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MASTER OF FINE ARTS

CORPORATE IDENTITY SYSTEMS
AND
COLOR PUBLISHING ON THE MACINTOSH

by
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SIGNATURES

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Dedication

This book is dedicated to three very special people in my life, who I love very much.

To my mother, Elaine Parell the first person to teach me about strength, courage and love by being a extraordinary example of an enduring spirit.

To my brother, Bill Parell for his unending support and early morning wake up calls.

To Paul Cofrancesco for his unfailing love and encouragement. With whom I was able to find the spiritual strength to accept all experiences as a promise of growth and adventure.

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Introduction

INTRODUCTION

In the rapidly-changing world of computer imaging, there exists a frustrating wall of confusion. Computer imaging offers endless possibilities, but it is extremely difficult to translate from screen image to printed page. Without some considerable knowledge in the area, it seems impossible to get correct or at least acceptable results.

Many design firms seeking to keep up with changing times are also taking on the challenge of multimedia. There is a strong awareness among business today of the importance of creating and maintaining a powerful graphic identity that spans over several mediums.

In my work, I strove to create visual consistency and graphic unity, utilizing the Macintosh computer as a tool for crossing the barriers. First, for conceptual development of a campaign and exhibit identity, I chose Aquatic Zoo animals as my subject. This allowed for experimentation with textures, patterns and colors.

Next, I challenged myself and the computer I was working on with an investigation into large digital output. The use and cost efficiency of Dye Sublimation, Electrostatic printing, DisplayMaker Pro technologies and a variety of other output methods were explored. In this exploration I was seeking to discover the areas that may hinder the designer in the quest for high-fidelity reproduction.

The final area was the integration of inter-activity to enhance the overall identity program by allowing the user to become an active participant in the exhibit. The primary concern in this area was design consistency.

In the beginning my goal was to provide a step-by step instruction for getting great-quality images. I found that there is simply no way to provide the exact settings needed for every piece of hardware and software in every situation. However, with my research I can provide a conceptual idea on how to handle out-put in a particular environment. My discoveries will cast some light on the mysteries of this process and what procedures may be taken to ensure greater success. The following work is a reflection of the journey I took.


Research

Color Publishing on the Mac

Within the last few years, advanced color reproduction has become possible on the Macintosh. This fact, coupled with the ability to produce finished publications without sending out for type or color separations, provide the designer with complete control over the entire design and production process. In the past, color separations of graphics required the use of an outside firm or the purchase of expensive equipment. This meant time and money. Now—within limits— a designer can directly handle the color production processes, as well as the color corrections and retouching of images.

The process of creating color documents conventionally takes a long time because many steps are involved. In conventional color publishing, type has to be set and corrected several times. Photos and illustrations have to be broken down into a format compatible with the printing press. The print shop spends several weeks assembling the job and readying it for press. Insert into this already lengthy cycle numerous client changes. A typical four-color brochure project, handled conventionally, takes approximately one month from completion at the designer's shop to actually reaching the press—assuming no serious mistakes are made that require time to correct.

Designers were once restricted to designing pieces with only a handful of colors because of limited printing budgets and lengthy time. Presently, by using Mac-based color, a single publication can contain twenty different screened colors and fancy typography at almost no extra cost. Options once cost-prohibitive are now endless.

Today, due to the advanced color availability with the Macintosh computer, all aspects of color publishing from simple spot color separations to image retouching can be done right on the desktop. These new color tools and capabilities provide designers with a much greater range for designing invitations, brochures, pamphlets, and posters. The charges for expensive outside services for color separations and typesetting are reduced or eliminated. The cost of producing quality publications is also reduced and the turn around time is minimized.

This is not to say that Mac-based color publishing is without its pitfalls. For example, a color image that looks fine on a monitor screen may produce surprises in the form of improper color balance when output on an imagesetter. Files that seem to read fine on one computer may have difficulty interpreting post script files at the print shop.

There are a number of other issues that cause problems with Macintosh color desktop publishing though many of these can be worked around. Improvements to color publishing hardware and software are gradually fixing these glitches. Print shops and service bureaus are also learning about computer-based color publishing and as a result are developing an eye for catching potential problems. Although print shops can be extremely helpful in giving suggestions that will help produce good results, they do not have all the answers or perhaps are not being asked all the right questions.

With the capability to control the entire design and production process, it now becomes the designer's responsibility to be familiar with the behind-the-scenes processes in order to prevent crucial mistakes.

Scanning Procedure

One of the most powerful tools for color publishing is the color scanner. Scanners allow designers to take images directly through to print without the expense of using an outside separation house. This gives the designer complete control over the entire project from the desktop to the shop. It also allows the designer to take advantage of the color desktop publishing special effects, screen tint color, and photo-retouching capabilities.

On the other hand, the scanning and color separating of images is one of the most complex elements in color publishing. Understanding this process requires time, patience and many hours of testing. Color scanners vary considerably in resolution capabilities, color accuracy, and scan-size limitations, all of which may produce surprises at the service bureau. Each of these elements have to be considered and understood in order to get good results.

There are several different types of scanners such as drum, overhead, 3-D, 35mm transparency, and flatbed. The one commonly used for color publishing is the flatbed scanner. Designers and printers find the flatbed scanner to be affordable, compact in size, and relatively easy to use. However, there are areas where flatbed scanners may fall short in high-quality color reproduction. One area is color registration and the other is the interpolation of color information.

Color flatbed scanners use a moving light bar that scans and captures the image in one or more passes. Color scans are made up of three colors: Red, green, and blue assembled on top of each other to create the impression of full color. Many flatbed scanners make one pass for each color layer. If the scanner light bar incorrectly places one layer in relationship to another, a fuzzy scan results. This problem may vary as repeated use wears the scanners mechanism. Checking the registration of a scanner can therefore help prevent many frustrating hours of color retouching. This registration problem can be tested simply by scanning, in full color, several black lines drawn diagonally on a piece of white paper. If after scanning and magnifying the image the black lines appear to have individual shadows of red, green, and blue components, the scanner has registration problems.

Another flatbed scanner limitation can be the interpolation of color information. Most flatbed scanners don't produce perfect color. The layer of glass between the scanning optics and the object to be scanned can cause detail information to be lost. This lack of information may produce images too murky for use in high-quality publications. To create higher resolution, some scanning software typically doubles the actual resolution and creates information by inserting new pixels or dots into the image. This involves algorithmic-based guessing or interpolation of the dots. To determine the color for these new dots, the software looks at the neighboring dots, averages the color value, assigns the average to the new dots and places them where needed. With smart interpolation software the effort works reasonably well. If a scanner is not equipped with software to handle this trick, image retouching software may be able to do it through resampling.

After checking the scanner for potential registration and interpolation problems, there are a set of fundamental procedures that can be followed to reduce scanning problems and to help capture a quality image for manipulation and subsequent output. These steps are:

1. Selecting and preparing the image or photo.
2. Setting the scanner controls.
3. Previewing the image.
4. Capturing the image.
5. Manipulating and repairing the image.

Although each of these basic steps have inherent problems they can be overcome.

1. Selecting and Preparing an Image or Photograph

It is important to be aware of the characteristics of the image to be scanned before starting. A photographic print, an illustration, or a printed picture from another source are considered reflective art. Transparent art; such as 35mm slides, negatives, and transparencies scan rather easily because light penetrates the medium to expose the image.

Reflective art reflects light from the print to reveal the image, unlike a transparency. Reflective art is more difficult to reproduce because less detail is captured when reflective art is scanned. When scanning photos, study the image carefully to see if it has the appropriate exposure and focus. If the image is too light or too dark, making changes to the scanner settings may partially correct the problem. Other corrections can be made in the color retouching software.

Severely out of focus photos are difficult to fix because the color may look faded even after enhancement. Also, it is common with photos for one area in an image to be sharp while another is soft. To work with this type of image also requires enhancing the soft fuzzy area with retouching software so it begins to match the rest of the photo.

The texture of photographic paper may also limit the quality of a scan. Glossy papers are particularly troublesome on some scanners. The scanner light is reflected off this luminous paper. The image, incorrectly

read, causes color shifts and washed-out areas. If the scanner has problems handling glossy paper, dulling spray can alleviate this problem somewhat.

Scanning images reproduced in books and magazines is another problematic area because the dot patterns in the printing may make the scan appear muddy or grainy. When one halftone screen is laid on another, a mathematical effect can occur that causes an undesirable and regular patterning. This obvious visible patterning is called a moiré and has been a major source of problems in Macintosh color publishing. This reproduction limitation is undesirable. If it is necessary to use this type of image in order to get reasonable results, the first area that needs to be understood is the relationship between LPI and DPI. This information is covered in the next step.

2. Setting the Scanner Controls

An understanding of resolution is central for effective scanning. Scanner resolution directly relates to the quality of an image when it is resized, printed and proofed for output. The standard measurement of resolution in the computer world is dots per inch, or dpi. This number specifies the number of dots scanned, displayed, or printed within a square inch. For magazine publishing needs 300dpi is adequate. For higher quality publishing the sky's the limit, although 400 to 600 dpi is more than adequate for the most demanding resolution requirements.

There are 4 kinds of resolution measurements needed for scanning and printing: Input resolution, screen resolution, output resolution, and lines-per-inch (LPI) resolution.

The input resolution is the precision at which an image is captured. Whenever possible the ideal scanning solution is to scan images at the size and resolution that is required for print. Though the resolution can be changed within color separation programs if necessary, it is not recommended.

The usual guideline for scanning images is at a ratio 2 dpi:1 lpi. In essence determine the desired screen frequency and multiply that number by 2. This value is the percentage at which to scan the image. For

example, a magazine may print its publication at 200 lpi. Images for this publication would need to be scanned at 2 x 200 equaling 400 dpi. The 2:1 ratio is optimal for high-quality work, however, 1.5:1 is adequate for most color publishing projects. The image quality and image size directly impacts the degree of variation in the ratio.

In an image composed of soft shapes and color transitions, i.e. a landscape with sky and mountains, a resolution ratio as low as 1.3 dpi:1 lpi can be used for high-quality printing. The image will not look crisp at a higher resolution if all of the color transitions are relatively smooth and have no hard edges. If, however, hard edges or diagonal lines are present, scanning at a higher resolution is required to assure that the edges are clear and crisp in print.

For images destined for newsprint, lower ratios approaching 1:1 may work, although the image may have a grainy or coarse-looking output. One advantage of a low dpi: lpi ratio is that file size and imaging time is reduced considerably. While the underlying rule is simple enough, actually putting it to work becomes more complicated when enlarging an image.

To determine the optimum resolution (dpi) for scanning an image at 100 percent, the following formula can be used:

> *"Screen frequency (lpi) x a number between 1.5 and 2.0 (depending on print quality desired) x the final width after resizing ÷ the original width = optimum scanning resolution(dpi)"*[1]

For example, if a 2" by 2" image, needed for a magazine,was scanned at 300 dpi and had to be enlarged to a 6"x 6" image, it would not be adequate for this kind of publication. A 300-dpi scan enlarged 300 percent reduces the dots per inch to 100 dpi, because the same number of dots covers an area three times as large. To print this 100-dpi image and keep the ratio of dpi:lpi at 1.5:1, this image could only be printed at 75 lines per inch. A resolution adequate for a newsprint job but not good enough for higher quality publications.

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[1]Kim & Sunny Baker, Color Publishing on the Macintosh From Desktop to Print Shop, (New York: Random House Electronic Publishing, 1992), 152.

If the same image is scanned at 600 dpi the enlargement would work. A 600-dpi scan enlarged 300 percent produces an enlargement with 200 dots per inch and would be an effective resolution. Using a ratio of 1.5:1, this image can be printed at 133 lpi—an adequate quality for most magazine work and mid-quality brochures.

Also keep in mind extra information does not always mean improved quality. A file that reaches the imagesetter with a dpi:lpi ratio of more than 2:1 contains information that is unnessary and causes substantial imagesetter overtime. Scans with too much information may even fail to image or crash the imagesetter. To much information will increase the size of the file and make it more difficult to transport because of the storage the extra information requires.

For example, if a halftone image scanned at 100 percent and at twice the existing line screen, the maximum amount of information is obtained. If the line screen is unknown, it can be determined with a Screen Pattern Analyzer. The only other way to increase the resolution is to interpolate it which may not necessarily enhance the image. Therefore, scanning files at resolutions higher than required to get extra information will not improve image output quality and will simply be a waste of time.

The Macintosh's screen resolution is always 72 dpi. When looking at a color image scanned at 300 dpi on screen and displayed at actual size, all the information is not really being seen because the Macintosh's monitor can not display it. If, on the other hand, the image is enlarged more of the information can be seen.

The output resolution is specified when the image is output to film on an imagesetter. This resolution is specified in dpi. Different models of imaging equipment are capable of different levels of resolution starting at 1,270 dpi and going beyond 3,000 dpi. A scan can be output at a higher resolution, but the result looks flat because the additional dots are created through interpolation.

The lines-per-inch rating is used to specify the resolution at which the image will print when on press. This setting determines how large or small the dots are and how close together they appear when printed. The

specification for this setting is largely determined by the paper the image will be printed on. If the image is destined for newsprint, a low lpi specification, e.g.65 lpi, is used, because newsprint supports only coarse (large) dots. The very best printing is possible at 600 lpi with new technology. Resolutions from 100 to 200 lpi are typical for most color documents.

The reason for these rules is simple. When an image outputs on an imagesetter, the system takes every 1.5 dots to 2.0 dots and interpolates them into 1.0 line of output resolution. If you use less resolution (fewer dots), the imagesetter does not have enough information to produce quality output. The image may look flat or grainy but potentially okay for some applications. As the ratio of dots to lpi gets closer to 1:1, the resulting image will appear "pixelized" with the individual pixels noticeably visible in the output.

3. Previewing the Scanned Image

Scanners vary considerably in their ability to interpret color images and accurately record them. Two scanners of the same model just off the assembly line will respond to color differently. One scanner produces crisp, clean images with lively color while another may produce murky images.

A problem with scanner color, in addition to the overall loss of information, is cross-contamination of colors. A photograph of a bright red apple may become contaminated with blues and greens. It doesn't take much contamination to reduce the bright red and make an image look flat and uninteresting. While professional color separators can compensate for this problem and clean up the red, and even make the apple image look more vibrant in color than the actual apple is. It is best to start with a color-corrected image.

