REPORT

BARACK OBAMA: LONG FORM BIRTH CERTIFICATE

by Mara Zebest

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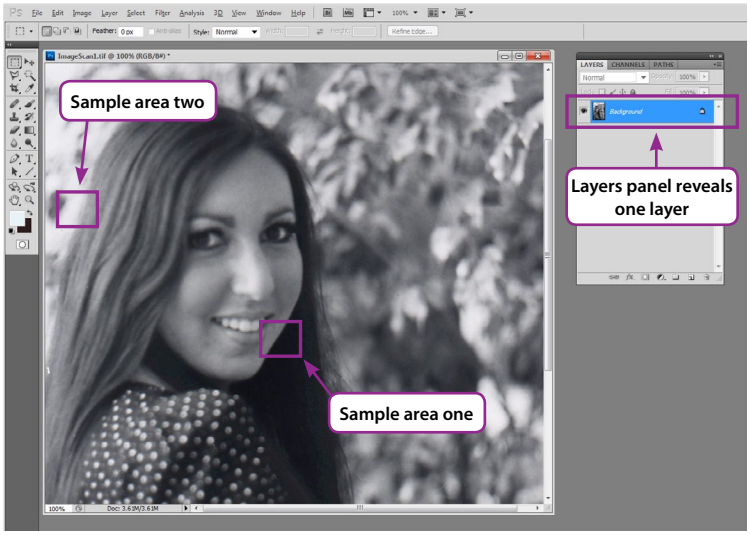


Figure 1: Photo Image at 100% Zoom Level

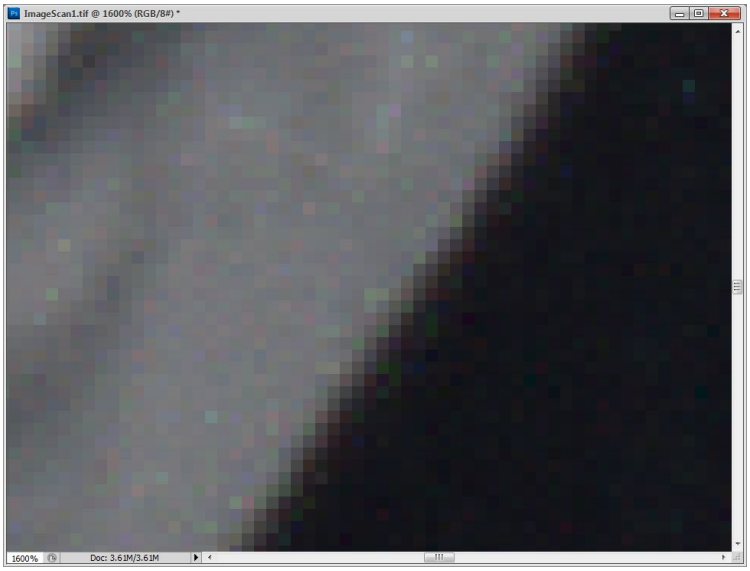


Figure 2: Sample area zoom and noise becomes apparent

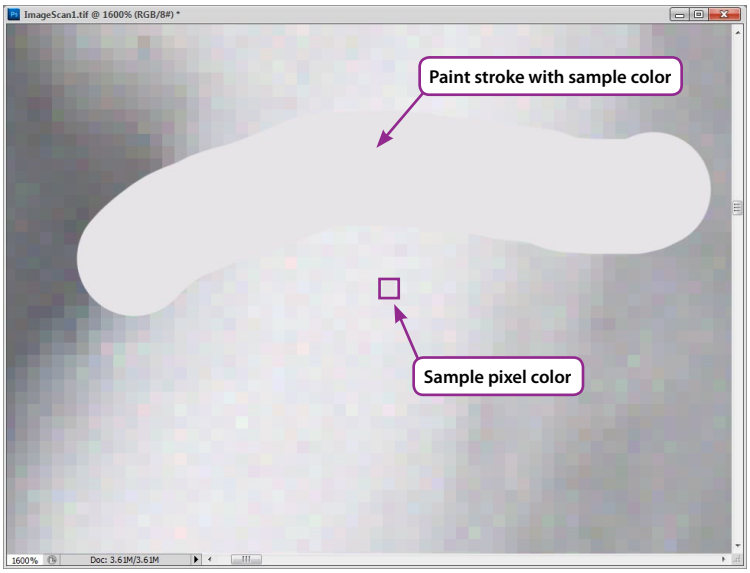


Figure 3: Solid digital paint stroke added to image

Introduction Basics

Merely viewing the Long Form birth certificate in Acrobat reader—without any special software—is enough to reveal a myriad of image tampering evidence. What do you look for?

Figure 1 is an example of a scanned image viewed in Photoshop. Notice that the Layers palette displays one layer which defaults to the name *Background*. A one layered file is also referred to as a *flattened image* (more on layers later).

Scanned images will have a consistent ***noise*** and/or ***grain***. Any inconsistencies in noise or grain would be a strong telltale sign of tampering. Obama's long form certificate document shows a clear inconsistency of noise in various locations. Let's examine a scanned image to get an understanding of what is meant by the term noise—which is more easily seen at high zoom levels. Figure 1 shows the sample zoom areas of focus—to get a closer look.

Noise and Antialiasing

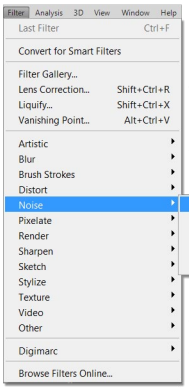
So what is noise? At the normal zoom level (100%) shown in Figure 1, there seems to be the normal transitions of color tones and shadows. For example, "Sample area one" appears to have a solid black area of hair near the face. Conversely, "Sample area two" (also shown in Figure 1) appears to have a solid white or off-white area.

However, when you zoom in closer as seen in **Figure 2** (for area one) and peek ahead to Figure 3 (for area two), you can easily view consistent *noise* which is apparent in the slight variations of color from neighboring pixels. This is the natural noise level for this image, and it is ***consistent*** throughout the image. If necessary, zoom in for a closer look at Figure 2, and you can clearly see the consistent noise in the black tones as well.

Also notice the transition of pixel colors that occur when colors of contrast bump up next to each other—such as the edge of the face against the dark hair color. This is referred to as ***antialiasing*** which offers a smooth line of transition and gives the appearance of a smooth line (to the eye) when viewed at the normal zoom level of 100% (in Figure 1). Without antialiasing, the edges appear jagged or ***bitmapped***.

Noise v No Noise

Before applying this concept to Obama's PDF certificate file, I would like to make another point using the same example image. **Figure 3** shows a pixel that is sampled to match one of the off-white colors within the image: Using a paint brush tool (in Photoshop), a streak of the sample color was drawn across the image area.



Notice that a component added digitally to an image *does not contain* ***noise***. All neighboring pixels for the sample paint stroke in Figure 3 is solid in color with no variation—not even the *slightest* of variations.

In order to avoid detection when editing an image, an experienced professional will attempt to mimic the noise to match the document. There are many methods, but the most common method would be to add **Noise** to the painted area via the **Filter** menu provided in Photoshop (shown in the menu figure to the left).

