighting set-up can (if it is well executed) be remarkably effective. Diffuse light generally works very well with children, emphasizing the delicacy of their skin texture and the roundness of their features: "character" lighting is considerably more difficult before the features have reached their adult lineaments.



smile

photographer **Jeff Manzetti**

client	Grazia
use	Cover
model	Petra
hair	Lucia Iraci
make-up	Michelle Delarne
editor	Stefania Bellinazzo
camera	6x7cm
lens	135mm
film	Fuji EPL 160
exposure	f/4
lighting	Electronic flash

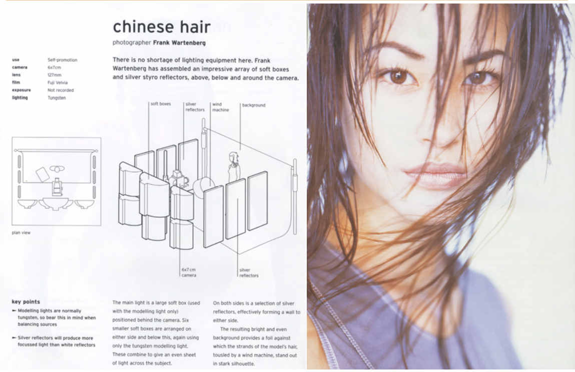
A large assortment of lights contribute to the dazzling look of this beautiful cover shot.

key points

- **The purpose of a shot will dictate aspects of the look and technique**
- **Using just a restricted range of saturated colours against a predominantly light or pale background can create a very strong impact**

The dazzling smile and gleaming complexion are shown to good advantage as they are bathed in an even spread of light emanating from a virtual wall of light in the form of a series of umbrellas arranged in an arc behind and around the photographer. These all shoot through a curtain of diffusion material, softening and evening the effect on the subject. In addition to this is a key light, a daylight-balanced HMI to camera right, which is the only direct light on the model. It is positioned just high enough to give a gentle amount of modelling below the chin.

On the background are four more umbrellas, one pair on either side. The resulting lightness and evenness of a large part of the final image makes a good background against which the necessary cover text can 'read' clearly. A very mottled or light-and-dark image makes it difficult for text to show up well, and this is always a major consideration for a cover shot.



chinese hair

photographer **Frank Wartenberg**

use	Self-promotion
camera	6x7cm
lens	127mm
film	Fuji Velvia
exposure	Not recorded
lighting	Tungsten

There is no shortage of lighting equipment here. Frank Wartenberg has assembled an impressive array of soft boxes and silver styro reflectors, above, below and around the camera.

key points

- **Modelling lights are normally tungsten, so bear this in mind when balancing sources**
- **Silver reflectors will produce more focussed light than white reflectors**

The main light is a large soft box (used with the modelling light only) positioned behind the camera. Six smaller soft boxes are arranged on either side and below this, again using only the tungsten modelling light. These combine to give an even sheet of light across the subject. On both sides is a selection of silver reflectors, effectively forming a wall to either side.

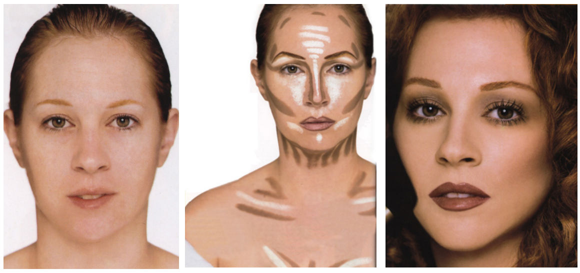
The resulting bright and even background provides a foil against which the strands of the model's hair, tousled by a wind machine, stand out in stark silhouette.

From Photographing People, Portrait, Fashion, Glamour

Make-up

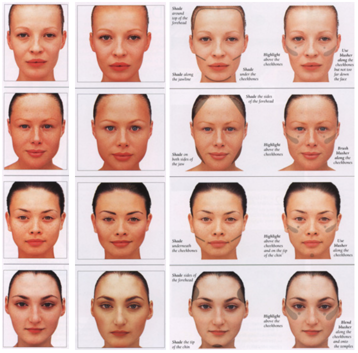
- **Scars, monsters, etc.**
- **"Creative" make-up**
  - Fancy!
- **Corrective make-up**
  - Hide wrinkles, etc
  - Balance the face
  - Not limited to the face!
- **Make-up for pictures**
  - Avoid highlights

Shading and highlighting

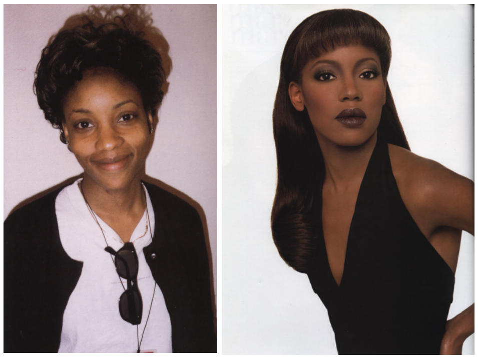


Corrective Make Up

- **Depending on the shape of the face**

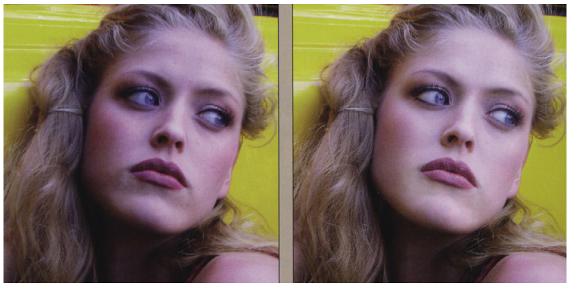


An example

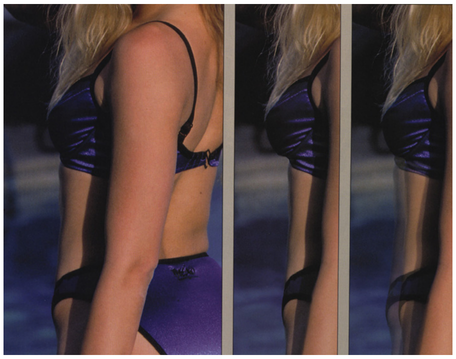


Is it fair?