The nature of the original to be scanning varies. Some scanning software packages include options that compensate for color shifts in order to produce more accurate results. In the case of a flatbed scanner, the color balance must be accurate both in the middle of the scanner bed and towards the edges. All colors must be balanced with no unnatural

leaning towards light or dark, nor towards any individual color such as yellow, red, or blue. For these reasons, many scanners require calibration of some sort to maintain color accuracy. Some scanners perform automatic calibration on power up. The best way to check a scanner is to have a color proof produced and compare the results.

4. Capturing the Image

After capturing an image remember one rule: "Don't Trust your Monitor!" If an image is important enough to print at high resolution, color balance and accuracy are also critical. To produce color designs, a monitor with near-perfect color accuracy is required. Unfortunately such a beast does not yet exist. While current calibration tools partially fix this problem, the perfect color monitor has not yet arrived.

Full-color images displayed on a computer monitor consist of red, green, and blue components that on screen appear to the eye as continuous tones unless the images are magnified. Each color component on a monitor is like a grayscale—it appears on the monitor as a solid color. When printed, color images must be converted to cyan, magenta, yellow, and black (CMYK) dots (like halftones) which are recombined on press to create a convincing representation of the original image. Because scanned images may appear as full-color RGB representations on screen, they may look different when separated and printed.

For now, fully accurate color display on a monitor is not available. Even the most expensive calibration system may perform a calibration that is only vaguely related to what shows up in print. Calibration systems do, however, provide correction to serious Macintosh monitor shortcomings such as white and cyan balance. Running a calibration system also provides day-to-day color monitor consistency and allows you to match a system with two color monitors so that they display color consistently.

"All but the most expensive Macintosh monitors have a serious problem producing the color cyan"[2]. This color is usually represented on the screen as a bright turquoise far removed from the real color. Since

[2]Kim & Sunny Baker, Color Publishing on the Macintosh From Desktop to Print Shop, (New York: Random House Electronic Publishing, 1992), 46.

monitors create all colors from just three guns, the cyan/blue problem throws most of the spectrum off. Because of this flaw with blue, achieving true white on the display is also a problem. Fortunately, there are ways of partially adjusting color display with software and hardware calibration to ensure more accurate color.

One easy-to-use tool for calibration is a hardware device that attaches to monitor screens through a suction cup. This device measures and adjusts monitor color to one of several standards using software to control the color output of the guns. This kind of tool combined with a high-quality monitor provides partial color calibration when used on a regular basis. It may still take some experimentation to get the monitor color to begin to match what is seen in print.

A second (software-only) color calibration system comes free with a number of high-end color painting or image manipulation software. These systems operate by having the user adjust software-based controls until the screen image matches one supplied in hard copy from within the software package. While these programs can be used to calibrate a monitor, they are limited in their capabilities. Matching a printed samples color brightness on-screen is difficult even for a trained eye.

One of the sources of inaccuracies in color monitors is their gamma—the transition from dark to light in the mid-tones. Color separation programs such as Photoshop include a routine for adjusting monitor gamma. While it will not give a completely color-accurate monitor, this routine will bring the brightness levels of colors displayed on the monitor closer to those that will be printed. It is better than no calibration at all. To run one of these routines, carefully follow the instructions provided and keep in mind that room lighting will affect the gamma "readings." Even the subtle changes in lighting as the sun moves during the course of the day will produce very different "calibration."

Once the highlight and shadow points are set, the software compresses the tonal level to match the limited range of highlight to shadow on press. The image may look marginally different after compressing its tone, because the range of tones displayed on the monitor with additive color can not necessarily be printed on paper.

Another simple test to check calibration is to acquire a Pantone Swatch Book and use it to check Pantone colors on screen. Open the program's Pantone color picker and compare the on-screen Pantone colors to the ones in the swatch book. On an uncalibrated monitor these colors should look at least similar to the swatch book colors. On a recently calibrated high-quality monitor each color should appear similar, if not identical.

A color monitor supporting thousands of colors can create instant comprehensives from the same document that will be used to produce the finished piece. Because scanned images may appear as full-color RGB representations on screen, they may look very different when separated and printed. Thus, evaluating a scan on screen is not the best and most accurate way to determine the quality of the scan. A color proof must be used.

5. Image manipulation software—Color adjusting

While an average flatbed scanner produces color scans suitable for newsprint-quality reproduction and some magazine work, problems can occur. The inability to capture detail, dull color, or a lack of information at the extreme ends of the brightness scale can make scans look unattractive and unclear. When printed at high resolutions on quality paper, these images may appear flat and lifeless.

Color images require accurate, or at least pleasing, color balance to attract the eye. Color balancing is more an art than a science. Considerable personal preferences creep into adjustments for anyone except a prepress professional. Color balance is best achieved by starting out with a properly balanced image scanned on an accurate scanner. However this is not always the possible.

Correcting color is very difficult. Moving slider adjustments around in either RGB or CMYK mode may not improve the image color balance. In fact, the image may look worse rather than better. The best way to approach color adjusting is to begin with the basics. The basic color corrections to make include adjusting brightness and contrast and then adding or subtracting the amount of red, green, or blue (or CMYK) to

correct for color shifts that may have occurred in the original image or were introduced by the scanner. In addition, the total amount of color can be adjusted to increase or decrease color saturation.

The last area to consider is the clarity of the image depending on the desired effect. All images, whether color or grayscale, share two characteristics—brightness and contrast. Brightness and contrast are important to color publishing. During scanning, imaging, and printing the brightness and contrast of an image tends to move toward the middle gray region. As images are processed, they lose brightness, detail and contrast. An image with proper brightness and contrast lends itself to color correction better than one with problems. The overall gray balance will ultimately affect how the color will look when printed.

An image brightness describes how light or dark the image is overall. For example, overexposing a photo in bright sunlight produces an image that is too light. Conversely, underexposing a photo during a sunset may produce an image that is too dark. Ideal brightness is achieved when the darkest elements are nearly black and the brightest elements are nearly white. All other elements in an image should fall evenly between these extremes.

Contrast is the difference in the degree of brightness between elements in an image. Images are said to lack contrast when too many elements are approximately the same brightness. A "contrasty" image is one where each element stands out distinctly because of strong differences in brightness. All images have a "range of contrast" consisting of highlight, mid-tones, and shadow colors. Images that contain black and white and color information that fails to span the entire range of contrast often look artificial to the human eye.

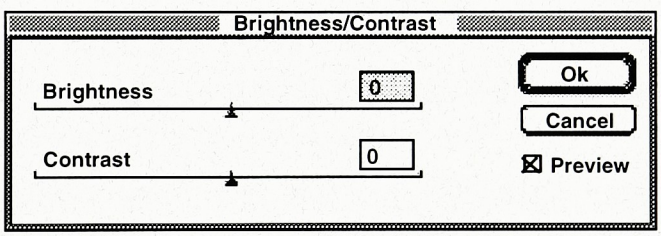
The ideal time to manipulate an image is before the scan. If an image is too bright or dark after scanning, it can be adjusted for within the scanning or image-retouching program. However, changing control settings and studying the resulting changes within a small preview box in the scanning software is difficult to see, particularly if the scans are large images and executed with a slow scanner. .Retouching software such as Adobe Photoshop may be more effective.

Photoshop is a software that enables scanned photos and artwork to be edited. The areas in which it helps the most are in clarity, image resolution and color correction. Under color correction there are some specific filters such as levels, color balance, brightness and contrast that improve the appearance of an image. Remember, however, that areas of an image where the detail has blended into dark shadows or bright white can not be corrected. If the information is barely present in the original, it will be lost during scanning.

Photoshop color correction controls consist of:

• Brightness/Contrast

This control effects highlights and shadows of an image. Brightness is the lightness or darkness of an image. Zero brightness equals black and full brightness equals white. Contrast affects the depths of gray within an image. Low contrast produces equal values between the shadows, midtones, and highlights. High contrast produces simply pure blacks and whites.

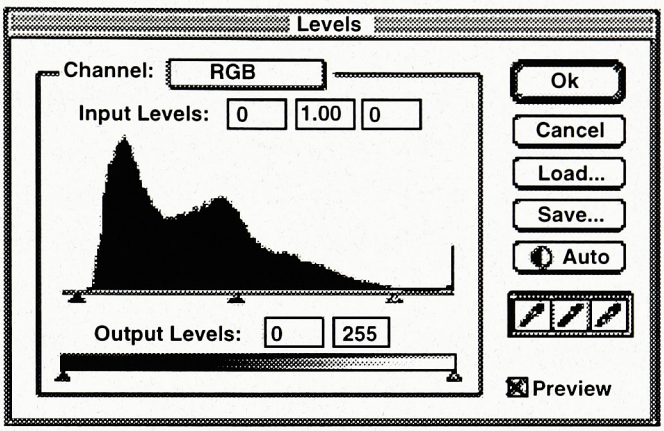


• Levels

The level control is the most accurate tool for precisely adjusting the highlight, mid-tones, and shadows of an image. Changes can be made to these areas to compensate for color shifts and to bring out detail. This control displays a histogram for the current document or selection area. A histogram is a powerful tool for evaluating images and image problems. This tool evaluates the image and then displays a histogram chart of the images overall brightness and darkness.

The left side of the histogram represents the darker areas of the image. The right side represents the lighter areas. The three triangular sliders at the bottom represent shadows, midtones and highlights.

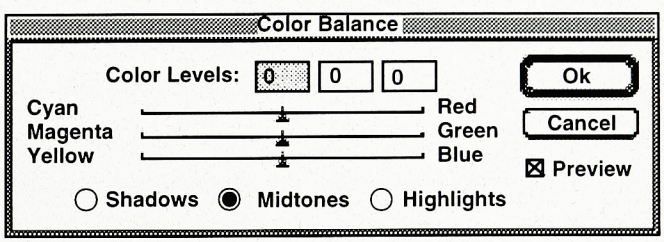
If the image has color, then each color component can be analyzed individually if desired. For example, a histogram with the lines clustered to one side or the other indicates an image either too dark or too light. A histogram with gaps between the lines indicates colors are missing, a problem common to color images scanned on inept color scanners. A histogram of a scan can tell a lot about the inadequacies of a scanner as well.



• Color Balance

Each pixel in an image is a color made up of a mixture of the three primary colors: red, green, and blue. The Color Balance feature allows the balance of these colors to be adjusted.

The Color Balance feature will affect an entire image or any selected portion. This control can adjust the relationship of the three brightness ranges of shadows, midtones, and highlights in RGB or CMYK. If an image is properly color balanced, all the colors appear natural.

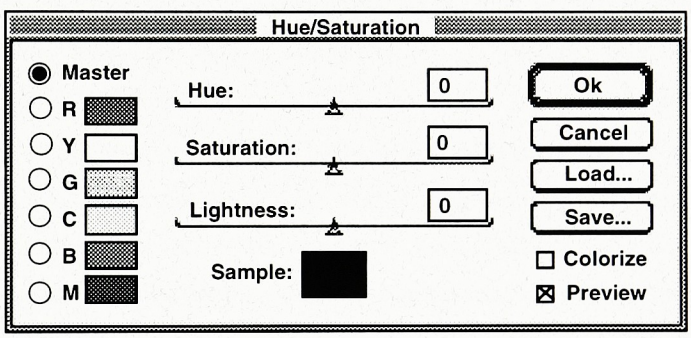


• **Hue/Saturation**

This control can change the hue (color) or the saturation (purity of color) of an image or selected area. It also can tint an image with a solid shade by using the Colorize command

Images often need color saturation adjustment to enliven their color. An image's color saturation level is the amount of color present. Images with low saturation tend to be dull. Images with high saturation have full, rich color.

"The Hue command is essentially equivalent to sliding all of the values in an image or selected area along a color wheel. By dragging the Hue slider, all of the colors change with respect to one another. By using this technique, multiple complex color variations of a specific image can be created, without much effort"[3]



• **Unsharp Mask**

Some scanners may produce good color balance, usually at the expense of detail in resolution. The scanner's ability to resolve the fine details of an image and to make even color transitions is a sign of a quality scan. Many images lose focus during scanning and this makes them look soft and flat, lacking definition and subtle detail. Because each step in the film reproduction, plating, and the printing process will exacerbate these problems, a filter such as Sharpen or Unsharp Mask can be used to help alleviate this problem. These filters make the scanned image appear crisper by enhancing changes in color or brightness, restoring the sense of focus and detail that was lost in the scanning process.

[3]David Biedny and Bert Monroy, The Official Adobe Photoshop Handbook, (New York: Bantam Books, 1991), 169.

The Sharpen filter performs the filtering over the entire image evenly. However, Unsharp Masking is the superior choice because it is the most accurate way of creating a controlled sharpening effect. It locates hard edges within an image and adds contrast to delineate them. The soft edges are usually the primary reason an image appears soft or out of focus after scanning.

"Unsharp Mask has its origins in the traditional non-computer techniques developed to sharpen images on film. The process essentially consists of taking a film negative, creating a blurred positive version of the image, sandwiching the two together, and shooting the results onto a higher-contrast photographic paper. "[4]

Photoshop's Unsharp Mask essentially does the same thing digitally. When the filter is used, the image is copied. The negative is made, blurred, and averaged with the original image. The results are brightness balanced and the image comes out sharpened only in the areas where there is substantial brightness differentiation.

Be careful not to over-sharpen by applying the filters too many times. This will cause the image to appear grainy and unnatural in print. Before sharpening, check the image one last time for scratches, glitches, and undesirable marks. Sharpening filters make these anomalies more apparent.

Well prepared scans are critical for the color publishing process. With careful attention outstanding results can be achieved by giving proper consideration to the scanning methods, resolution settings, and enhancement software. In the next section outputting the corrected images will be discussed.

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[4]David Biedny and Bert Monroy, The Official Adobe Photoshop Handbook, (New York: Bantam Books, 1991), 204

Preparing to Output Finished Images

Besides scanning, there are several other criteria that have to be taken into consideration before going to press with the final image. One such area that needs careful attention is the conversion of the image from RGB to CMYK. In this conversion the colors become altered and need to be checked for printability. Other areas for consideration before final output are: file size, portable storage, color printers, test prints, dot-gain, screen frequency, and service bureaus.

Conversion from RGB to CMYK

One issue that affects Macintosh color publishing on a fundamental level is the incompatibility of monitor screen color with printed color. This difference involves the projection of additive and subtractive color. The RGB colors on a monitor screen are created by adding light to change a black-appearing screen. In contrast, four-color printing uses colored inks which obscure the paper's white surface and subtract reflection of certain colors, making the desired color visible.