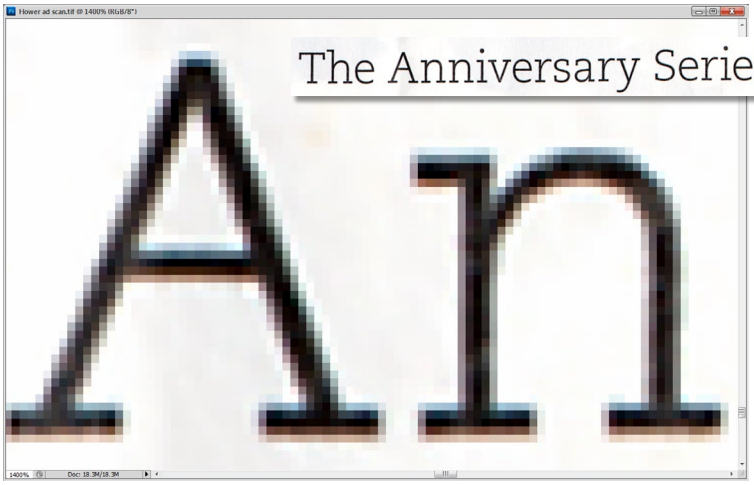


Figure 4: Scanned text and chromatic aberration

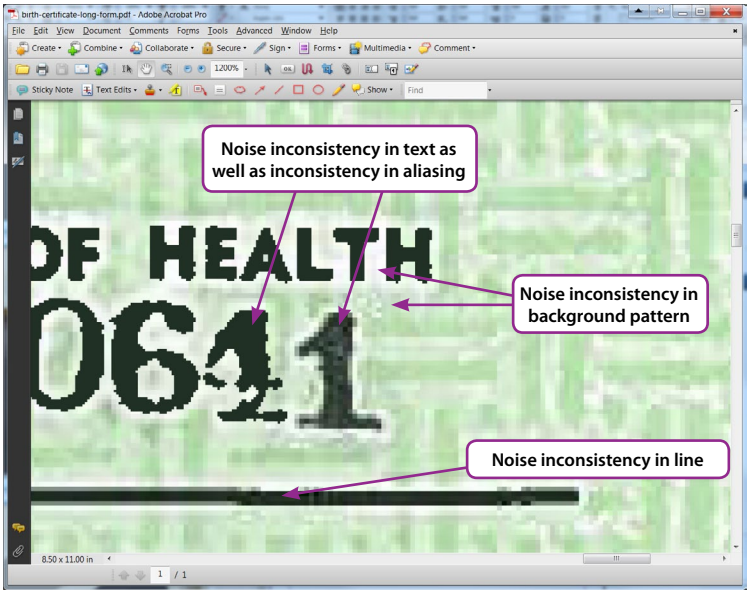


Figure 5: PDF LFCB viewed in Acrobat at 1200% zoom level

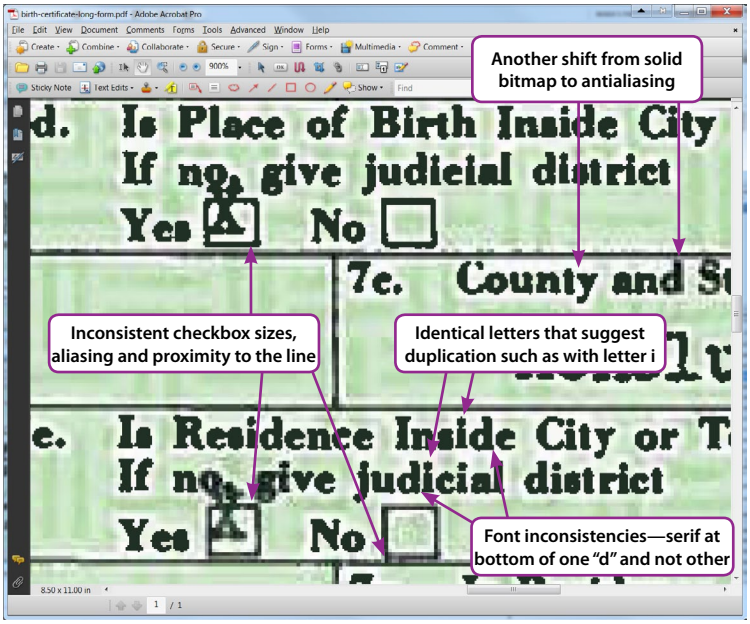


Figure 6: Evidence of font typesetting inconsistencies

Scanner Chromatic Aberration

The previous sections discussed noise and antialiasing in reference to a scanned photo, but what about scanned text? Figure 4 shows a sample section of scanned text. The **Figure 4** insert shows the sample text at normal zoom level—*The Anniversary Series*—looks like ordinary black text. The majority of Figure 4 zooms into a couple of text characters for a closer look at 1400% zoom level.

Clearly a similar consistency in noise and antialiasing can be seen at the higher zoom level. Additionally, notice a pattern in the antialiasing transitional colors: The bottom or left edges of the text (as it transitions into the white background) are red-ish color values in this example, similarly there are consistently blue-ish color values around the top and right edges of transitions. This is typical, quite normal and is referred to as ***chromatic aberration***—caused when different wavelengths of light are refracted differently as it goes through a lens or prism during the scanning process.

Applying Foundational Basics

Now let's examine some sample areas of Obama's Long Form Certificate in Acrobat. Again, no need for special image editing software at this point, just an understanding of what to look for.

Let's start by mentioning that there is no evidence of chromatic aberration anywhere in the document—this is not normal and neither is the white halo surrounding the text—both points indicates image tampering (more on the halo later).

Figure 5 clearly displays numerous inconsistencies of *noise* and *aliasing*—also indicators of image tampering. A normal document—scanned and saved as a PDF—would not display these inconsistencies ***unless digitally altered*** and compiled.

It should be noted, that these inconsistencies alone refute the argument floating around that the layers can be explained by using OCR (Optical Character Recognition) software. OCR software would not generate an inconsistency in noise and aliasing. Not to mention, the ethical implications of using OCR software—which is to allow for the capability to ***edit text*** in a scanned document. So why would you choose to use OCR software when scanning an official document that is ***not*** intended to be edited or altered?

Figure 6 offers more inconsistency examples as follows:

- Bitmap text versus antialiasing text—notice the **bitmap** X checkbox in question ***d*** compared to the **antialiased** X checkbox in question ***e***—major inconsistency.
- Additionally, the checkboxes are slightly different widths and positioned differently (pixels of checkbox on the bottom-right overlap line pixels below). It's almost as if the boxes were copied and pasted and manually positioned.
- Some letter characters are identical (pixel for pixel), almost like they were copied and pasted (and then moved into position). Example, the lowercase "i" in the word *Inside* is ***identical*** to the first "i" in *judicial*. There are many similar identical instances as there are dissimilar typesetting examples of different fonts—both suggesting compilation of a document digitally.
- Irregular typesetting spacing which is not consistent with proportional spacing used by computers or monospacing used by typewriters in 1961—but ***is*** consistent with copy and pasting and moving letters around. Example: The word "Yes" which has too much space between "Y" and "e" and not enough space between "e" and "s".

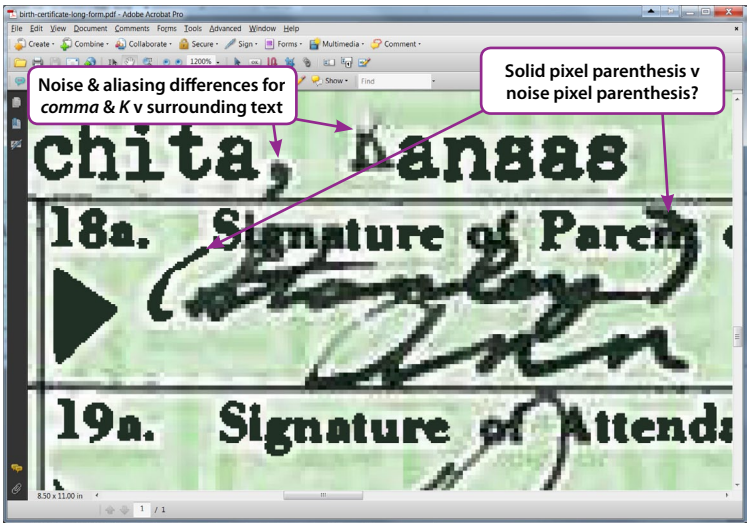


Figure 7: Inconsistencies within signatures

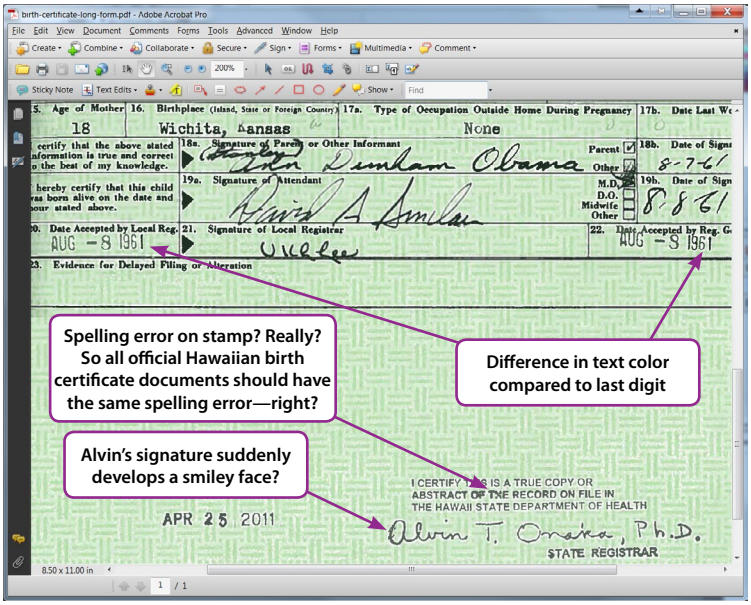


Figure 8: Inconsistencies in pixel colors and spelling errors?