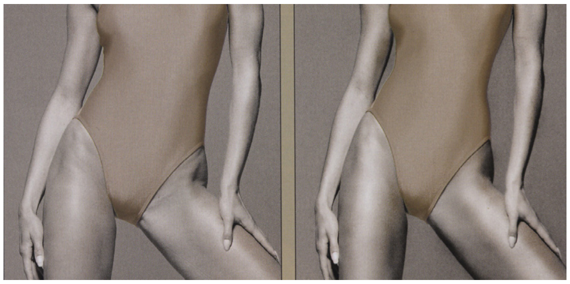
Touch-up: too dark face



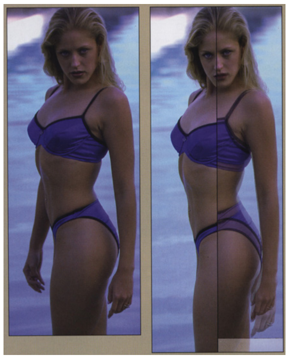
Touch-up: silhouette



Touch-up: undesirable lines



Touch-up: stretch and arm



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- http://www.kodak.com/eknec/PageQuerier.jhtml?pq-path=2/3/38&pq-locale=en_US
- **Fun interactive demo: http://www.kodak.com/eknec/PageQuerier.jhtml?pq-path=6369&pq-locale=en_US**
- http://sd.essortment.com/howtotakebett_rjbg.htm
- http://photography.about.com/library/weekly/aa080502e.htm
- http://www.photosafaris.com/Articles/CompositionsTen.asp
- http://luminous-landscape.com/essays/books-12-03.shtml

Photoshop refs

- **http://www.luminous-landscape.com/tutorials/instant_photoshop.shtml**

DVD recommendation

- **Visions of light**
- **Scorsese**
- http://luminous-landscape.com/essays/ten-movies.shtml
- **The Video Journal** https://www.luminous-landscape.com/video_journal/index.shtml

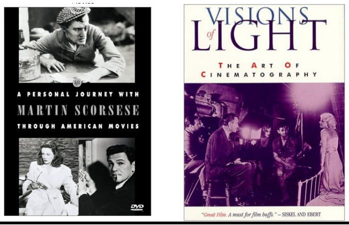
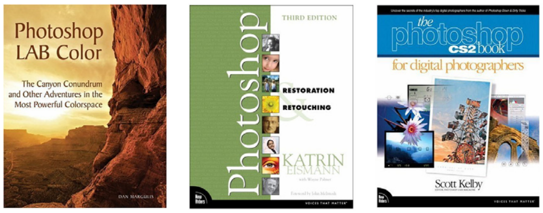


Photo books

NATURE PHOTOGRAPHY
FIELD GUIDE
NATIONAL GEOGRAPHIC
PHOTOGRAPHY FIELD GUIDE
digital photographer's HANDBOOK
TOM ANG
CORRECTIVE LIGHTING AND POSING
photographing people

Photoshop



Photoshop LAB Color
The Canyon Conundrum and Other Adventures in the Most Powerful Colorspace
THIRD EDITION
Photoshop
RESTORATION
RETOUCHING
KATRIN EISMANN
the photoshop cs2 book for digital photographers
Scott Kelby

Art, science & depiction

- **Self-promotion:**
  - http://people.csail.mit.edu/fredo/ArtAndScienceOfDepiction/
  - http://people.csail.mit.edu/fredo/SIG02_ArtScience/

Cool retouching

- **http://medialit.med.sc.edu/aniston.htm**
  http://www.nppa.org/news_and_events/news/2005/03/newsweek.html
  http://www.eonline.com/News/Items/0,1,12006,00.html
  http://www.accesshollywood.com/news/5118659/detail.html
  http://medialit.med.sc.edu/isbmag.htm
  http://www.glennferon.com/portfolio1/

  http://www.fluideffect.com/
  Go to Portfolio, click Agree, then click Before/After.

  http://www.i-am-bored.com/bored_link.cfm?link_id=14537

Ethical issues in retoucing

- **http://luminous-landscape.com/essays/cloning-the-can.shtml**

Interactive

- Who takes pictures?
- What’s your style?
- What’s your goal?
- What’s your technique?

- What’s your favorite Photoshop tool?
- What’s your main challenge?
- What’s your keep rate?

What to do with questionable talks?

- See if they can inspire you

Anecdote about brainstorming

- **From Chuck McVinney**
  - (but my memory might be faulty)
- **Interesting technique to think out of the box:**
  - Brainstorm for a little while
  - Then select the stupidest idea that was given
  - Work to make it into something useful
- **One successful example:**
  - A luminaire factory discovered they had a productivity problem. The luminaires had to be protected before getting packed, which was done by wrapping them into newspapers. Unfortunately, the workers were getting distracted and read the newspapers.
  - The most stupid idea during brainstorming was to poke their eyes.
  - The practical solution was to hire blind people, which had a number of benefits, in addition to alleviating the journal-reading problem. These people traditionally had a hard time finding a job and became extremely dedicated to their employer. In addition, the company acquired a glowing reputation as a social employer.

Next time: Markov random fields

Could not find the photo of an MRF