Obviously, the monitor's screen can represent brighter colors than the printing process, because the light on the screen is much brighter than the white of a sheet of paper. For this reason, RGB color on the monitor can create a number of vibrant hues that can not be reproduced in print. Thus, a conversion from RGB to CMYK is necessary.

The four-color printing technique using process color or CMYK color is employed to print full-color images. Images are broken down during color separation into cyan, magenta, yellow, and black components. When recombined on press, these process colors are printed as combinations of dots to give an approximation of the original color and detail. Much in the way RGB works, the colors magenta, cyan, and yellow are capable of representing almost any color when mixed together in varying amounts.

Using the CMYK process color method, some colors shift into other related colors, The finished printed image generally looks very much like the original. CMYK colors also relate fairly well to RGB colors: red in

RGB becomes a combination of magenta and yellow in CMYK; green in RGB is composed of yellow and cyan in CMYK; and blue in RGB is made up of cyan and magenta in CMYK. While in theory solid cyan, magenta, and yellow will produce black when mixed together equally, in practice they create brown. Black adds crispness to shadow areas and makes the image more convincing on paper. A true black is not available in the RGB system. Black is actually the color of the monitor screen when an area of light in the tube is turned off—and this varies from gray to green.

Color Density

While RGB images must convert to printable CMYK colors before going to press, the results of the conversion may not be suitable and the image will need to be re-examined. To compensate for color differences, CMYK simulation mode is available within some software programs for direct manipulation of images. One advantage of working directly on images in this mode is fewer surprises when RGB images are converted to CMYK images. Some CMYK simulations limit the number of RGB colors that can be created. Unprintable ones are not available.

Some of the most problematic colors are intense RGB colors. They often can not be printed with CMYK inks. For example, if there is a substantial increase in the color saturation of a washed out photo and it takes on a "neon" look in some of the stronger color areas, the image may have colors that can not be simulated with CMYK inks. The way these colors can be checked is by measuring their density.

In conventional printing, density is checked by a powerful tool called a densitometer. This tool can measure how "dense" a black and white or process color is. For example, a reflective densitometer is used to measure the amount of CMYK ink on a press sheet. To use a reflective densitometer, the tip of the densitometer is placed over the area to be tested. Pushing down on the densitometer brings a sensor almost into contact with the paper or proof. A reading of the density then appears in the window as a percentage of the measured color. This number will give the printer an approximate idea of what is happening to the dot information, ink, and/or paper.

On the computer certain software is available to simulate this reading. Photoshop handles this task with the GET INFO window. A suspect color can be checked by picking it up with the eyedropper within Adobe Photoshop and opening the color picker. If the color is unprintable, a warning triangle with an exclamation point will display. By clicking on the triangle, Photoshop will substitute the closest printable color. This triangle also will show when an unprintable color is picked for painting or retouching. As the densitometer tool icon is moved across the page, a read-out shows how much cyan, magenta, yellow, and black ink are being used to create a color. A shadow area measuring 370 percent total build-up will obviously require correction to reduce ink density before printing or the image will be very muddy.

After an image is color corrected, a proof should be made to determine how accurately the software has interpreted the color conversion and retouching process. But first, there is the consideration of image size and transportation to the service bureau.

Saving files and portable storage

When attempting to process color images that take up more than 30 megabytes, there is often a size barrier. Images this large choke imagesetters and result in monstrous bills for overtime charges and rerunning defective film. Color publishing stretches most Macs to the limit. Giant files will crash, produce poor quality images, or sometimes result in unusable output.

Understanding color representation in memory is necessary because full-color files are huge due to the amount of memory required to store each pixel in the image. Storage and memory are always at a premium in a computer system. The smaller the files, the faster they can process. However, the large color files hold more information in the form of more colors or more pixels for a larger image. Balancing these requirements will make maximum use of the computer resources.

Signs that an application needs more memory include: frequent unexplained crashes when working on large files; extremely slow

response when making changes and carrying out commands, and "Out of Memory" dialog boxes that appear on screen.

If a black and white image is scanned in full-color format, it will take up as much room as a four-color image although there is only one color in the image. The resulting file will be approximately 32 times larger than it needs to be a waste of storage and processing capability. On the other hand, a full-color photograph for use in a high-quality brochure must use full 32-bit color to store the image. This is the only way to represent the full spectrum of colors in the photo. If this file were saved as eight-bit color it would look dithered and unnatural even though the file would be smaller and easier to store and image. Eight-bit color should only be used for screen representations or for files that will not be separated. Eight-bit color does not have enough information for adequate color separations.

Saving files in a proper format can also help manage the size. There are a number of file formats used by the Macintosh for storing and transferring graphic files. Each of these has advantages and disadvantages. Some support color publishing better than others. In addition, not all programs support all formats, or they provide support that is limited, only partially compatible, or unpredictable. Although there are many types of file formats, the most commonly used are EPS, TIFF and PICT. An awareness of the configuration of each file and its strengths and weakness will help prevent problems at a service bureau.

An **EPS** file format stands for Encapsulated Postscript, probably the most powerful file format for color publishing, but not always the easiest to use. Encapsulated Postscript provides a vehicle for producing highly detailed images that are portable across a wide range of computer systems and output devices. EPS files are stable and produce predictable results when outputting images. This format handles bitmaps as well as object-oriented illustrations.

However, saving a file as an EPS file rather than a TIFF or PICT will take substantially more disk space and memory because it contains so much code. Large EPS files present logistical problems for small or congested hard disks and make transporting files from the Macintosh to the service bureau difficult.

A **TIFF** file is a standard format used for high-resolution bit-mapped images like those generated by most scanners. The name is an abbreviation of tagged image file format. A TIFF is currently capable of supporting grayscale and full color at nearly any resolution. TIFF is a standard that has been adapted to other computers including the IBM PC. TIFF is strictly a paint-type format. Many scanners and paint programs use TIFF as their default representation. TIFF, along with EPS format is the standard for files that will be color separated. Files saved in this format are compatible with all page layout programs, retouching programs, and most paint programs.

TIFF offers easy compression of large images if the LZW compression option is selected in the originating program. This kind of compression is "lossless," so the entire file is maintained with no data compromises. Files compressed with this option remain more than half their original size. This does save hard disk space, but not all programs can directly open compressed TIFF's.

A **PICT** file is a standard format for object-oriented graphics. PICT supports full-color bitmapped images similar to TIFF. PICT also supports object-based draw images created by MacDraw and most illustration packages. PICT files tend to be more compact than either uncompressed TIFF or EPS graphics. This means that they take up less hard disk space and often image faster at the service bureau. PICT files can also be opened by almost all Mac graphics and page layout programs. With a translation program they can be imported into an IBM PC environment.

However, PICT images used in some programs produce unexpected on-screen results. The rendering may appear much larger than the measurements specified within the application or scanning software. This occurs because the program displays the PICT at 72dpi regardless of the file's actual physical size and resolution. When this occurs, the higher the resolution the larger the on-screen image appears to be. While this makes retouching, accurate cropping, and resizing difficult, the picture will usually print and image at the correct size.

Another potential problem with object-based drawings saved as PICT can occur when a drawing is moved between applications. Some items may move around on the page, change their appearance slightly, or disappear altogether. This usually requires only minor fixes although major surprises do occur. Working with PICT is really the only way to learn which programs transfer PICT files best and where problems will creep in.

Surprisingly, there is considerable missinformation on file formats and thereare differing opinions on which format produces the most reliable and consistent results. Which should be used? It depends on the project and which formats are best supported by the color publishing software tools being used. Calling the service bureau is also an option.

Proofing for Output

Today, when going from the Macintosh to press, far greater color accuracy is becoming possible. New technology allows print houses to print images directly from the computer screen to the press, plate. None of these advances in technology and printing techniques are completely fool proof. The only way to minimize on costly mistakes is to run test proofs.

To proof an image is to determine how accurately the colors are interpreted on paper before the final printing. In the color printing world, there are several kinds of technology that produce color proofs from the Macintosh. The results from these various systems look distinctively different. Even a company's own implementations of the same technology produce color printers with strikingly different output. The reason that there is more than one color model: None of the models can accurately reflect all the relationships among the entire range of color possibilities without being too convoluted too understand and apply. A model that best suits the immediate output needs should be the one used for that particular job.

Color printers fall into four categories: Some Ink-jet and thermal wax printers at the low end, solid toner printers somewhere in the middle and dye-sublimation printers at the high end.

- Ink-Jet Printers deliver colored dots out of disposable ink cartridges. This carefully measured spray of ink is applied to paper through multiple passes on each page. The newest ink jets produce colors not only by regulating dot sizes but also by adjusting how much ink is sprayed onto the paper. Ink-jet printers often require special paper to get the "best" output. Even on these expensive papers the ink spreads when it hits the surface. This spreading can cause ink-jet output to have a slightly fuzzy or out-of-focus appearance.

- Thermal Wax Printers utilize colored wax that is forced off four panels (one each for cyan, magenta, yellow and black) in a roll of clear plastic onto the paper to create an image. Thermal wax printers can produce shiny images rich with color and stunning clarity. However, some models produce obnoxious patterning when they mix colors.

- Solid Toner Printers release a powdered "ink" to create a colored image in much the same way a laser printer or photocopier works. In fact, color copies using this technology produced by Canon and Kodak take output directly from the Mac and produce dazzling 11" by 17" color images. These printers may be connected to the Mac via systems provided by the manufacturers or by EFI's Fiery ColorLaser controller, which provides better resolution and faster processing than the controllers provided by Canon or Kodak.

- Dye Sublimation Printers use a solid dye that is changed into a gas to create an image on special paper. The best of these printers produce results that look almost as good as a photograph. The printed image is not made up of observable colored dots or dither patterns like ink-jet and wax technology-based printers. Unfortunately, while these printers produce beautiful color images some do an inept job of reproducing text because they are not Postscript compatible.

When trying to determine what printers will produce the most accurate

color proofs, the best way is to simply test the printer. To test a printer, set up an image with a series of colors using scanned images. Then use it to produce output from the same program on each color printer under consideration. There are three main areas that can be looked at to determine if the printer has good quality output: color balance, consistent color output and type output quality.

For color balance, look for output that shows as little patterning or dithering as possible. Look also for an image with strong, bright color. A murky appearance that is shifted slightly towards yellow, red, or blue is unacceptable. Some color printers consistently produce color that looks dull or shifts towards one color or another. The best way to test this is to use the same color scanner to produce output from the same program on each of the different color printers under consideration.

To check for consistent color output run a sample and then wait a week or two and run it again on the same printer. Then compare the two samples. If the color has shifted significantly between the two tests then the printer may produce variable results according to the humidity and amount of day-to-day use. This makes the printer of little use to a designer concerned with consistent results.

The best printers produce twelve-point type that look almost as good as a 300-dpi black and white Post Script printer. Printers that produce grainy looking hard-to-read type at twelve point are difficult to use for proofing. In other than dye sublimation printers, this may also point to a fundamental weakness in the printer design that will result in soft-looking images every time.

After the test proof is made and reviewed, determine the best printer for the finished image proof. Remember to use the printer that is appropriate for each job and keep notes on the result so they can be referred to at a later date.

Printing the finished image

Once a test print is made, analyzed and then corrected the image is ready to go. The last two steps in color publishing are to send for color separations and to have the images printed. With these last steps it is important to be aware of several final things, such as line screen, moirés and screen angles.

The process of using screens to break images down into printable dots is a technique that makes lithographic reproduction of black and white and color images possible. Screens and screening become complicated when one screen is layered on top of another. This is what is done to reproduce process color images and screen colors. There are two important aspects for specifying screens before images are sent out for color separations. They are screen frequencies and screen angles. Each of these will directly affect the quality of a printed image

The first and easiest specification is screen frequency. Screens are rated in *lines per inch*. Lpi refers to the resolution used to break the image down into printable dots. This resolution is called *screen frequency*. This term is used to refer to screen resolution in page layout programs and color separation software. The higher the lpi rating, the higher the printed resolution and the more halftone cells.

One of the most serious and pervasive color publishing problems—whether using the Macintosh or conventional techniques— is dot gain. This is the amount by which a halftone cell is expected to shrink or expand during the printing process. It can also be exacerbated by incorrectly calibrated imagesetters, improperly processed film, the wrong paper choice, and excessive ink extrusion levels on press. These problems can result in murky photos and gummed-up presses. Although not all of them can be prevented, it is important to understand dot gain and paper choice.

This has substantial impact on the screen frequency that is used for the document. Newsprint images, for example, are typically printed on very porous paper and a halftone cell can be expected to bleed into the page and expand by about 30 percent. The line screen needs to be very low, at

about 65 to 85 lpi or the image may become muddy. Magazine ads on the other hand use much better quality paper and can print at a finer lpi of 133 and higher.

The second area of consideration is how screens are aligned with each other in order to be less noticeable when printed. In the case of black and white images the screen is usually rotated 45 degrees from horizontal. This rotation allows the eye to see the image without immediately noticing the screen.

In color publishing, screen angles become complicated. Instead of only one screen as used in a black and white halftone, four screens are superimposed on each other to convince the eye that it is looking at a continuous tone photo. The finer the screens the more convincing the effect. Each screen must be rotated so the dots do not print on top of those from other screens. Screens assembled on top of other screens at incorrect angles can create a noticeable patterning called a moiré. Moirés are a serious problem in printing particularly to color publishers working on the Macintosh. The best advice for avoiding moirés and other potential problems is to leave the color separation software settings alone! The printer will usually be able to provide the information needed to set up the file the proper way and getting the right output.

Choosing the Right Printer for Macintosh Color Publishing Projects

When choosing a printer for a color publishing project, the task at hand is to match the right kind of shop with the best price for the work. It helps considerably to use a print shop that prints a lot of projects originating on the Macintosh, if the job will be close to final form at the service bureau, complete with traps and separations. These organizations will help identify and iron out problems that an ordinary printer will overlook. Unfortunately, some shops have had experiences where a desk-top based job was wrong in print and they were blamed.

These printers may look at the work with disdain and suggest that they will print the job only if the designer setting up the file will accept the responsibility for any problems. Do not agree to work on this basis. Instead find a printer with Mac experience. A few simple steps that may help in locating a good printer:

- Identify prospective printers through referrals from other color publishers or from a service bureau that handles color work. Also, consider any shop with an in-house Mac based service bureau that handles color jobs.
- Call to discuss jobs and type of work they do.
- Get samples of work and see if its possible to see work on the press.
- Look for work that equals the project to be run in its complexity and study each piece for crisp color, clean solid areas of ink, and perfect registration in process color images.
- Get at least three quotes and do not make the final selection on price alone. The overall impression of the shop, its print quality and its Macintosh color experience should be considered.