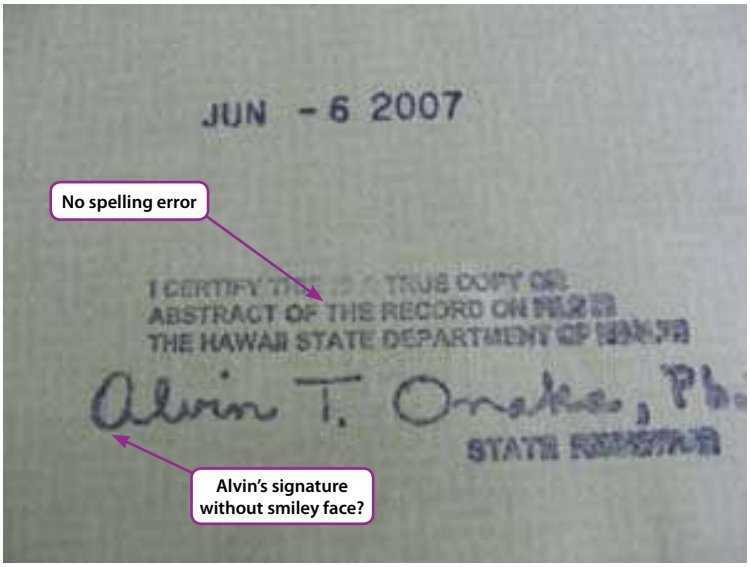


Figure 9: http://factcheck.org/2008/08/born-in-the-usa/

Figure 7 once again demonstrates a trend of mixed solid bitmapped character elements combined with antialiased elements. It also seems apparent that typed text characters were altered whenever signatures overlapped or bumped against typed text characters. Additionally, signatures shows signs of being pieced together from multiple source documents.

Many of the adjustments are on separate layers—again, more on this later—but currently the focus is on what can be seen in Acrobat.

Differences in Text Color Values

Figure 8 shows two similar dates in which portions of the date were from different edited sources. Visually, this can be seen in the differences of text color. Look closely and you can clearly see dark black color for some digits (especially the last digit 1 in both instances), while other digits are a light gray.

It is only speculation, but my guess is that the creator of this document is inexperienced when it comes to a multitude of important concepts. The user might have known enough to be dangerous, but not enough to know how to cover his/her tracks.

In the printing world, you quickly learn that the object may appear as solid black on the monitor screen but not all blacks are created equal. After working in a printing department, and ripping files to a professional printer, you quickly learn to check for the quality of the black values to ensure consistency in black tones. In addition, Adobe has a setting that can prevent objects colored in pure black from being displayed as ***Pure Black*** or ***Rich Black***. Not understanding this printing and typesetting concept is a common mistake made by beginners. And printing to a PDF is similar to ripping to a professional printer. So guess what? An object that is colored black on the monitor may not appear black when printing to a PDF. More evidence the document was digitally compiled?

On page 4 (the next page), I offer two web page captures of article links provided in **Figure 10** and **Figure 11** (along with their URL's). Figure 10 is from Adobe's web help file and discusses the Mac settings for the pure black issue. Figure 11 offers an easy to understand explanation of the significance of *pure black* and *rich black* when printing.

Applying Common Sense

Not everything on Obama's certificate document needs a professional analysis—you just need common sense. For example, all of us are often told that the first telltale sign of a fraudulent document or email scam is to look for misspellings. Wouldn't that obvious concept apply to the official stamp that displays "*TXE*" (shown in Figure 8) rather than "*THE*" (shown in Figure 9)—especially based on an assumption that such a stamp was supposedly used on multiple official documents?

Interestingly, **Figure 9** shows an image of the same stamp displayed at Factcheck.org in reference to the short form certificate from 2008. The spelling error is absent along with a smiley face in the Alvin signature. It should be noted, that if a low resolution image (such as the one shown in Figure 9) was used as an added component for the long form document, the enhancing process could have been a possible cause or explanation for the final anomaly flaws. In fact, I believe that the enhancement process of low resolution text would explain the bitmapped quality of the text, the poor readability characteristics, as well as a possible explanation for the white halo effect surrounding the text.

Information on Pure Black v Rich Black

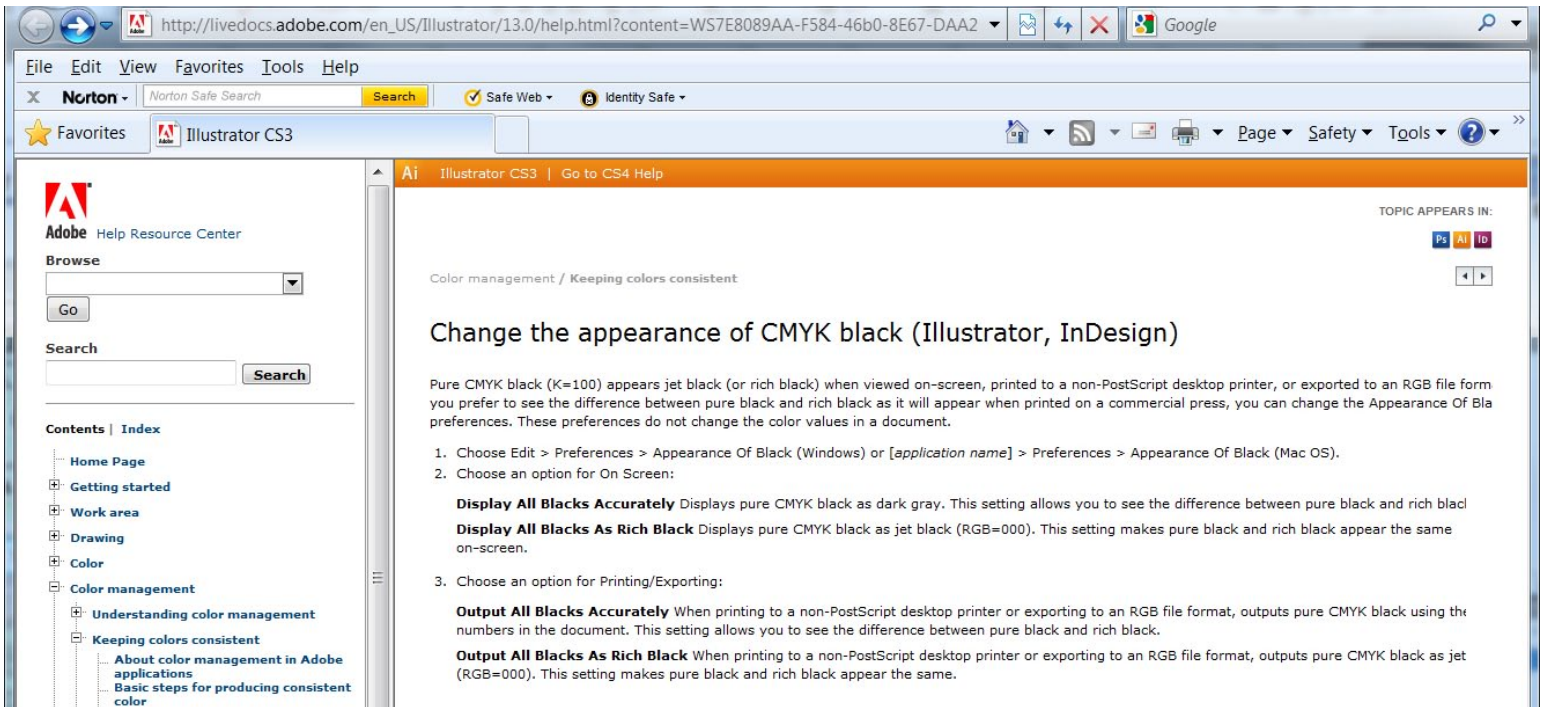


Figure 10: http://livedocs.adobe.com/en_US/Illustrator/13.0/help.html?content=WS7E8089AA-F584-46b0-8E67-DAA2ED79BE4B.html

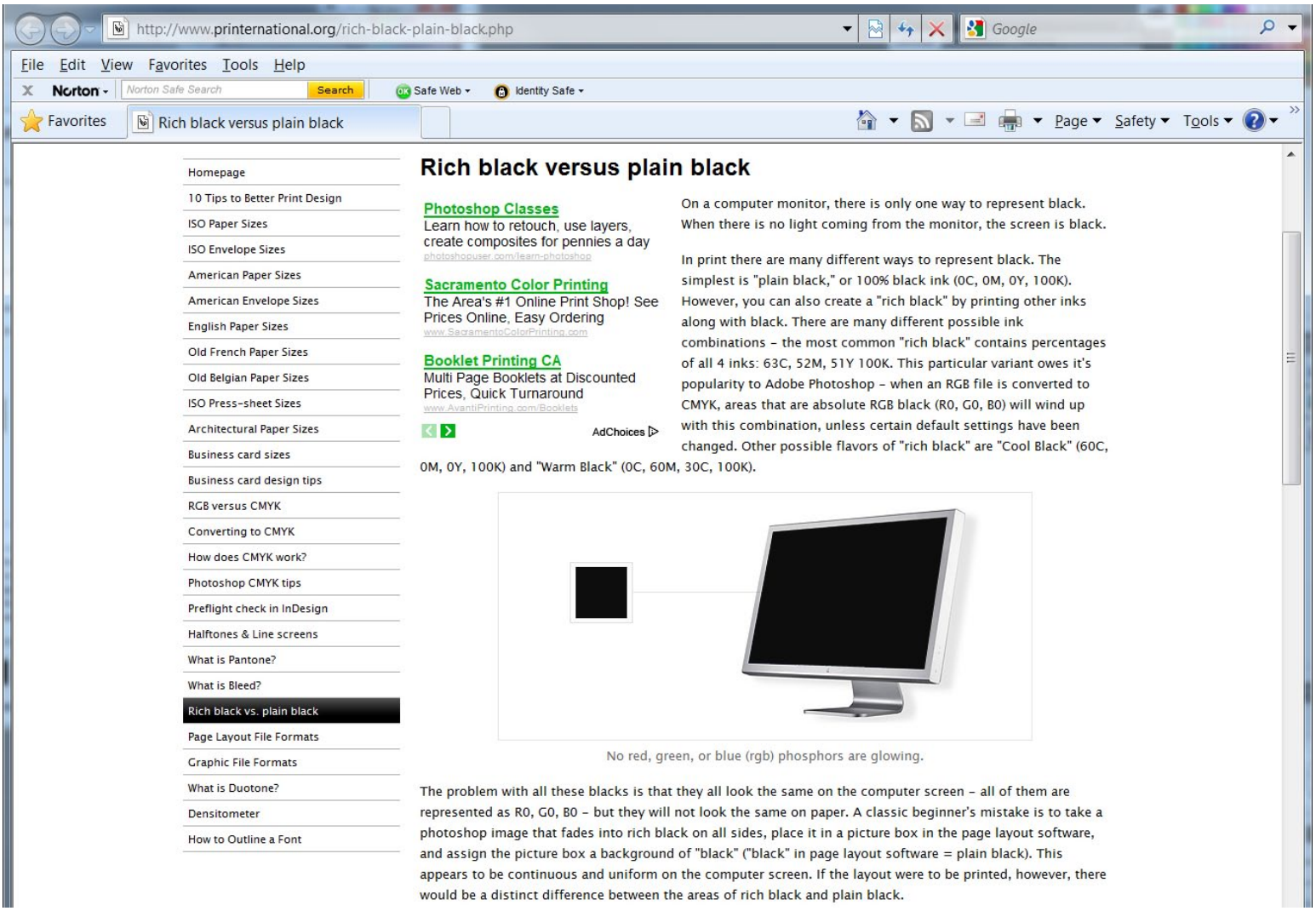


Figure 11: http://www.printernational.org/rich-black-plain-black.php

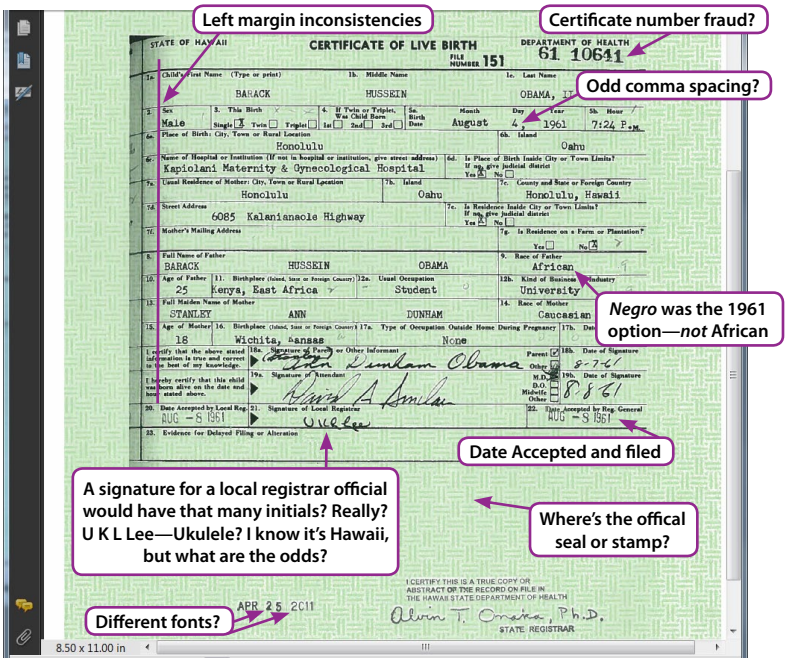


Figure 12: Overall information defies common sense

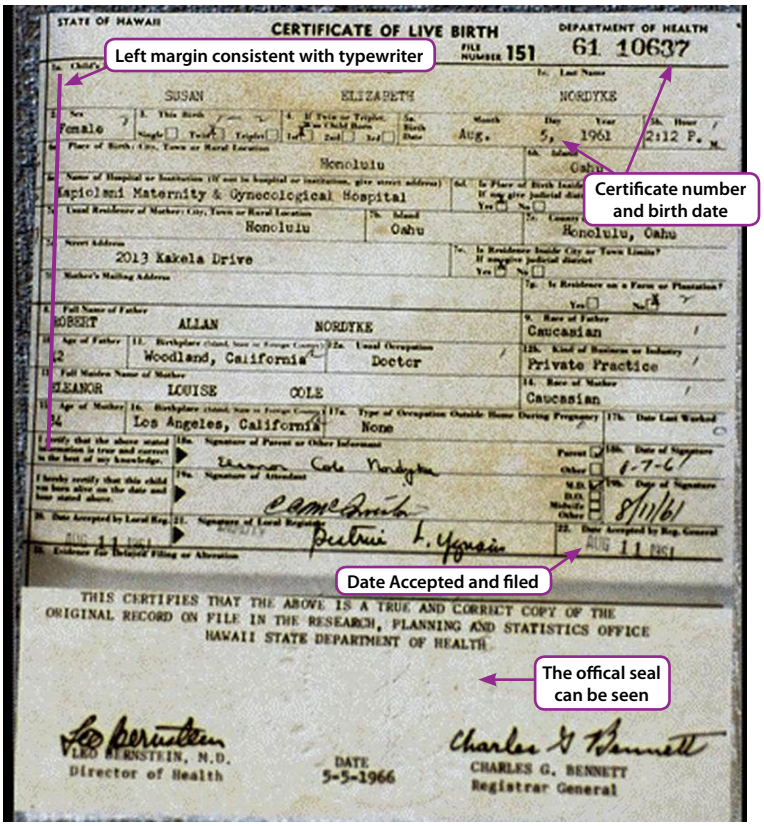


Figure 13: Nordyke certificate a possible template source?

More Questions

A few more items to consider are shown in the overall view of the document in Figure 12 as follows:

- Why is there an odd excessive typesetting space between the number 4 and comma in the birth date?
- "African" is not a race. Would "American" be a race? It may not be politically correct, but in 1961, the option for race would have been *Negro*—not "African" which is another odd artifact out of place with the context of the historical time and place—an anachronism.
- Speaking of anachronisms—in 1961, when typewriters were used, the typist would move to the next line, and items started in a standard left margin (unless the typist purposely tabbed over to a different location on the document). Thus most of the left margin text would consistently line up at the same point. Figure 13 is explained below, and can be used to compare the margin line text in the Nordyke certificate with Obama's in Figure 12. Nothing is properly aligned in Obama's document.
- Figure 12 v Figure 13: If Obama was born the day before the birth date shown in Figure 13, then why would his certificate number be greater? Wouldn't a smaller certificate number be consistent with the earlier birth date and the earlier ***Date Accepted*** (filed date)?
- Where is the State seal? Who has an official birth certificate document that is missing a seal?
- Why is there a background pattern? The Obama administration claims the pattern was added for security purposes—but isn't that admitting to altering the document? Is the administration trying to create a frame of hiding the edits in plain site by saying "Yes, we edited the document to add security paper." And why would this even be necessary?
- Why would the date at the bottom of the document display different type fonts? The font used for the year is clearly a different font than the one used for the day. Under what circumstances would you change fonts while typing a date? Even if a stamp was used to stamp a date, wouldn't the stamp be made with the same consistent font?

The Nordyke Twins Birth Certificates

For those that are not familiar with the story—flashback during the 2008 election cycle, when questions were raised about Obama's birth certificate. I believe it was the mother of the Nordyke twins who released an image of the birth certificates in an attempt to show an example of what a real 1961 Hawaiian birth certificate should look like. Fast forward, to 2011 when Obama releases a long form and the Nordyke image becomes even more significant in the discussion.

When viewing Obama's document for the first time, one of the first items that struck me as odd (especially if still applying common sense) was the curvature on the left edge of the document. To make matters worse, I could see evidence that the poor quality text seems to be digitally manipulated to mimic the curvature. For me, the Nordyke image explains the inspiration for the curvature effect (and trust me, it is just that—an *effect*—even down to the shadow).

Furthermore, I believe the Nordyke image played a significant role in compiling Obama's document and used as the ultimate template for the final product.