To color separate a job containing scanned images and screen colors, consulting with a knowledgeable print shop—preferably the one that will be printing the job—will help tremendously. Printers naturally have an eye for problems and their expertise can be used to help set parameters for a number of technical specifications in the color separation process. If the service bureau is a responsive one that takes the time to discuss jobs with the print shop, the more technical aspects of color separations and screen color can be handled by following their advice.

In the world of color printing, terminology is bantered around by just about everyone. When computer jargon is added to design and printing lingo, the mix can be downright intimidating. Pretending to understand may cause incorrect process changes or specifications and may be regretted later. One of the best ways to cut through jargon is to ask for an explanation of every phase. Carefully question both the service bureaus and the print shops to see if they understand the job and whether or not an appropriate amount of information is exchanged to insure proper set up of the files. Ask enough times and the purveyors of technical or cryptic language will stop using it. In the meantime, there are a few basic elements that have to be included with every job . Remembering these things will minimize the frustration level of the service bureau.

Always check and see if the service bureau has the same software and version that the file being imaged was created in. If not, the software needs to be included with the document. Make sure all the copy has been proof read. And last, be sure to include image files and fonts with every job.

Proofs and Proofing

Once again the first line of defense against mistakes at the service bureau when imaging color jobs is the color proof. It gives the designer and the client one last time to check imagesetter calibration. It is important to see how screen color and color separations look, to check layout, type, color combinations, and assembly of brochures or mailers. If the job uses only spot color, a color proof of the job may not be needed. It is important to check the traps in the document to ensure that they imaged as expected. Keep in mind that the color seen in a proof will vary on press and specified dot gain compensation needs to be made for highly absorbent paper stocks. Images and screen colors may appear lighter than planned. The more dot gain compensation applied, the greater the color shift will be in the proof. In addition to seeing a proof at the service bureau the printer may also show a blueline proof that indicates how the job will fold and specifies any die cuts. The three most popular proofing systems are: Bluelines, Matchprints and Cromalins, and Color keys.

- Bluelines is a blue (or sometimes brown) proof produced on paper. They are the least expensive and easiest of the proofs to produce and are usually used to proof copy and check that a job has been assembled correctly by the print shop.
- Matchprints and Cromalins are color proofs that are created from four layers of plastic representing cyan, magenta, yellow, and black. Extra layers are added to the proof to represent spot colors created with Pantone colors. These proofs are used to check color within separations, screen colors, and tints of other colors. One disadvantage of Matchprints and Cromalins is that they often look better than the actual job does when on press.

- Color Keys are color proofs used to show the entire layout of a job. Like Matchprints and Cromalins, they consist of four layers. Extra layers are added to represent additional spot colors if used. Unlike Matchprints, these proofs remain as separate layers tacked down only on one side. This allows the layers to be lifted and each color is to be studied one at a time. Color in color keys is not as accurate as that created in Matchprints. This is due to the film material that has a faint yellow tint to it. It is best used for checking color jobs for correct assembly and for checking each layer of color for problems.

In the idealized world of Macintosh color publishing, color from scanner to monitor to print shop is accurate through the entire process. In actual practice, however, Macintosh color fidelity has a long way to go to reach this ideal state. This is not to say accurate color outputs are not possible, but it takes experience and practice.

Summarized here are the basic problem areas that have just been discussed:

- Color scanners shift tonal balance and hue.
- Macintosh monitors require calibration to be even remotely accurate.
- Extremely bright colors that can be displayed or specified on screen may not be printable when converted from RGB to CMYK.
- Color retouching software can treat color inconsistently.
- Application software uses inconsistent screen values at the imagesetter.
- Imagesetter calibration and precision varies among models.
- Colors shift on press because of ink color imperfections and dot gain.
- Printing papers have differing textures and absorbencies that shift color.

There are other less serious issues but this list gives a general idea of where the main problems are. Unfortunately, there is no single solution for all of these problems. There is a variety of techniques and work using conventional methods to process large high-resolution images, using smaller image sizes, or enhancing scans through programs such as Photoshop. Fortunately, many of these problems are addressed with improvements to Macintosh color technology.

CORPORATE IDENTITY SYSTEMS

A picture is worth a thousand words, because a well-chosen image gives an idea, process, event, or person a life that words alone cannot convey. Pictures catch the eye and supplement the text with additional detail that makes it easier to understand and livelier to read. For the desktop color publisher the ability to add images to designs is vital for creating work that catches and keeps the attention of the reader.

For this reason businesses today are becoming aware of the importance of creating and maintaining a powerful graphic identity. Big businesses rely on graphic recognition of logos to help convey their message. Graphic identity is no longer merely "a logo" but instead it is a visual symbol. Visual identifiers once seen as cosmetic or decorative elements are now considered part of the total advertising strategy, reflecting well-thought-out business plans. As such, they can have far-reaching implications for the companies who develop them.

Graphic Designers play a very important role now and have increasing responsibility to devise an identity that is both effective and appropriate. For better or worse, today's graphic design has as much to do with business strategy as with art and innovation. However, the most successful designs do not sacrifice the integrity of the design for the hard sell strategy of the corporation. They try to get to the heart of the company uniqueness and express it across the full range of visual communication, thus, defining the corporation and its goals through a carefully formulated design plan. A corporate design plan has to be strong and clear to convey the distinctive corporate image.

"Image is how you're perceived; identity is who you are. What is called "corporate identity" is the graphic expression of both. As a graphic expression, a company's identity can be created and can influence its destiny. "[5]

Regardless of appearances, corporate or graphic identity is very complex. It encompasses not just a logotype or symbol but also innumerable associations, both strategic and emotional. And then, there

[5]Rose DeNeve,The Designer's Guide to Creating CORPORATE I.D. SYSTEMS, (Ohio:Northern Light Books, 1992), 3.

are the systematic applications of the identity to stationery, signage, posters, displays, printed communications, and now more than ever educational video's and CD-Roms.

It's important for designers of visual identities to have a basic understanding of how these many facets interrelate. Large corporations, for example, need to develop an identity hierarchy that clearly explains through naming, typography, and graphic identifiers. The graphic identity must consciously mirror the company business plan: Where the company is now and where it wants to go in the future while accurately reflecting who the company is in terms of products, services, and markets. Effectively communicating a graphic identity will maximize the company's image.

The Identity Process

A graphic identity can be as literal as a signature or a pure typographical application of a name. It can combine the logotype with a geometric or abstract form. Sometimes it can even rely on the graphic symbol alone. A symbol can be a direct depiction of the company name or business, or it can be a pure abstraction with no inherent meaning at all.

Most graphic identifiers combine elements of more than one type, the advantage being they gain benefits from each. Combining a logotype with an abstract mark, for example, will add to the recognizability, eventually allowing it to be used without the name. An abstract form imprinted with initials doubles its visual impact and so increases its likelihood of recall.

A well conceived logo-mark is the key to an effective identity program. It will identify products and services differentiating the company and its businesses from others in the field. Also it can communicate the company personality and culture. Over time a logo-mark can be so strong that it immediately evokes an emotion. This kind of logo-mark symbol can be very powerful because, whatever feelings they evoke, the viewer will come to associate those emotions with the entity being symbolized. Obviously whatever its form, a corporate logo-mark must be developed very carefully.

Much has been written about logo-marks and their use in design as well as about their psychological ramifications. Whether abstract or figurative, the best defy logic and operate on a psychoemotional level. This appeals to a wide variety of audiences through shared human values. The most successful ones reinterpret ordinary things in an extraordinary way.

Contemporary symbols have lost a certain utility simply because there are so many of them. One company implements a successful and widely acclaimed identity program: soon its competitors are following suit, often in blatant imitation. The result is a confusion of generic symbols, none of which meet the criteria to which they were designed.

Because of this trend, many companies are returning to identifiers that are more figurative and more descriptive. These might be cartoon characters, animals, or other identifiable objects coupled with meaningful names. These images are embodied with more personality than yesterday's abstract symbols. They are usually more flexible in application as well.

Graphic identity must be grounded in the nature of the company business, traditions and culture, products, services, and markets. The process of developing a visual identity for any business can be broken down into major three steps:

The first step is to research and analyze the subject. Learn all about the client. Client meetings are very important for gathering insights and information. Any materials accumulated at these meetings should be analyzed thoroughly. Examine the nature and structure of the company and how it is perceived both inside and out. This evaluation will yield a clearer definition of the client's identity issues and help establish goals for identity development. This phase is imperative because a missed step or overlooked application could throw off a later solution. Also at this phase it is a good idea to evaluate what competitors are doing.

The next step in the identity process is design development. At this point in the development stage, a solid foundation for the design work has been laid. Based on the findings of the research and analysis, a designer

should be able to begin experimenting with a graphic identity. The information gathered in the research and interview phases will constantly shape ideas and provide direction during the design process. The criteria established serve as constant reference points for gauging design appropriateness. Without such preparation, the entire identity system might go completely astray.

The last area of the graphic identity process is design application. In this area the designer has the real challenge of bringing client insights into the visual communication. The graphic solutions must become reality.

Beyond the development of the graphic identifier, or logomark, lies the corporate identity testing ground: its application to the range of materials a company needs to conduct its business every day. Implementing a corporate identity is a significant area of the design process. Systematic, consistent application is the most important part of a corporate identity program. A strong corporate identity haphazardly applied will be less effective than a weak identity applied with diligence.

One important thing to remember is whatever the company's size, consistency pays. Consistent application is what gives the corporate identity its strength, no matter what form it takes. All else being, equal a company with a strong, well-applied graphic identity will beat its competitors every time.

Some common applications of the graphic identity are:

- Letterheads
- Business cards
- Envelopes
- Direct mail
- Press releases
- Posters
- Invitations
- Brochures
- Annual reports
- Newsletters
- Certificates
- Educational information
- Ads for products/services
- Human resources documents
- Exhibition materials
- Directional signs
- Exterior and interior sign systems
- Corporate flag
- Promotional materials (T-shirts, hat, cups, etc.)

The new areas to be aware of are:

- Videos
- CD-ROMs
- Educational kiosks

When looking at all the possible applications for the graphic identity, it is important to keep in mind that each of these steps builds one upon the other. All are essential if an identity program is to be truly complete and effective.

New Graphic Possibilities

With the challenge of creating a dynamic graphic identity it is reassuring to know that with the aid of the Macintosh and specialized graphics software just about any kind of experimentation is possible. In the past many designs were limited by the inability to recreate the same design for a variety of applications.

The Macintosh provides a full complement of tools for creating and manipulating images. Scanned images brought in from the outside world via scanners can be imported into painting and illustration programs and then manipulated into completely new composite images. The Macintosh also has software programs for desktop painting and illustration that allow designers to create images from scratch.

Illustrations in general become much easier. While the color pencil and opaque watercolor paints familiar to all designers are not at hand, software functions that substitute for these tools are available. Variable pressure watercolor brushes, airbrush tools, colored pencil and even charcoal and pastel, can all be simulated. Effects such as computer-perfect linear gradation of color can be achieved in seconds and complex curves and polygons can be adjusted as many times as needed.

Now a rough composite can not only be printed on a color printer to give the client a clear idea what the finished piece might look like, it can also be used as a template for the finished work. However, design direction and possibilities may become confusing with the many new options to choose from in software.

Paint-type graphics versus Object-oriented Graphics

The first thing to understand is the two types of graphics that can be created on the computer. The first, raster graphics, is a paint-type image. These images are comprised of pixels. These pixels may represent simple black and white, grays, or colors. The second type of image that can be created is vector-based graphics or object-oriented graphics. These images are composed of individual "objects" and each one remains a separated entity that can be individually manipulated. Unlike paint-type graphics where the image is described by pixels, each object is described mathematically to define its shape, angles, and fills.

Paint-type graphics are made from a combination of dots. The quality and detail of these images are a function of their resolution that is specified as "dots per inch" or "dpi". Images made up of a larger number of dots per inch have greater clarity and detail, as discussed on page 24. When painting a line in a paint program a series of dots are being added to the image. If the new line overlaps a previously drawn element, the first element is partially replaced by the new one. Paint-type images are the only way to represent a scanned image on the Macintosh. As a result, a scan can be retouched dot by dot. A properly scanned image can be extensively retouched. The image can be added to, pasted into another image, or completely changed from within a paint or retouching program. The image can be magnified on screen to retouch glitches in scans and to identify and fix rough edges and stray dots. Since paint programs employ dot structures, they allow textures similar to those created with conventional brushes and paints to be produced.

The more powerful paint programs offer masking capabilities. When using a real airbrush, an adhesive plastic material (the Mask) is carefully cut and laid down on the surface where paint is not desired—much like a stencil. In computer terms, masks work much the same way, a mask can be created that allows an entire image to be pasted down on top of another image. With a Mac you have full control of where an image does and does not show. Ghost-like effects are possible by creating a mask that allows only a percentage of an image to be laid on top of another image.

Paint-type graphics may not be suitable for drawings that contain a large number of hard-edged lines. When paint-type images are output at high-resolution on the imagesetter, edges of circles and diagonal lines may appear stair-stepped or rough. This can be worked around to some degree by painting or scanning at a high resolution. In this situation it may be better to re-create the image in an illustration program.

Object-oriented drawing programs use mathematically defined "objects" rather than dot structures to define the image. This method of representing images is very powerful for creating detailed illustrations of all kinds, especially those comprised of hard-edged lines that employ precise color fills and carefully defined variations in color. When printed at higher resolutions the line actually appears more solid. Because the line exists as a command, if the size of the image changes, the algorithms used by the program will automatically specify where the line will be drawn and how big and wide it is in proportion to the new dimensions.

In paint programs, each new element becomes integrated on one layer as part of the total image. In an object-oriented program, each object remains a separate entity, fully capable of being moved or discarded without affecting other objects. Multiple layers can be used to represent an image. These layers float either in front, behind, or on the same layer as all other elements and still remain independent of each other.

Employing color into a Graphic Identity

Color can be used to set a mood for a publication, whether it is quiet and classy or eye-popping. Color is a powerful tool for making brochures, posters, direct mail pieces, and ads stand out from the competition. Color can also be over-used or used ineffectively, negating its value.

When designing with color it is important to keep in mind that some colors are more "optical" than others. A bright red catches the eye much faster than a pale blue. Using the pale blue for a key headline and bright red for an unimportant detail will result in the secondary item getting more notice than the primary message. It is important to choose colors for maximum impact.