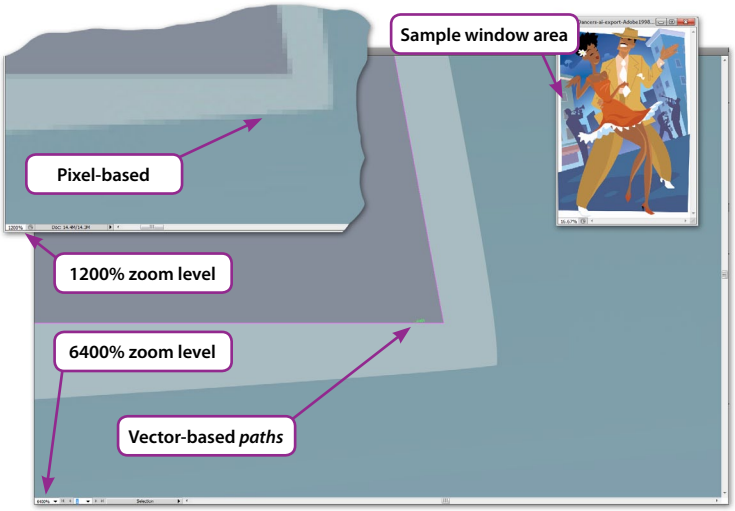


Figure 14: Pixel-based compared to a vector-based file

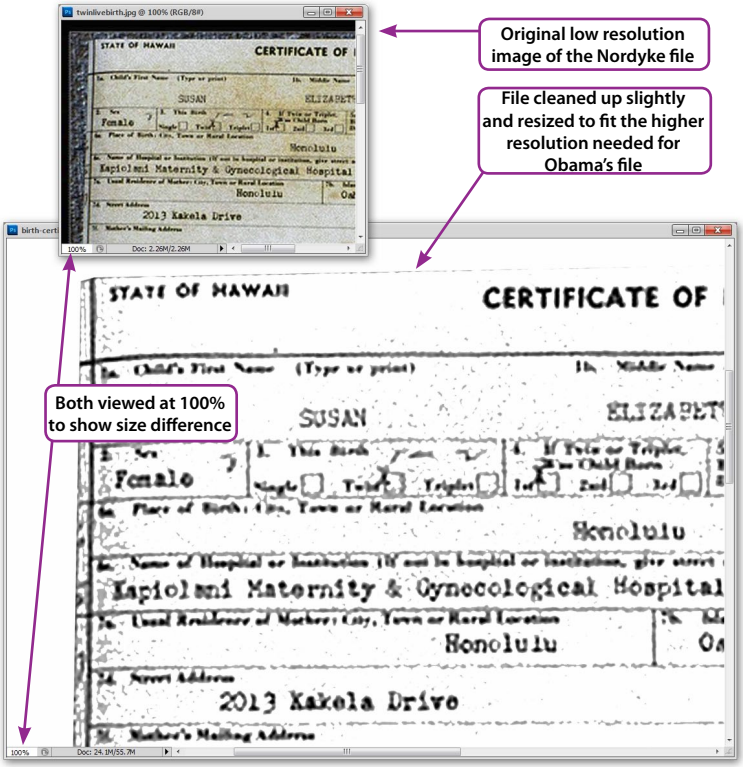


Figure 15: Nordyke image text enlarged

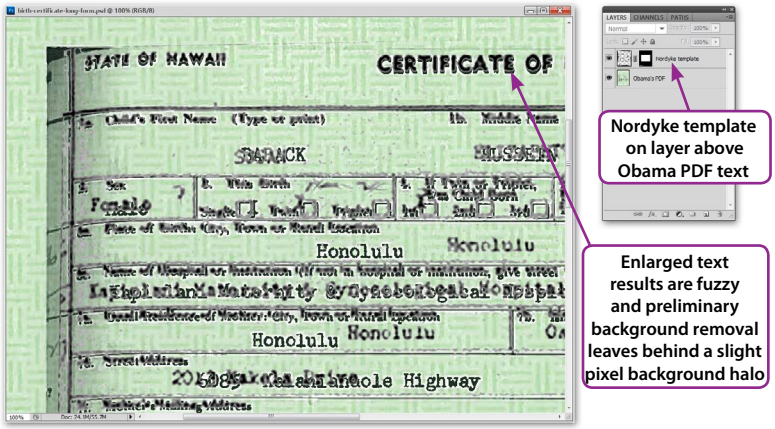


Figure 16: Enlarged Nordyke template set above Obama text

Photoshop and Illustrator Differences

Up until this point, the document has been viewed in Acrobat. However, when the file is opened in Illustrator, significant information is revealed. Keep in mind that I believe the certificate image was compiled and created in Photoshop, but the PDF file needs to be opened in Illustrator in order to view the embedded information within the PDF. Why Illustrator and not Photoshop? Stick with me while I explain the differences of both programs.

Photoshop v Illustrator

There are two different types of graphics: ***raster-based*** or ***vector-based***. *Raster* is merely a fancy word for pixels; therefore a raster-based graphic is a pixel-based image. Photoshop is a raster-based program. All scanned images, digital camera photos, and most images seen on the web sites are pixel-based (raster) files. So what is vector?

As you might have guessed, Illustrator is a vector-based program. *Vector* implies math, thus every line drawn in Illustrator is a mathematical equation to the computer. Resizing a vector graphic means the program simply recalculates the math and the resulting image ***retains clarity***. Why is this important? There are a couple of reasons. The vector capability of Illustrator is why embedded information in the PDF file can be viewed in Illustrator.

Whereas opening a PDF file in Photoshop would flatten and rasterize the file to convert the image to pixels—embedded information would not be seen. The main take away point is that just because you can see this PDF information in Illustrator does not necessarily mean the file was compiled or created in Illustrator.

Also the lack of clarity in the certificate items suggests it was a pixel-based file, not a vector-based file.

Figure 14 offers a comparison of raster vs. vector objects. An enlarged view of a sample area (from the full image shown) displays the pixel antialiasing edges when zoomed in at 1200%. The vector version is crisp even at a 6400% zoom level. There are no pixels—only a crisp clear edge line known as a ***path***.

It is important to understand that you cannot convert a pixel image to a vector image simply by opening it in Illustrator. Unfortunately, it's still pixel-based, but it can be opened and viewed in Illustrator.

Also important to consider is a disadvantage of pixel images when resizing. Enlarging an image in Photoshop, requires the program to decide (or guess) where to add pixels, and what color value to assign the added pixels. The result is a loss of clarity or blurriness. This is important to remember, because this would account for the lack of clarity for text elements in Obama's certificate.

Figure 15 shows the original low resolution Nordyke image at normal zoom level (100%). The darkest pixel colors (to select the text) were isolated and resized to fit the size needed for Obama's document. Notice the loss in clarity of text.

Figure 16 shows the resized Nordyke text on a layer above Obama's final document. Zoom in to see the similarities of poor quality text when enlarged, compared to the poor quality text in Obama's document (peaking from under the resized text). The idea is to demonstrate how a low resolution image will become soft and blurry when resized. Photoshop provides enhancing tools that can be used to help compensate for the loss of clarity, but the results will still be less than perfect when dealing with low resolution images.

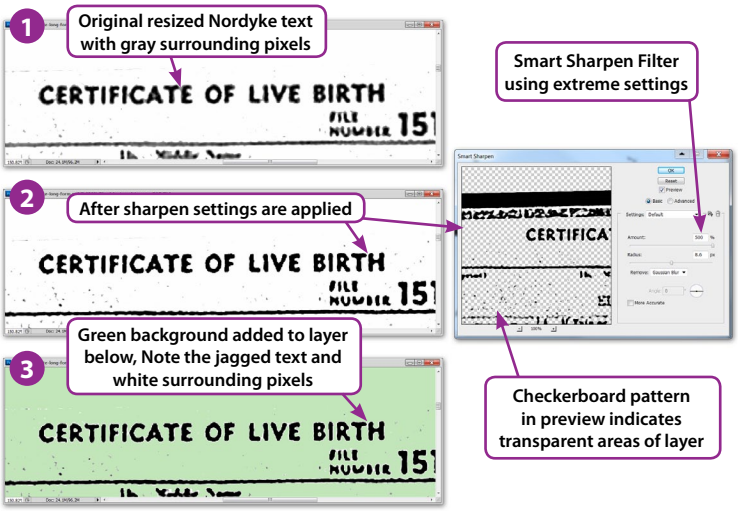


Figure 17: Effects of over sharpening a resized image

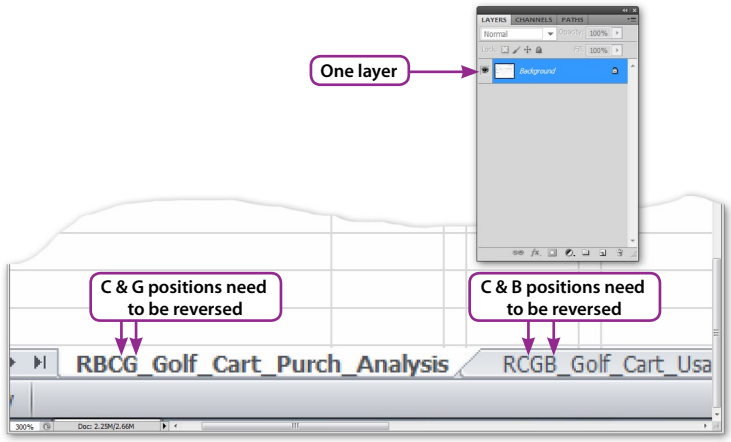


Figure 18: Text letters on Excel screen capture will be moved

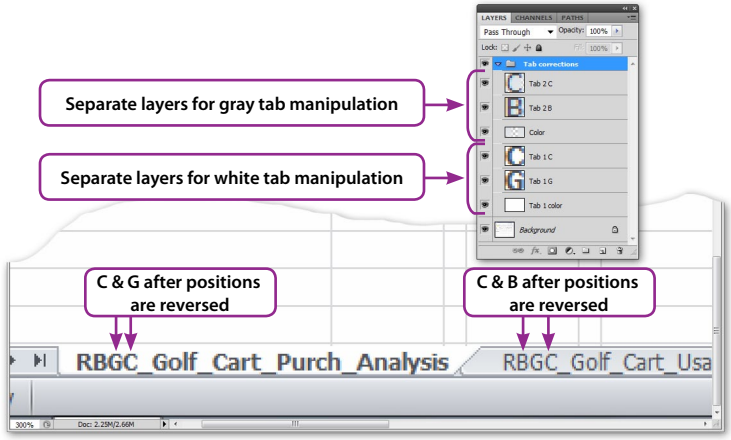


Figure 19: Text manipulation via layers

Over Sharpening to Compensate

Based on how the text appears in the PDF document, it would be my guess that the user over sharpened poor resolution text in an attempt to achieve clarity. The problem with over sharpening is that Photoshop is looking for edges of contrast, and increasing contrast until eventually (in this case), the resulting pixels are either black or white—with no transitional pixel colors (for antialiasing). This would explain the clunky bitmapped jagged edges, the solid black text, and the white halo effect surrounding the text.

Figure 17 helps to illustrate how this might work. Step 1 in the Figure shows the Nordyke enlarged text without a background. Notice that the surrounding edges of the text are grayish in tone (remnant colors of the original image background). Step 2 shows a sharpening filter applied to the text using extreme settings. Notice the jagged bitmapped result (starting to look familiar?). Finally, Step 3 shows a green background applied to a layer below the text so you can easily see the pixel edges of the text. Notice the remnant gray pixels turned white (the white halo effect?).

The results in Figure 17 are not an exact duplicate since it's impossible to know every step taken when creating the document, but this Figure does display a valid explanation for the quality of the text. Consider the clarity that would be present if the file had actually been scanned from an official document. Recall Figure 4 (on page 2) in which the scanned text example provides a significant amount of clarity. And if the document had been created digitally by typing text within a graphic program, the text would have been extremely clear and sharp (since typed text would most likely be vector). Thus the poor quality is also a strong indication of image compilation, and also provides another good argument against the OCR theory, since an OCR scan would convert the text to editable text, thus the text would be clear.

Layers

Think of Layers as analogous to transparencies used on a projector. If an image file is unedited, whether scanned, or transferred from a digital camera, the file will only have one flattened layer. In keeping with the transparency analogy, this would be like having the file printed on one transparency and showing it on the projector. When a portion of an image is selected and copied to a new layer, it would be like having that selected object on a separate transparency above the starting transparency image. This allows you to move the object around independently of the other surrounding layers (or transparencies).

Figure 18 shows a screen capture of an Excel file, focusing on the tab text (to demonstrate moving text around). The starting image shows one layer. The first four capital letters are in the wrong order in both image tab areas. The correct order for both tabs (in this example) should display the letters as ***RBGC***. **Figure 19** shows the copied letters moved into the proper position and the Layers panel shows each copied letter on a separate layer which makes repositioning easy to accomplish. Notice an additional layer was created for each tab and filled with the tab background color in areas of the affected original letter positions to keep the old letters from show through behind the new letter copies. In other words, part of a B might show through if behind the letter C. The block of gray or white tab color between the old letter and new letter solves the problem and leaves the original image intact.

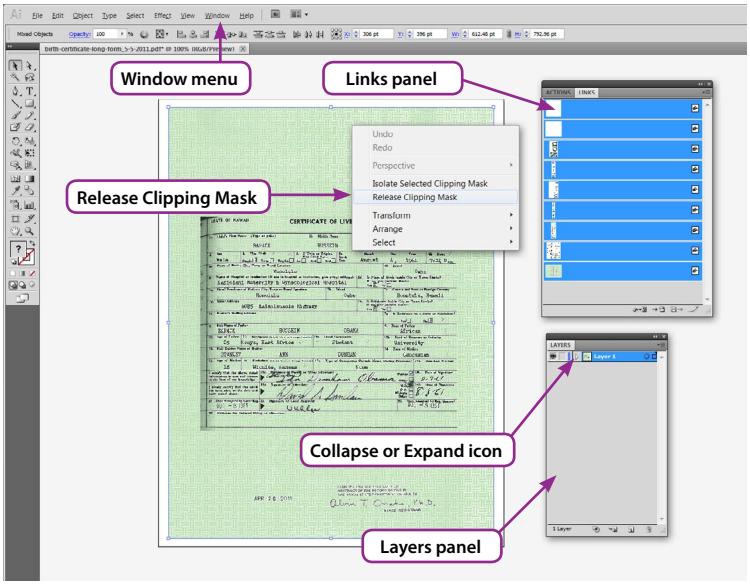


Figure 20: PDF file opened in Illustrator

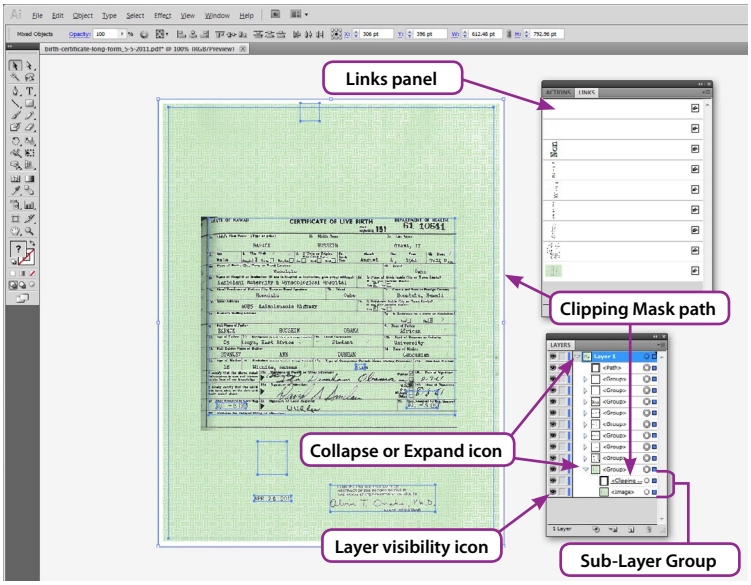


Figure 21: Objects displayed on the Links & Layers panel

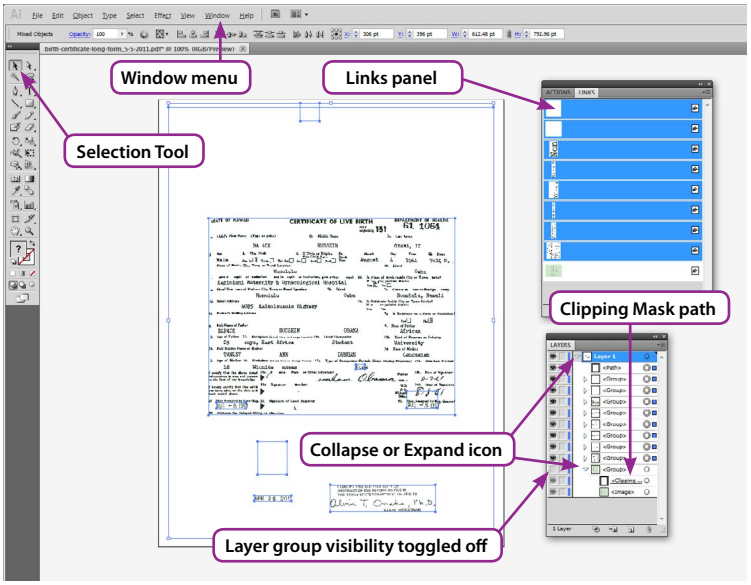


Figure 22: Visibility of Background layer pattern toggled off

Obama's Certificate PDF File in Illustrator

The previous page offered a crash course in layers, but the main idea is that they allow for the ability to manipulate or reposition objects separately within a document—emphasis on *manipulate*.