It is also significant to be aware that some colors "vibrate." When bright red and bright blue touch in print, the eye has difficulty determining where one color stops and the other starts; thus the colors seem to vibrate. Green with red and some other combinations have the same problems. While this can be used as a design element on rare occasion, it can also become an irritating and work against the design.

Some things to remember about colors are they go in and out of style and can be overused. For example medium blues are the most popular color for publications. Using this color for a publication may make it look like one of the crowd, lacking impact as a result. Use the right dose of color: loud, bright colors in small amounts and light, pale colors in larger areas. When designing with colors, particularly bright ones, leaving lots of white space in the publication will help. This allows the eye to rest while looking at the piece. White space also makes the color seem fresh and crisp. Too many colors confuse the eye and tire the mind. Body copy should be easy to read. Text is easiest to read when printed in black or dark gray.

There is not any one prescription for making great corporate identity systems, but there are common threads that run through the best and that help make them great. This section serves as a guide and simply reflects some observations. Any one of these rules can be broken and still create an outstanding corporate identity. When searching for what looks fresh and inventive on screen, remember when transferred to print it may look clumsy or incomplete. Always study from the pros and examine each masterpiece carefully.

MULTIMEDIA AND INTERFACE RESEARCH

Multimedia is hard to define because both its scope and applications are so broad that it defies a simple explanation. At its most basic, "multimedia" refers to the personal computer's growing ability to process not just text, but all sorts of visual and sonic information. Thus, at the simplest level, it can be used to spruce up a corporate presentation with video clips, to read about a composer's life while listening to his symphony, or to use 3-D animation to visualize the interior of a new home—all on the desktop of the Macintosh.

There are many new and helpful ways that multimedia is being used. Through the ages information has been presented and absorbed in a linear fashion. Books are read from cover to cover, movies are watched from beginning to end. Even so, people have long recognized that this may not be the best means of communicating or retaining all types of information. Some people learn better if they can read more detailed information about a subject or perhaps see an image, to get a complete visual experience through a video.

The undeniable force and appeal of multimedia stem directly from the power of the visual image itself, a power that has only recently been tapped in the world of computers, although it is becoming readily apparent in everyday life. For example, "The Tulane county department of social services uses interactive touch screens to help people apply for Medicaid and other social programs. It's estimated that the system will save the county over $18 million per year in improved efficiency and reduced errors. "[6]

The world is going digital and there's no turning back. Sound, music, and graphics, animation, photography and video can be fed into an ordinary computer, combined and recombined into fascinating works of the imagination. Multimedia is even reinventing industries. Consider the world of professional video production. Traditionally it has been dominated by high-priced equipment and overpaid specialists. Now

[6]Peter Jerram and Michael Gosney, MULTIMEDIA POWER TOOLS, (New York: Random House Electronic Publishing, 1993), page 3

desktop editing systems based on Apple's QuickTime video standard are being released at prices that are spiraling downward even as features and quality are matching high end traditional systems.

Multimedia is being brought to the desktop by an unprecedented digital information convergence. All of a sudden computers can be equipped with different low-cost digitizers which convert everyday media (artwork, photographs, music) into binary format. Flat-bed scanners convert type, artwork, or whatever else can be stuffed onto the scanning bed. Video capture boards pluck and convert individual frames in real time and will play them back at full speed, full screen. Slide scanners will do the same with photographs, and Kodak's Photo CD provides snapshots with near-film resolution quality.

Once all of these things are in the computer there is a wondrous assortment of applications to help manipulate, combine, and re-shape—sound and imagery. Clearly, multimedia is a broad-based phenomenon that already has a far reaching impact in business, education, entertainment, and personal creativity. Its emerging influence on the desktop is being driven by increasingly sophisticated personal computers and by the metamorphosis of information into digital form.

Electronic publishing is one of the hottest areas in the computer industry. Multimedia is having a serious impact on this emerging phenomenon. Voyager has been turning out its annotated books for some time now and even mainstream publications such as MacWeek and Newsweek are experimenting with the new medium.

CD-ROMs are becoming one of the most popular ways to save and distribute all these new digital creations. CD-ROMs have numerous advantages for multimedia. They hold large quantities of information up to 650mb a piece. They are relatively indestructible, impervious to viruses and other contamination and they are not costly to produce and/or purchase. CD-ROM readers are also catching on very quickly. The players are also relatively inexpensive. Standard CD drives perform adequately for electronic books that don't have too many graphics. CDs have proven an excellent storage and retrieval mechanism for text, enormous amounts of which can be searched quickly.

However, standard CD drives are extremely slow for interactive presentations. When CD's began being used for multimedia presentations, the tremendous increase in the size and complexity of these images was offset by a small increase in drive performance. The fastest drives can get at data in about 150ms, a far cry from a fast hard disk, which has an access time of about 10ms. The CD-ROM is one of the driving forces of multimedia. Due to the overwhelming demand, the technology for the speed and efficiency of the drives is quickly catching up.

The type of multimedia presentation that are being created for CD ROMs span a wide range of subjects. For example, consider a trip to the Louvre. Hundreds of reproductions of the museum's works can be scanned. An animated tour guide can narrate in either French, Spanish or English. An understanding of the museum's rich treasures can be deepened by interactive maps, timeliness, glossaries, and essays.

Perhaps no other development of the modern age has the great ability to free the creative imagination the way this kind of interactivity does. Virtually any subject can be explored in this format, allowing the adventurer to go at their own pace and to review as often as needed.

Interface is the focal point and control center of any multimedia project. It brings the component pieces of text, graphics, sound, animation, and videos together into a cohesive whole. It is the all-critical graphical environment through which a user interacts with them. Creating an elegant and useful interface is where the real art of multimedia production comes into play.

Interface is a critical facet of a multimedia project. Screen design must be well thought-out from the perspectives of good graphic design, user-friendliness, and appropriateness to the content of the project. This is the situation where the design team composed of a producer, a designer, and a programmer must work closely to develop a design that is aesthetically pleasing and serves the more technical aspects of the project.

A skilled producer can create a delightful and powerful synergy among its various content elements, forging new ways for the audience to learn, experience, and understand. But for a successful result, a producer can't

just settle for the prettiest icons, the coolest music or the most impressive special effects. Content has to balance purely esthetic wishes within the realities and logistics of multimedia architecture.

How is the data going to be organized on the disk? Should users navigate through menus or a palette of icons, or should they get around by clicking and exploring the screen? How far can the user wander before getting lost? Is a highly animated interface too sluggish in it's performance?

Planning a multimedia presentation means not only gathering all the elements needed but also conceiving a structure and design for the program. Good interface design is extremely important, because it means the difference between users scanning the first couple of screens or really diving into the total experience. Information flow is important as well. The presentation and interface style of a multimedia project can attract or repel users with surprising force. The ideal is to have various areas where users can reach out and find data that will ultimately draw users further into your project, hopefully entertaining them enough to keep them there.

Design integrity is one of the most important elements of a good interactive project. Establish a look and feel immediately and then stick with it. Choosing a direction should be a conscious decision based on what is known about the audience. Then the proper use of icons, good screen design, logical ordering of content, and a consistent structure are all to follow that direction. An ergonomically designed interface will offer the user a logical flow between different functions. It should not force users to look everywhere for information and buttons, but rather maintain consistency in the placement of text, graphics, and navigational tools.

Keep in mind that unlike most viewable media, such as television or films, interactive multimedia is a non-linear medium. Free navigation to traverse back and forth easily among the sub-levels without having to return to the top level should also be a key feature. This will give the user choices and is more likely to keep their interest.

Some of the most popular CD-ROMs today offer very intriguing and educational experiences. But some also fall short in their interfaces, navigation and graphics. The following reviews six of the most popular type of CDs out today. Each is unique in it design style, interface and content.

CD-ROM Review

From Alice to Ocean ($46.99 from Claris Clear Choice)

Alice to Ocean is a photojournalistic essay, created by world-renowned photographer Rick Smolan. It describes Robin Davidson's 1700-mile trek across the outback of Australia and her adventure learning the ancient culture and language of the aboriginal people.

Although this CD is award winning and does have beautiful imagery, it was also one of the first its kind. As a result it is a narration with a limited amount of interactivity. The audio track, narrated by Davidson, leads the viewer through most of the information about the outback culture, history and language with very little individual exploration.

Animals ($49.95 from Software Toolworks)

This interactive CD-ROM allows the viewer to take their own private tour or a guided tour of the San Diego Zoo. There are over 300 exotic animals and exhibits. This interactive CD-ROM details the diet, habits, and habitats of more than 200 mammals. There are 150 mammal vocalizations and more than 700 captioned, full-color photographs. Also included are 45 award-winning, full motion video clips.

This CD does offer the viewer many different areas and options to explore. There is a tremendous amount of information to be obtained. However, when viewing the CD for the first time it is extremely difficult to figure out the navigation. There are two different sets of navigation pallets. One is for the immediate image on the screen. The other is for the overall. Navigation almost like the main menu stays on the screen the entire time.

The graphics are very bright and colorful, almost like a child's crayon drawing. This gives the impression that the material may be geared for a

very young audience. Yet, the interface is to difficult for a child too navigate alone. Another disturbing fact about the graphics is that the bright colors are never subdued when text is on the screen. Because this CD is very text intensive, the competition between the text and graphics becomes very difficult to focus on and is tiring to the eyes. This is a situation where the graphic element does not seem to be very well thought out.

Peter Gabriel's Secret World XPLORA 1 CD ($48.99 from MacPlay)

This CD takes a musical tour with Peter Gabriel as the interactive host. It shows a behind the scenes look at the Grammys and backstage of a concert . It gives the viewer the opportunity to remix a hit single and explore Peter Gabriel's most recent album, "US". This CD ROM features a collector's edition of a 60-page book with over 100 photographic images and more than 140 minutes of video and audio. There is a wealth of other hidden surprises to discover.

This CD is definitely geared to the MTV viewer. New things may be discovered, but it is difficult to find them again. The navigation of this CD seems completely arbitrary which is fine for the type of subject it deals with. If there was a reason to get somewhere in particular on the CD the viewer might become very frustrated. Over all this CD can be a lot of fun.

Myst CD ($49.99 from Broderbund)

This CD is a compelling computer adventure/mystery through several extraordinary lowland worlds. Discovery lies around every corner and up every tree. Every scrap of paper, rock, and sound holds vital clues to help the viewer unravel the tale of intrigue and injustice. The view becomes an integral part of this 3D photo-realistic world.

The graphics on this CD are outstanding. Every room has beautiful detail and fluid movement. The viewer can move freely. The entire feeling of this game, although mysterious and intriguing, is very lonely and depressing. There is very little action and the user is the main and only character on a deserted island. The goal is to discover why you are the only one. Many people find that they want someone to play this CD with them.

Ocean Below ($49.95 from Software Toolworks)

Discover the underwater world of scuba diving or explore shipwrecks and learn about sea life in exotic locations. This CD shows a fascinating menagerie of amazing creatures from giant clams, sea stars, shrimp, Christmas-tree worms, and other invertebrate species from beneath the seven seas. This CD contains 140 outstanding color images with narration plus CD audio. While its soundtrack of tropically spiced music plays along, this CD-ROM offers generous amounts of narration, photography, and video to teach the fundamentals of scuba diving equipment, techniques, and locations. Then it guides the viewer through an interactive dive in a location that is selected from a world map. The viewer peers through scuba goggles to observe shipwrecks, sunken treasures, coral reefs, and colorful aquatic life.

The graphics in this CD are also quit spectacular. The video is displayed in a divers mask helping the viewer get the sensation of being underwater. The explanations of scuba-diving and the marvelous creatures under the ocean are both practical and interesting. The interface is easy to follow and the graphics are very attractive. The only flaw of the graphics is the way some of the images are montaged together. There seems to be an inconsistency in size relationships to some of the elements, which in turn causes some of the images to look disproportionate and flat. The other area that gets a little monotonous is the repetitive action of the interface. In each location the same actions occur but there are different things to explore.

Living Books ($39.95 from Broderbund)

Living Books brings children's favorite books to life with sound effects, music, humor, and lots of animation—creating a whole new learning experience. When Harry D. Rabbit hits a home run off one of Earl's famous curve balls it lands in the spooky old house across the street. He and his friends tiptoe through the house in search of their baseball, stumbling across dozens of startling sights and sounds having a host of hair-raising experiences. As the computer reads aloud, individual words phrases and sentences are highlighted to help improve reading skills through word recognition.

Of all the CDs available today this type seems to have the least amount of flaws. Perhaps because of the type of subjects used or the audience, these CDs always keep going. There are constantly new things to discover and if the viewer doesn't click things happen randomly. They are amusing and fun for both children and adults.

Each of these CDs approach their subject differently and each is a success in its own right. The most important thing to remember when developing an interface for a multimedia project is consistency. Charting out the direction of the project will give it a strong foundation, and knowing the subject and audience will help target the designs.

Results

Technical and Output Procedure

In my technical procedure I put to use all of the conditions I learned from my research. First by selecting images that had good color balance and clear focus. Because all of the images I selected were preexisting printed images, it was necessary to read the line screen of the existing half tone before scanning. Knowing the halftone screen helps in preventing moirés and in obtaining the most amount of information from the image as possible. To determine the line screen I used a simple tool called a Screen Pattern Analyzer and Rescreening Key (SPARK). SPARK consists of a semi-circular pattern of concentric lines and twelve halftone tints of the most common screen rulings from 50 to 300 lines per inch. This tool is laid on top of the image to be scanned. The area of the semi-circular pattern that lines up with the line screen is the lpi reading. Twice the lpi reading is the appropriate dpi for scanning, as was discussed before.

After scanning the images, each was carefully examined. Most scanned images required correction to increase the sharpness or to adjust incorrect color shifts. Before making any adjustments on the scanned images a copy of each was made to return to if necessary. To keep the file size to a minimum and to reduce computer processing time, each image was reduced to the actual resolution and size appropriate for printing. This also made it easier to transport the image to the imagesetter as well.

For the best results, images should be resized and resampled in the color separation program. I selected Adobe Photoshop because of the vast image retouching and production capabilities. The size of the image was approximated by the average of the original images and the file capacity of the computer. By discussing my project with several different service bureaus it was determined that a 300 dpi resolution would be sufficient to achieve an output of 150 lpi.

Once the images were sized, each was studied carefully and compared to the original to see what corrections needed to be made. To get the most consistent results the following adjustments and filtering functions were made in this order:

- First the gray levels were adjusted by using the Levels and/or

Brightness and Contrast Filter. Color adjustment hinges on the correct tweaking of the range of tones between light and dark. The Levels Filter allowed for individual adjustment of mid-tones, highlights, and shadows. By comparing the scanned image to the original, appropriate adjustment could be made. Experimenting with these controls were useful in compensating for scans with inadequate contrast within the extremely dark and very light areas of an image. By using the sliders, details became more apparent.

- Color balancing was the next area to work on. Shifts in color can be introduced during scanning, giving the image a particular color that will make it unnatural in appearance. Color balancing is when the various colors were adjusted through a variety of controls to make the total image appear natural. Hue and Saturation and Color Balance were the filters used. In most situations the colors appeared dull and lifeless so it was necessary to increase the saturation to obtain richer appearing colors. Also, adjustments to the overall hue were necessary to coordinate the images with the background colors. In two situations the hue of the image needed to be dramatically changed. With the reptile background the blue needed to be shifted to green and with the invertebrate foreground the starfish needed to shift from yellow orange to red purple.
- After the photos were color corrected, Unsharp Masking was used to increase the focus if necessary. Images lose focus during scanning which makes them look flat. Scanned images may also lack definition and subtle detail. Before sharpening, images were checked for scratches, glitches, or undesirable marks. Sharpening filters make these anomalies more apparent. Each step in the film reproduction, plating, and the printing process will exacerbate these problems.

Unsharp Masking was used to sharpen parts of the image to make them crisper by enhancing changes in color or brightness and to restore the sense of focus and detail that was lost. Filtering of this kind was not always necessary because of the nature of the paint type illustration I was trying to achieve.

- At this stage I began to experiment with filters and montaging of the images. Once again, a copy of each image was made in case I needed to refer back to it, the details of this area are discussed under my illustration procedures.
- After the images were color corrected and montaged together, they needed to be checked and converted from RGB to CMYK for printing. The initial areas to check were the highlights and shadow points and then the color saturation of individual colors.

The highlight point is the brightest part of the image that maintains detail. When printed the highlight will print as the smallest dot on press, five percent or less away from solid white. Levels of brightness a few percent lighter than the highlight point will not print at all. The shadow point is the darkest point in an image that still displays detail. When printed, the dot color that represents the shadow will close, typically 95 percent to solid black. By zooming in on each image the printable areas could be checked with the eye dropper.

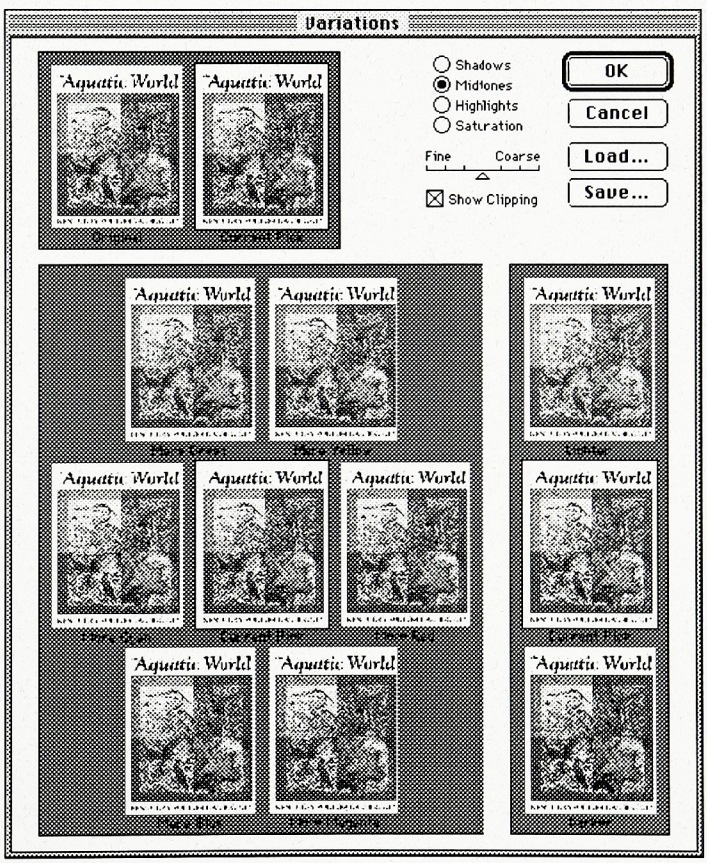
Color saturation is the degree of color richness in an image. Adjusting color saturation is relatively easy if it is done in small steps and if care is taken not to add so much color that the resulting image is unprintable. Because of monitor calibration problem,s it is possible to add too much saturation, resulting in neon like colors instead of soft pastels. Using the eye dropper tool I could tell which colors I might have problems with and was able to make the appropriate adjustments.

- The last area I needed to be concerned with was preparing the file for the service bureau. It was determined that a test sheet would be set up and run on each of the different processes under consideration. This test sheet would allow the opportunity to proof for color inaccuracy before running a final print. Modeling the test sheet after Adobe Photoshop Variation filter allowed me the opportunity to compare different degrees of color balance, contrast, and saturation variations in the image. Through this comparison the exact impact of each change could be measured and modifications could be made systematically.

To get the best results and most accurate comparison it was important

to handle the process consistently every time, from start to finish. Being consistent meant using the same techniques, hardware, and software each time. The scanner, computer, monitor, and color separation program had to have the same settings every time. Even the brightness and contrast on the monitor had to be marked so it would be consistent. It was also important to work with the same people at the service bureaus, to develop an understanding and familiarity with the job.

Keeping notes on my work became invaluable for recognizing problems and reference for future work with similar requirements. On the following pages is a list of service bureaus, the test sheet used, and the chart I created. In the chart there is a listing of each process, settings, results, and any problems encountered.



Service Bureaus

Digitech Publishing Incorporated—3M Dye Sublimation Print
478 Thurston Road
Rochester, New York 14619-1719
(716) 436-3100
Donna Catli

Chromatic Copy Corporation—Bubble Jet
6020 North Bailey Avenue, Suite #4
Amherst Development Park
Amherst, New York 14226
(716) 831-8108

Educational Technology Center Imaging Service—Dye Sublimation
Wallace Library A-600
Rochester Institute of Technology
Rochester, New York 14534
(716) 475-2555
Tony Gerardi

Printing Prep Inc. —Giant Color
12 East Tupper Street
Buffalo, New York 14203
(716) 852-5011

Sentry Imaging —Electrostatic
571 South Avenue
Rochester, New York 14620-1383
(716) 262-2030

Quadracolor Express—Iris
72 Cascade Drive
Building 1, Level 1
Rochester, New York 14614
Tom Pierce

UFO Systems Inc.—Xerox 5775 Color Laser Copies and T-Shirt
1 Tobey Village Office Park
Rochester, New York 14534
(716) 248-3372
Bethann Hurley

Test Sheet

Original Image

15% Lighter

30% Lighter

20% Less Saturation

30% More Green

30% More Blue

30% More Yellow

Original Image

30% More Cyan

30% More Magenta

30% More Red

20% More Saturation

20%

30%

40%

Composite Controls

20%

30%

40%

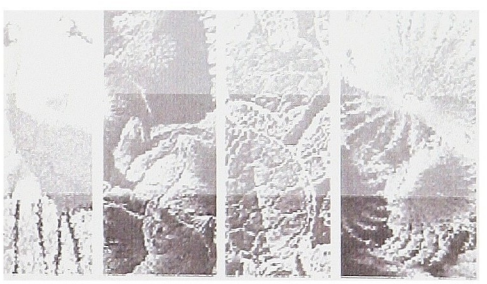


Illustration Procedure

The initial stages of designing the logo were demanding. Evaluating a way to represent the four specific areas I wanted to highlight was the most challenging aspect. My first attempt was to collage a variety of images. I found that the use of too many objects weakened the impact of the design. There was a lack of a focal point. Of my four category's—Birds, Mammals, Invertebrates and Reptiles—I decided to select just two species from each and do a composite of each area. This proved to be more effective. Having the illustration sectioned into four areas needed special attention to avoid a stagnant symmetrical image. I specifically chose images that would allow me to create open spaces. I was able to incorporate an S shape into the design by using the bird and starfish.

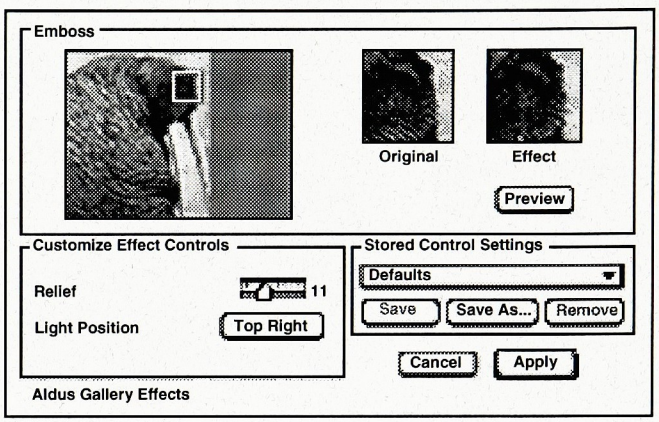
The background colors where chosen by using the eyedropper from Adobe photoshop to select a color from each photograph. Using the Hue and saturation filter, I adjusted the colors until I found the appropriate combination. The breaking out of the design into other areas was rather easy. First with the posters, I extrapolated and rearranged components from each area to develop the new designs. The chart on the following page illustrates the expansion of the design.

Adobe photoshop proved to be a very effective program for image-retouching and color separation. It offered excellent color correction and filtering abilities to improve image quality. The Unsharp Masking feature was a must for use with halftone originals. Photoshop also supported special effects filters capable of a wide range of transformations such as converting a color image into something that looks like a hand painted water color. The main special effects filters I used were Adobe Gallery Effects Spatter and Emboss.

I selected the Spatter filter because it gave me a very controlled dry brush effect. The Emboss filter added contrast and depth. Each image required different parameters of filtering to achieve a consistent unified look through out the entire image. The final results from using these filter are on the following page.

In addition to a comfortable interface and quick screen redraw, Photoshop allowed me to adjusted color with predictable and repeated test results. A fundamental requirement of this program was the ability to produce high-quality color conversion and separation of images. This program also supported advanced features such as masking and alternate

image channels, as well as offering anti-aliased brushes and type capabilities. Support for direct editing in CMYK mode on screen, reducing surprise color shifts during conversions, I used the resampling tools to resize some, of the images and to change resolution when necessary. Photoshops compatibility with other programs and prepress systems made it relatively easy to discuss my project with service bureaus.