At first glance, when opening Obama's PDF file in Illustrator, you may not notice any differences. Adobe programs offer many different panels—each with its own purpose. The two crucial panels that need to be open for this discussion are the *Layers* and *Links* panel as shown in **Figure 20**. This is where the fun begins. If playing along and you're not familiar with these programs, all panels are toggled on or off via the **Windows** menu. So if you do not see these panels opened by default, just go to **Windows** and click each panel name to toggle each panel on as needed.

Layers and Clipping Masks

At first glance, the Layers panel appears to have only one layer, but the Layers panel in Illustrator varies slightly compared to the same panel in Photoshop. In Photoshop, the layer stacking order determines what object is on top or bottom. The same is true in Illustrator, but due to the vector nature of this program, you can also have an object layer order within each layer—***sub-layers***—in addition to multiple layers to determine order. Figure 20 shows where the toggle icon is located to collapse or expand the view of each layer. Click to expand the Layer as needed and a *Group* is revealed.

These groups are made up of the object and a clipping path, so what is a clipping path? Recall that in vector programs, the edge outline of each object is known as a path. When objects are pixel based, there are no paths to define each specific outline (for example, typed text is still pixels, not vector paths for the text), so the outside edge of each pixel object image becomes known as a **Clipping Path**. In other words, a path is generated for the outside boundary—where the object ends.

Additionally, all the individual objects import into Illustrator as one grouped object—the total composite image of this document. In order to have free movement of each individual layered object, they need to be *ungrouped*. Perform the following steps:

- Press **Ctrl+A** to *Select All* (Mac users: Command+A).
- *Right-click* inside the document image and click the option **Release Clipping Mask** (see **Figure 20**).
- Repeat the above step a second time to release any sub-grouping of objects.
- On the Layers panel, click the **Expand** icon as necessary to reveal all sub-layer objects (see **Figure 21**).

Notice that each Group layer is made up of subgroups which consist of the clipping path (the edge boundary) and the actual pixel object (also seen in Figure 21). The first column in the Layers panel displays an eye icon which controls the visibility for each object. Simply click on this icon to toggle the visibility *on* or *off*. **Figure 22** shows the visibility toggled *off* for the bottom group—the background pattern.

Also, try this, click the Selection Tool (shown in Figure 22), then click and drag on any of the grouped objects within the document to select it and move the selected object to a new location. Can you do this with any of the official documents you scan? At the risk of sounding like a broken record, this is not normal, unless the document has been compiled digitally.

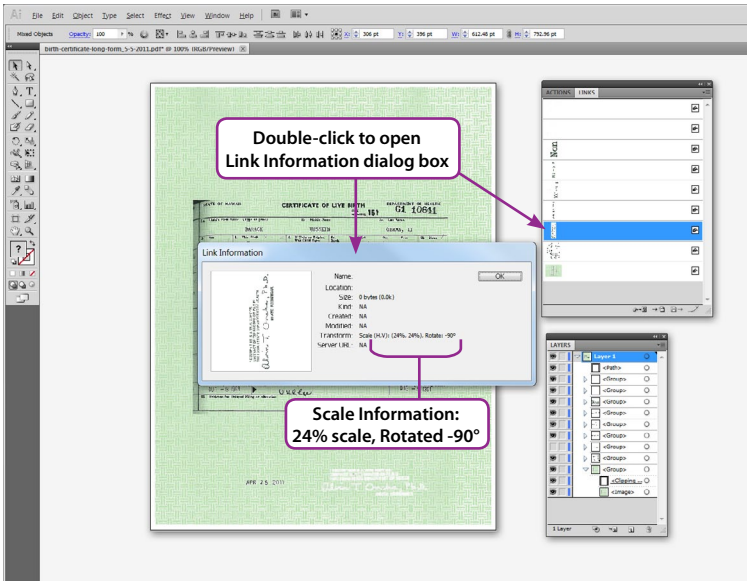


Figure 23: Link Information for Onaka stamp object

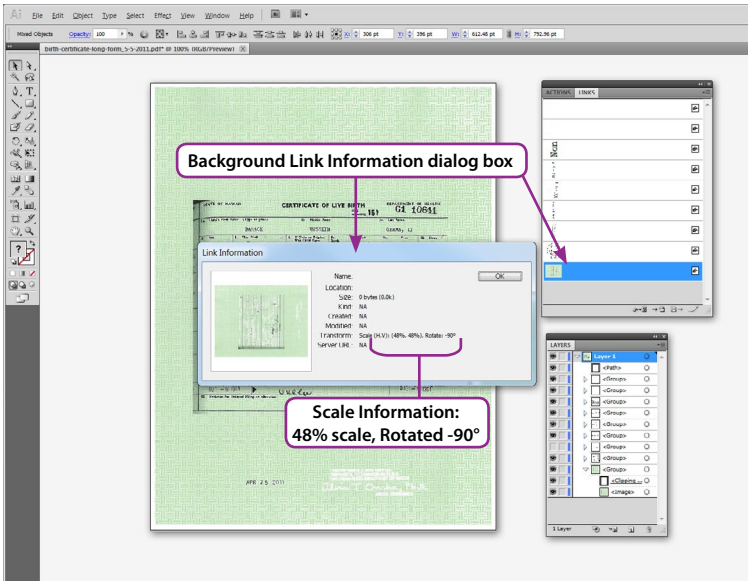


Figure 24: Link Information background pattern object

Similar to the Layers panel, the ***Links*** panel should only display one link (if this was a normally scanned image). Multiple links are also indicators of image manipulation since they reference objects added to the document (not part of the original document). Double-click any of the link items seen in the Links panel to display a Link Information dialog box (for additional information).

Figure 23 shows the Link Information for the Onaka stamp object. The important focus has to do with the scale information which shows the object was scaled **24%** and rotated **-90°**. Most of the links show similar scale information except for the background pattern. **Figure 24** shows the Link Information dialog box which indicates the background pattern object has been scaled at **48%** (instead of 24%). Again, this inconsistency is another indicator of image manipulation that refutes the OCR naysayer argument. If the document is scanned, regardless of whether OCR software was used or not, there is still a consistency in the scanning process (which is not present in this document). Items will not scale at different sizes during a scan.

The OCR Argument Explored Further

OCR—which again stands for Optical Character Recognition—will scan a document for text and convert any images of text to live text which can be edited. The text responds as if you were in a Word document. The text can be selected, changed, copied and pasted. If the PDF had been scanned using OCR software (as many claim); the document would also be able to search for keywords. In other words, when opening the PDF file, you would be able to type in a keyword in the find dialog box and the document would recognize the word. This does not happen when opening Obama's PDF file.

Additionally, the properties dialog box would reflect which fonts were used in the document. **Figure 25a** reflects the Font Properties dialog box in Obama's PDF certificate file. This can be viewed by going to the **File** menu > **Properties**, then click on the **Font tab** in the *Document Properties* dialog box. As you can see, this dialog box is empty indicating that the PDF file does not recognize any text.

In contrast, fonts can be seen *after* the file was then processed through the **OCR Text Recognition** option in Acrobat (found on the **Document** menu). For anyone playing along, go to the **Document** menu and select **OCR Text Recognition**, and then click **Recognize Text Using OCR**. Acrobat will then perform a scan on the document and convert any text found in the image to editable text.

The Acrobat **Find** box is then able to locate and recognize words in the document, but more importantly, **Figure 25b** shows that all the fonts recognized during the process are now listed in the Font Properties dialog box. Interestingly enough, the file no longer shows multiple layers in Illustrator, which also contradicts the claims made by the naysayers.

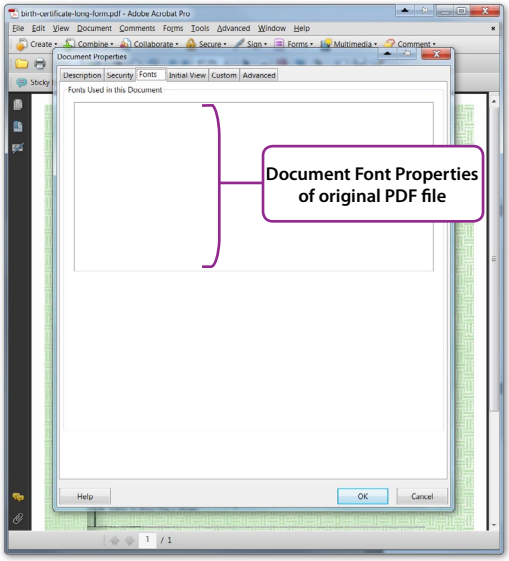


Figure 25a: Font Properties of PDF file

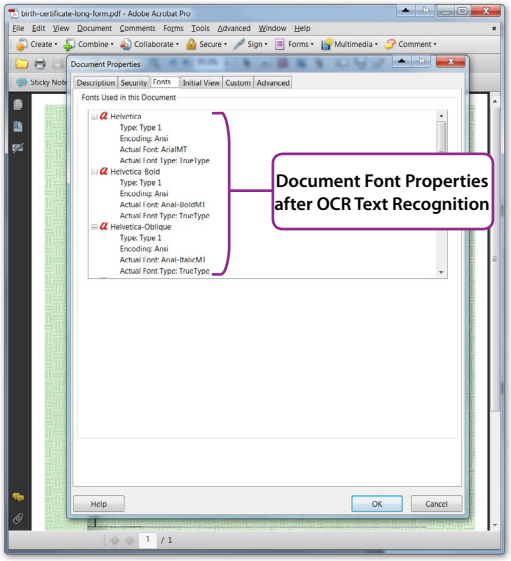


Figure 25b: Font Properties dialog after OCR Text Recognition

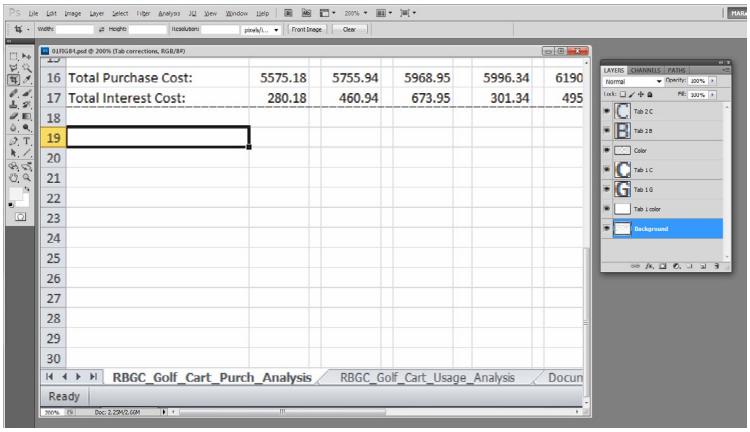


Figure 26: Excel capture with layers saved as a PSD file

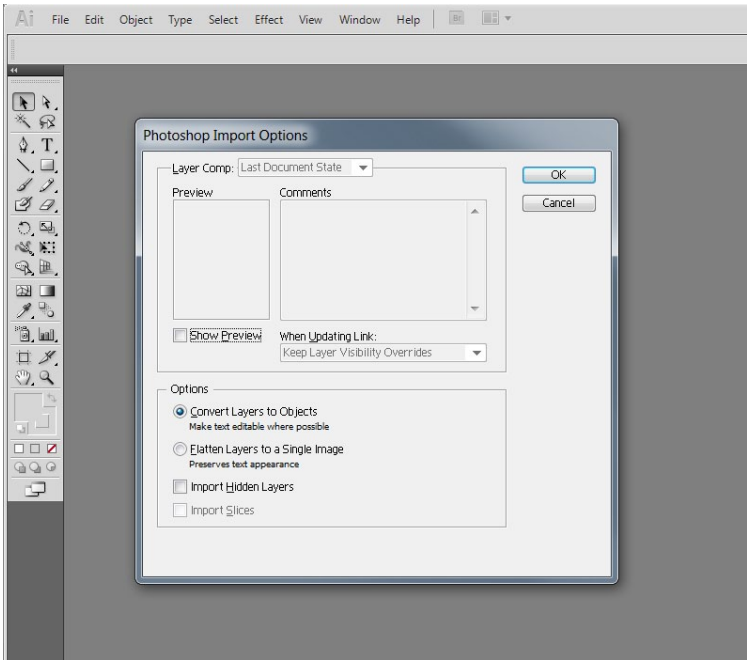


Figure 27: Default settings in Illustrator preserves PSD layers

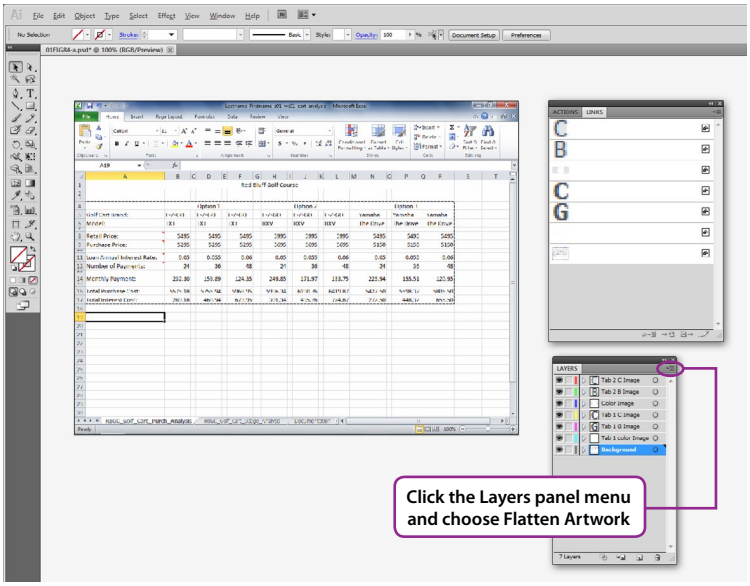


Figure 28a: The Links panel and Layers panel after opening

Saving the PSD (Photoshop) Layered File

As stated earlier in this report, it is my theory that the file was compiled and created in Photoshop, but some work might have been done in Illustrator as well. A Photoshop file (known as a PSD file) will preserve all the layers created (as long as the image hasn't been flattened). The Excel capture used previously in the report (and seen in **Figure 26**) will be used again for the purposes of this next demonstration.

When the PSD file is opened in Illustrator a **Photoshop Import Options** dialog box displays as seen in **Figure 27**. The default settings will preserve the layers and convert them to an object which merely means that each pixel-based object will have the outer path to distinguish the boundaries of that object.

Figure 28a shows the opened PSD file in Illustrator. Notice the Links panel displays the layer objects as links (similar to Obama's file), and the Layers panel displays the layers in the same order as the Photoshop counterpart seen in Figure 26. The process of flattening the document in Illustrator is also a similar process compared to Photoshop. The user would click on the Layers panel menu icon (see icon callout in Figure 28a) and click on the **Flatten Artwork** option. In Photoshop the menu option would be **Flatten Image**.

While the process may be similar the results are not. When the document is flattened in Photoshop, it becomes one flattened layer in the traditional sense (as previously discussed). However, as **Figure 28b** shows, the Layers panel in Illustrator flattens the 7 layers by placing all the objects into a separate sub-layer contained within one main layer. Recall that vector programs can contain sub-layers. In addition, if the user were to select the entire document and then go to the **Object** menu to choose **Clipping Mask** > **Make**, the result is the opposite of the procedure used to *release* the clipping mask group. This will cause all the sub-layers to be converted to the groups also seen in Figure 28b.

When saving the file as a PDF from Illustrator, the default setting will **Preserve Illustrator Editing Capabilities**—which means it will retain all the object (sub-layer) information within the PDF file. Thus when the PDF file is opened, the layer and sub-layer groups are still available. There's a very strong possibility that the creator of Obama's certificate file followed a similar process.

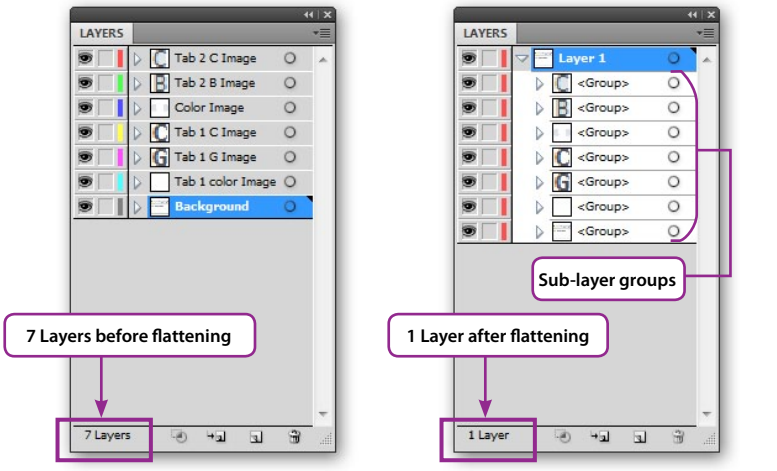


Figure 28b: The Layers panel before and after Flatten Artwork

Mara Zebest grew up in Baltimore MD, where her parents cultivated her life-long love of art and graphic design. She spent 26 years as a Navy wife, traveling around the country with their two children; until settling down in the Sacramento area in 1990.

Mara has served as co-author on the Inside Photoshop series of books as well as Photoshop Elements 2.

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Mara also teaches private classes on Adobe InDesign, Illustrator, Photoshop and Microsoft Office to Goverment Employees and Fortune 500 corporations.

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