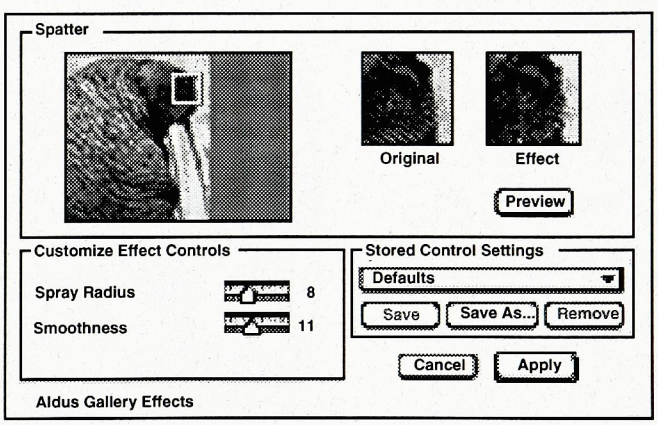


Illustration Procedure for Birds

Background Color Percentages

R-116	C-57
G-129	M-43
B-167	Y-8
	K-4

Fig. 1

Original image had Lpi of 200 scanned at 400

Emboss Filter
relief—16
light position—top

Spatter Filter
spray radius—8
smoothness—10

Fig. 2

Original image had Lpi of 150 scanned at 300

Emboss Filter
relief—16
light position—right

Spatter Filter
spray radius—11
smoothness—7

Image Composite Procedure for Reptiles

Background Color Percentages

R-95	C-64
G-53	M-83
B-102	Y-11
	K-15

Fig. 3

Original image had Lpi of 150 scanned at 300

Emboss Filter
relief—16
light position—top right

Spatter Filter
spray radius—7
smoothness—9

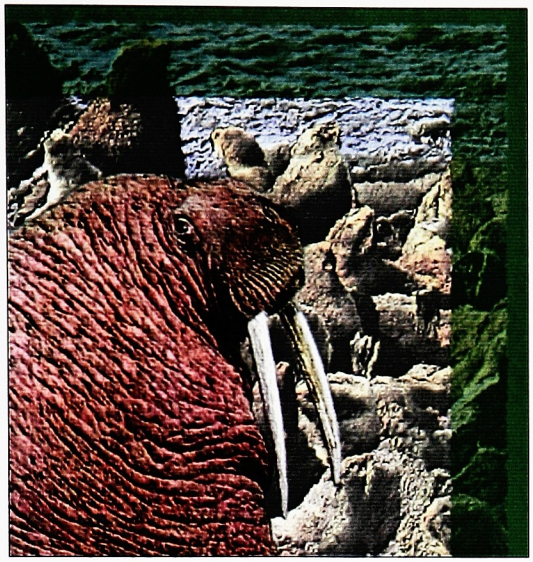
Fig. 4

Original image had Lpi of 133 scanned at 266

Emboss Filter
relief—16
light position—bottom right

Spatter Filter
spray radius—20
smoothness—7

Image Composite Procedure for Mammals



Background Color Percentages

R-73	C-69
G-107	M-24
B-83	Y-63
	K-32

Fig. 5

Original image had Lpi of 150 scanned at 300

Emboss Filter
relief—8
light position—bottom right

Spatter Filter
spray radius—13
smoothness—7

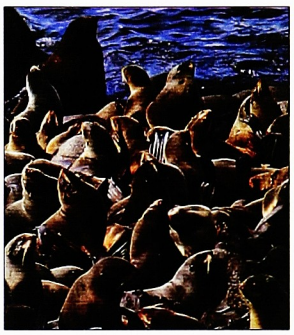


Fig. 6

Original image had Lpi of 150 scanned at 300

Emboss Filter
relief—16
light position—bottom right

Spatter Filter
spray radius—20-
smoothness—7

Image Composite Procedure for Invertebrates

Background Color Percentages

R-129	C-34
G-32	M-92
B-73	Y-27
	K-26

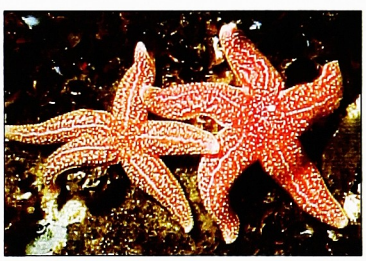


Fig. 7

Original image had Lpi of 200 scanned at 400

Emboss Filter
relief—8
light position—bottom right

Spatter Filter
spray radius—14
smoothness—9

Fig.8

Original image had Lpi of 200 scanned at 400

Emboss Filter
relief—16
light position—bottom right

Spatter Filter
spray radius—20
smoothness—7

The Aquatic World

KENTUCKY ZOOLOGICAL SOCIETY

Aquatic World

MAY 24
Fund raising banquet

MAY 26
Polar Bear ice cream party

JUNE 7
Opening lecture series

JUNE 14
Mammals and their habitat

JUNE 21
The behaviors of aquatic reptiles

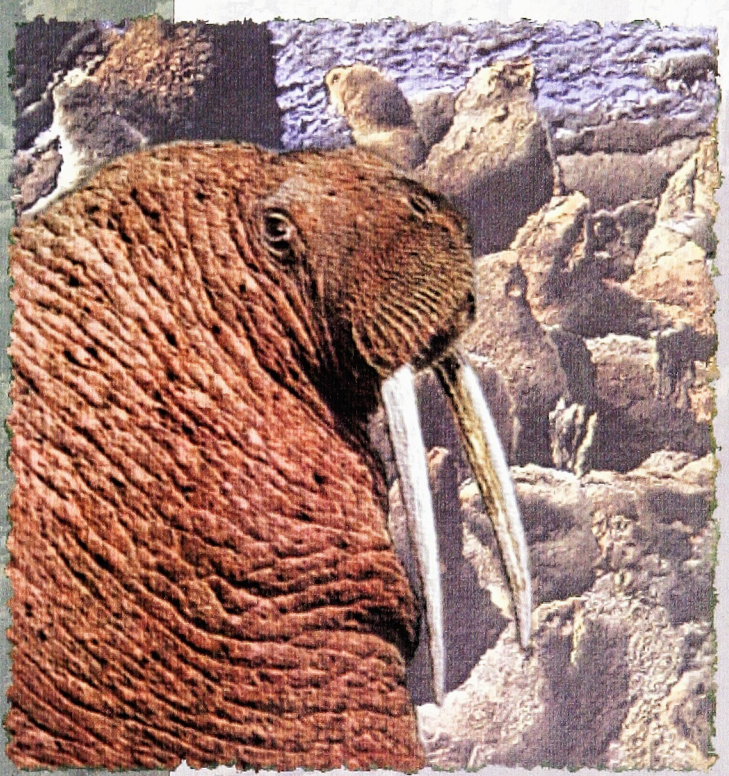
JUNE 28
Exotic and extra-ordinary water birds

JUNE 1-7
Invertebrates of the coral reef

KENTUCKY ZOOLOGICAL SOCIETY

Promotional Poster for Exhibit

Aquatic World



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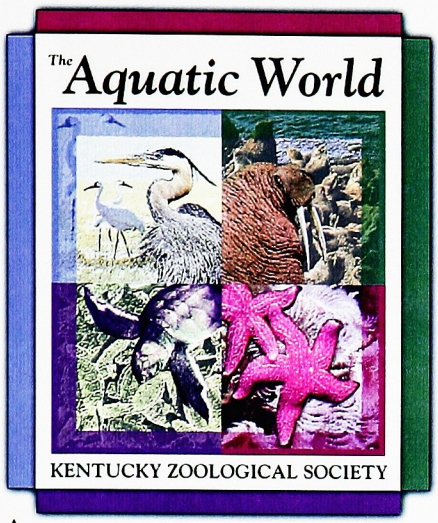
Aquatic World

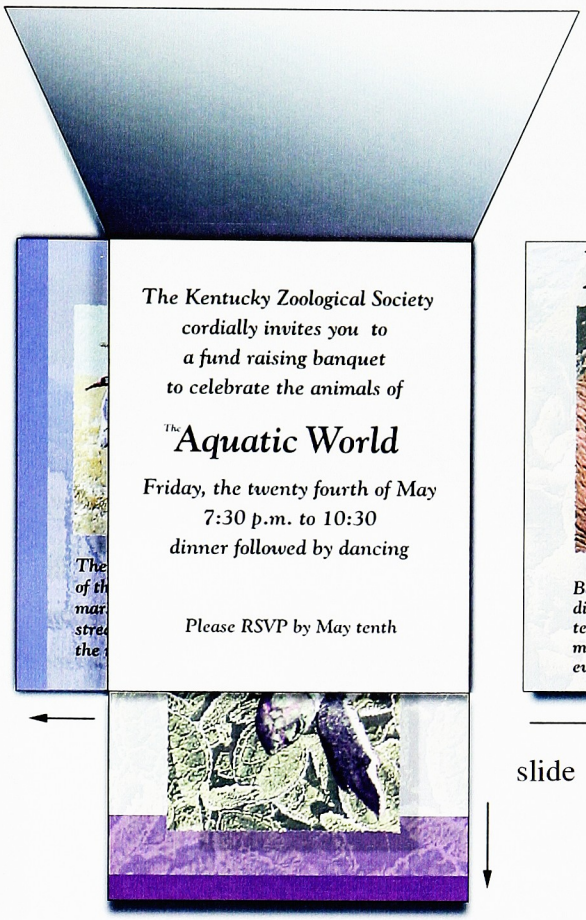
Promotional Poster for Exhibit

INVITATION

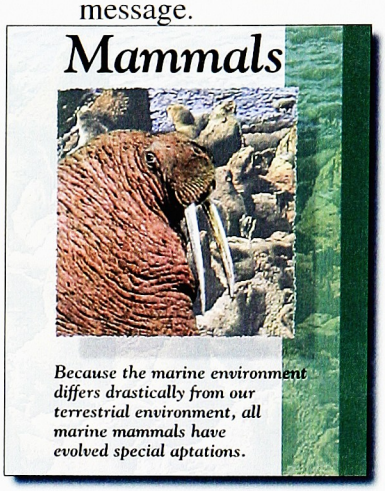
Each card contains information about the four category's representing the Aquatic World. The cards are printed on one side.



A

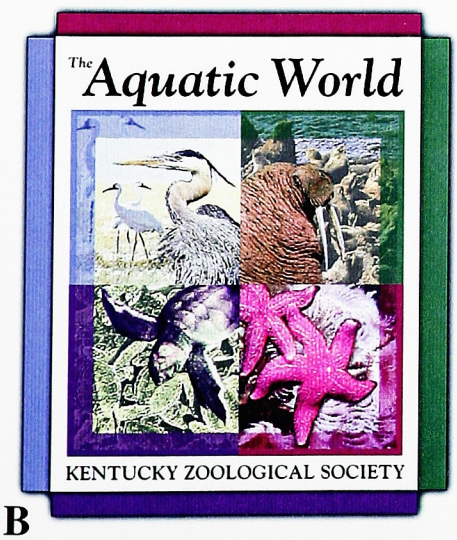


In this invitation the front panel folds up to reveal the message. Four informational cards slide out of slots behind the message.

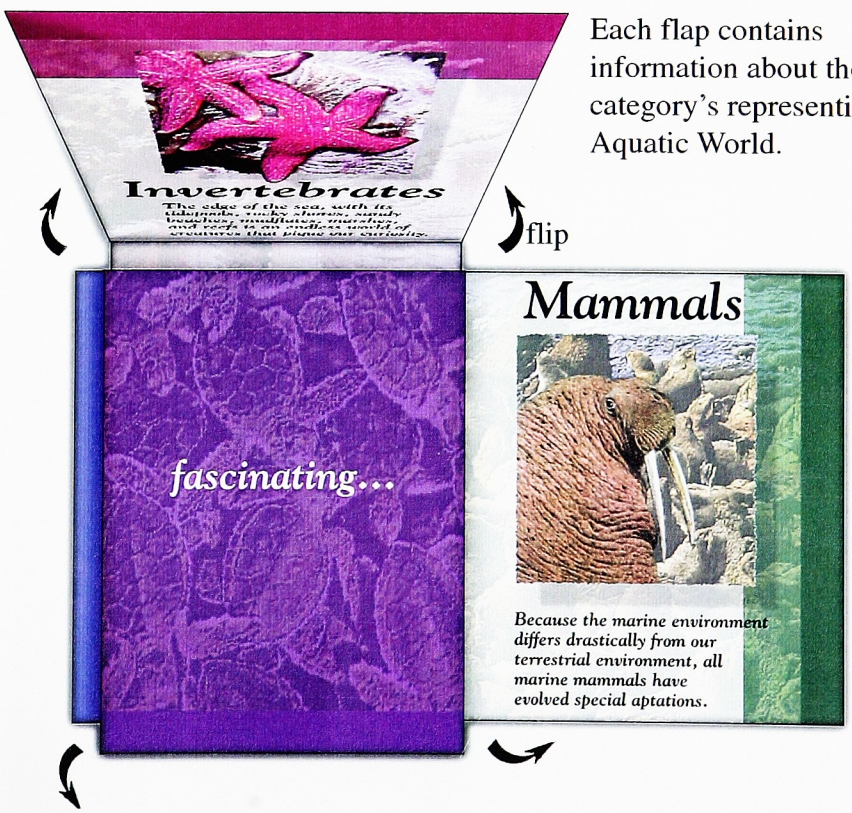


slide

In this invitation the front panel folds up. Three other flaps fold out to the right, left and bottom.

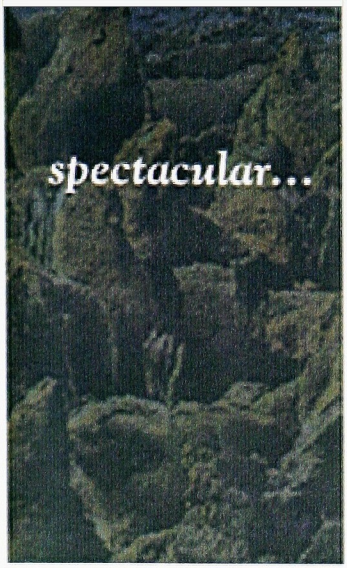


B



flip

Each flap contains information about the four category's representing the Aquatic World.

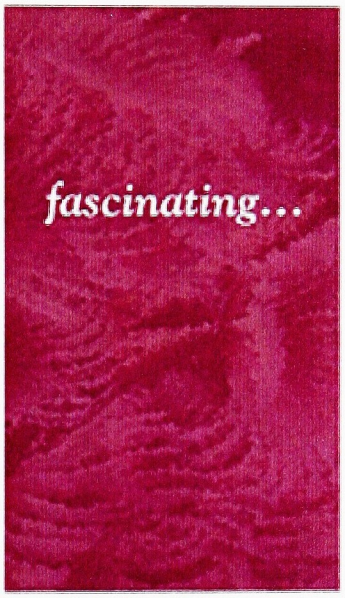


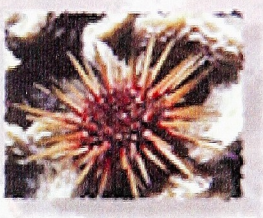
Mammals

Mammals evolved from reptiles about 200 million years ago, during the Age of the Dinosaurs. There are more than 4,000 species alive today, including polar bears, seals, whales, dolphins, manatees, and walrus.

Characteristics of mammals:

- *mother feeds her young on milk*
- *bodies are covered with fur of hair*
- *can maintain a constant body temperature and have sweat glands to cool their bodies*
- *intelligent, with large brains*
- *breath with lungs*



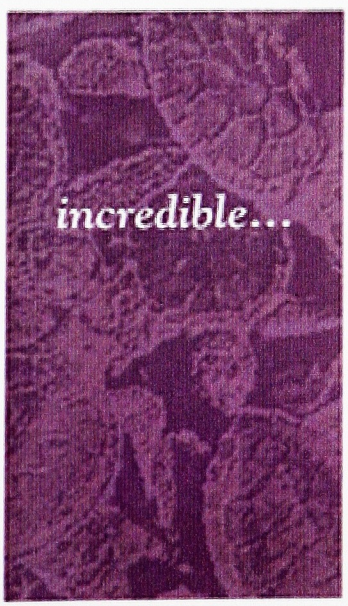


Invertebrates

Invertebrates (animals without backbones) were the first animals to evolve on Earth, between 600 million and 1 billion years ago. Hundreds of thousands of species are alive today, and they far out number the vertebrates (animals with backbones). Invertebrates come in many different shapes and sizes, including microscopic mini-like animals, corals, jellyfish, insects, snails, spiders, crabs, centipedes, and worms.

Characteristic of invertebrates:

- *do not have backbones*

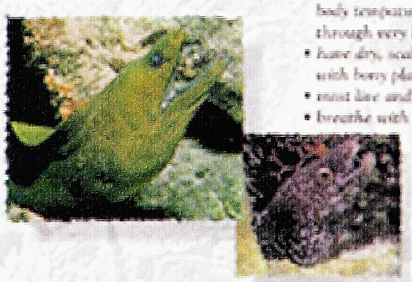


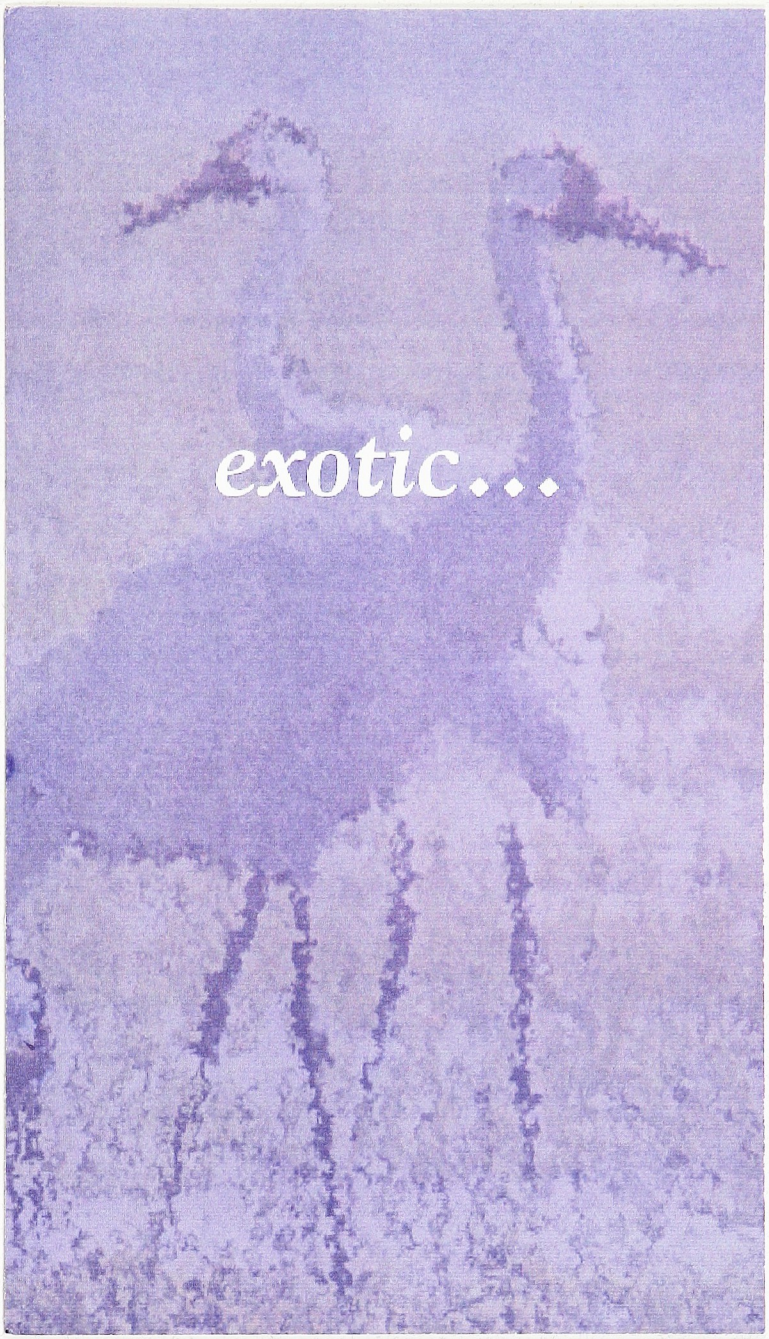
Reptiles

Reptiles evolved from amphibians about 300 million years ago. About 6,100 species are alive today, including lizards, snakes, turtles, tortoises, and crocodiles. The dinosaurs were also reptiles.

Characteristics of reptiles:

- *cannot maintain a constant body temperature; may sleep through very hot or cold weather*
- *have dry, scaly skin, sometimes with bony plates for protection*
- *must live and breed on land*
- *breathe with lungs*





Comprehensive for Bird Pamphlet

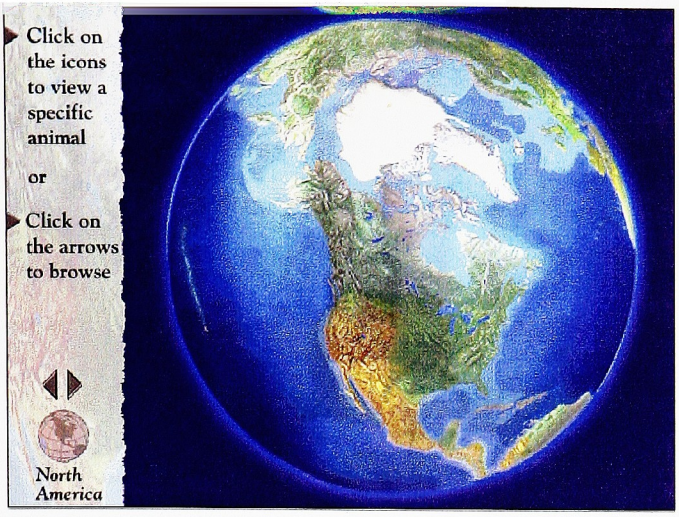
Interactive Procedure

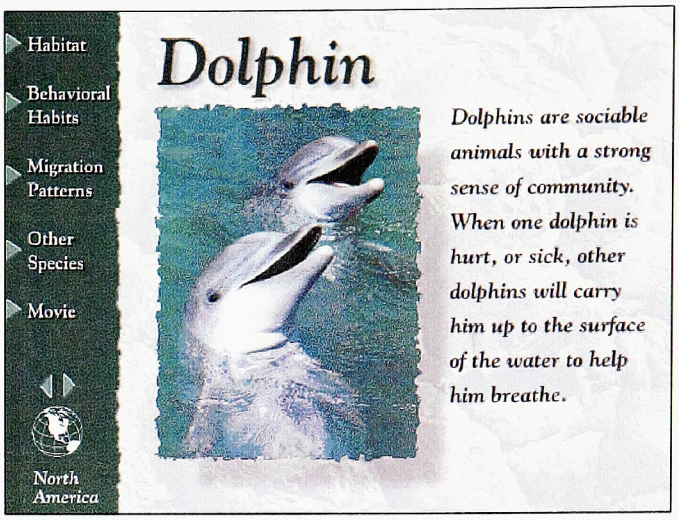
The interactive screen designs were more challenging than I had expected. Most of my designs had been planed for vertical format, screen displays are generally done in a horizontal format. Adaptations needed to be made to comply with the screen display format.

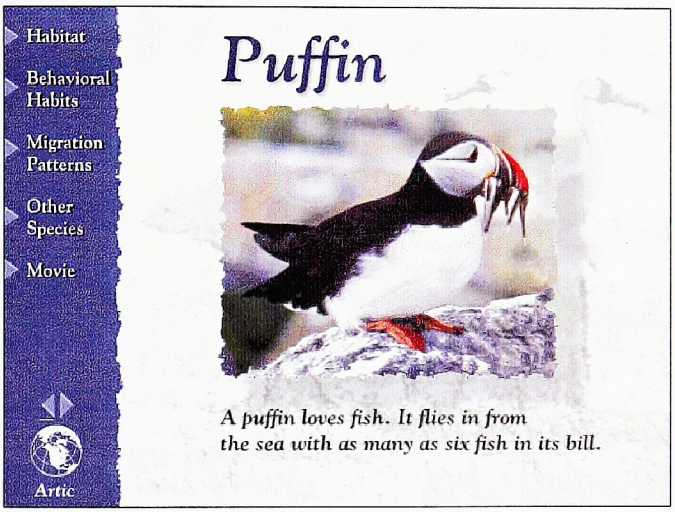
Developing multimedia projects can be a complex process. To minimize on potential problems a diagram can be created, outlining the general parameters, such as the target content and major features. To more accurately gauge these factors I created a chart identifying the content and navigation.

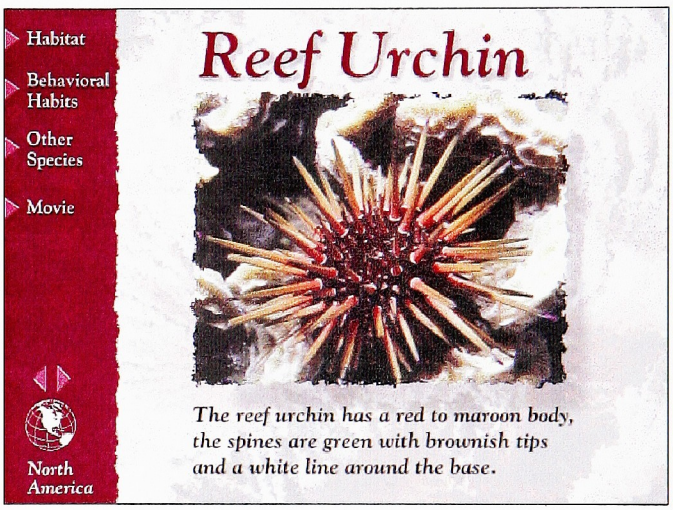
The initial chart consisted only of navigational direction. Parameters were filled in with details such as the interface look and feel as the rest of the design developed. A design was created that was consistent with the graphic look and also met the functionality needs of the program.

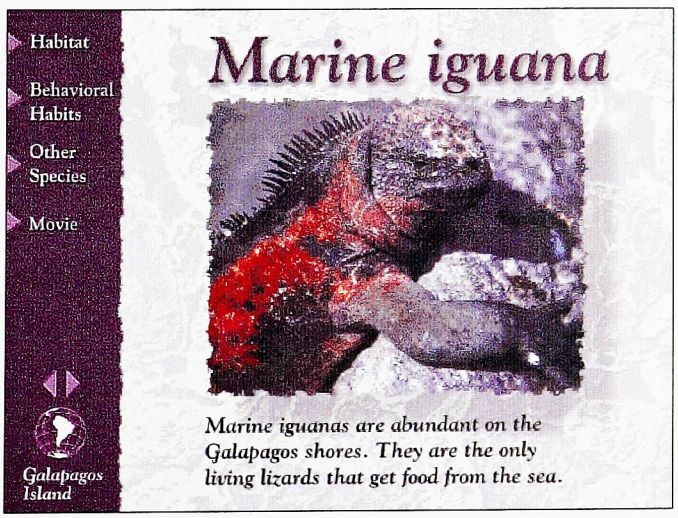
The following flow chart provides a blueprint for screen layouts, text descriptions and navigation options. The links of each screen are clearly indicated to better conceptualize the features of the interactive design.

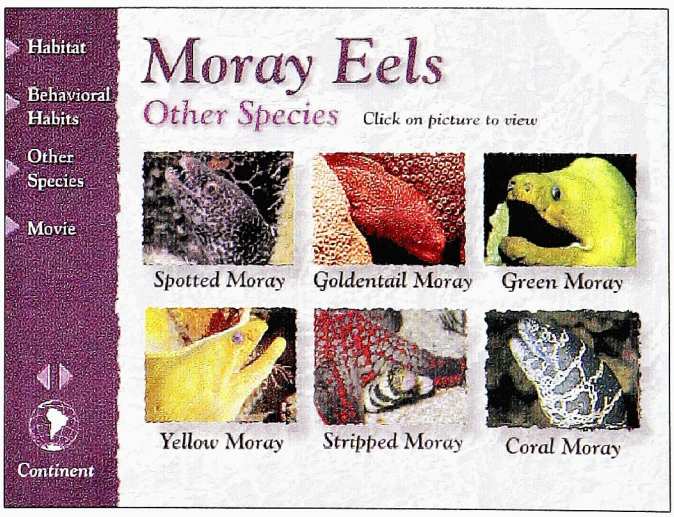












Interactive Screen Designs

Conclusion

Conclusion

In color publishing today image editing means different things to different people. For artist, the emphasis is typically on capabilities that allow creative freedom and power in compositing multiple images, achieving special effects, and experimenting with a variety of manipulations. Retouching features enable designers to isolate and remove unwanted elements, such as repairing blemishes or tears with cloning tools, selectively lightening or darken areas, and adding realistic color to washed out images. When scanning, tools for sizing and cropping images are needed, as well as color controls that make it easy to achieve accurate reproductions of original art.

During the last few years, developers of image-editing software have rolled out dramatic new features in an effort to distinguish their respective products. All of these capabilities are important for image editing work in a production environment, where customers are likely to request anything they can imagine. But it's the ability to create color separations—to put an RGB image file into CMYK format and adjust the contents of those four process-color channels— that most clearly distinguishes image-editing software and output processes. In many cases, these new features are difficult to work with to get accurate results suitable for use as display material or for prepress proofing. To achieve accurate color, an image setter must be perfectly calibrated to a degree that few service bureaus bother to attempt. The machine must also be a recent, top-of-the-line model, because older equipment inherently lacks the precision and resolution necessary for accurate color and proper screen angles. Lazar printers are not considered proofing devices because they lack sufficient quality or resolution to output final images. Color printers can be used as proofing devices because commercial printers can reproduce from any color output composite except slides.

Computer monitors use the red, green, and blue (RGB) model, because it provides bright color on a video display and is easily compatible with the technology of color video devices. Four-color printing on offset

lithographic presses use three colored inks—cyan, magenta, and yellow—with black as the fourth color. Both the RGB and CMYK color models are important to the color conversion performed in order to move an image from the RGB world of computers to the CMYK environment of the four-color press. Far greater color accuracy is becoming possible on color printers. New technology allows Mac's to drive machines capable of producing proofs that look almost identical to the finished pieces. This enables designers to show clients how an ad or brochure will look before it goes into print and this also helps assure more accurate color output of images. Still, with all the advances in technology and printing techniques available today there is not one single method that is completely fail proof. Therefore the safest way to have accurate color output is to always run a test.

On the bright side, many of these problems are being addressed with improvements to Macintosh color technology. The Mac itself is gaining in processing power with each new model. The problems of desktop color publishing can be limited by using conventional methods to process large high-resolution images, using smaller image sizes, or enhancing scans through programs such as photoshop. When color separating a job containing scanned images or screen colors, consulting with a knowledgeable print shop is the best approach—preferably the one that will ultimately print the job. A color publishing guru is one of the most important "services" required by Mac-based color publishers or an on-staff person who really knows color publishing on the Macintosh and is experienced with printing as well. This person should be familiar with all the major product platforms and understand the pros and cons or using various settings and file formats. The person should be willing to help solve problems, give advice, and specify the parameters for best results. It helps if this person also has the patience of a saint. Printers naturally have an eye for problems, and you can ask for their expertise on how to set parameters for a number of technical specifications in the color separation process. When using a responsive service bureau—one that takes the time to discuss jobs with the print shop, then the more technical aspects of

color separations and screen color can be handled by following their advice. A familiarization with the process and carefully questioning both parties, is essential in order to ensure that the appropriate amount of information has been exchanged will help minimize production problems.

When running jobs with screen color or color images of any kind, a color proof made of the job to verify quality is necessary, in addition to relying on the experience of the service bureau. Make a point of checking the images, highlights, or shadows of a test scan against the original image.

Reminder

Today's technology provides the tools to reproduce published materials quickly, easily and inexpensively. No matter what the format—print, recording, film, video or computer software—there is a way to copy it. Copyrights however restrict reproduction. "Copyright laws grant the copyright owner exclusive rights to reproduce, distribute or perform the work."[7]

[7]Compiled by members of Division of Academic Services and Computing and Division of Instructional Design and Technical Services, NTID, Guidelines for Use of Copyrighted Materials at RIT, 1.


Appendix

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Fig.3 Ranger Rick's nature magazine, February, 1973, page 4
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Fig.4 The Living Reef, by Jerry and Idaz Greenberg
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Fig.5 Wild Animals of North America, page 282
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Photo by Tom Walker

Fig.6 Wild Animals of North America, page 290-291
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Fig.7 National Audubon Society Field Guide to North America Seashore Creatures, plate 547
Published by Alfred A. Knopf, Inc., 1981
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Fig.8 Field Guide to Caribbean Reef Invertebrates by Nancy Sefton and Steven K.Webster, page 71 plate 106
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