Analysis and Technical Information for
Selected Examples of Print Images

BACKGROUND

The basis for this image collection was a directed reading course on the “History of Print Images” from the time of their first general use to the present. The primary goal was to investigate the techniques and technological developments related to the printing of images along with the evolution of their use in a variety of printed works and materials. Important contextual issues such as the interaction of images with text, geographic distribution of techniques and the social, economic and educational needs which these printed works addressed and their impact on society and events were also considered. In addition the principles of bibliographical description were briefly reviewed to better understand the compilation of earlier works. [1]

The collection contains examples of the significant printing techniques used since the mid 16th century and attempts to present those techniques in a digital form that will allow the viewer to examine, in relative detail, the differences between those various reproduction techniques. During the selection and digitization of the examples a number of assumptions were made that were later revised as to the methods used for reproduction of the originals. Details of the most notable examples are included. Additionally, the identification and description for each specific example is annotated in the metadata associated with each sample image.

Basic procedures and technical details of the image acquisition process for the various types of materials and specific equipment used is described in a following section. Comments on ways to better represent the features of an original in electronic form are made. Due to the complexities of the overall image acquisition process and associated workflows a complete and detailed explanation of all techniques and technologies used for the process is beyond the scope of this document. Additionally, the volume and diversity of material covered in the associated readings preclude a detailed review of all the material. Therefore, a more limited approach to the subject is taken and all aspects of the procedures and analysis will not be discussed in detail. References, the reading list and additional sources are included for review.

SELECTION and DESCRIPTION

Selection of the images used in the collection was determined by their availability and the scope of the project. All items except the photograph came from the holdings of the Department of Special Collections at Western Michigan University. The primary intent was to select images for the collection that represented “the historical development of mass-produced images” and included the major reproduction techniques for both black and white and color methods. The scope of the project limited the number of examples but representative items from the five major techniques were selected and cover the time period from the mid 16th century to the year 2000. There are a total 17 images that provide basic examples for relief, intaglio, planographic, serigraphic (screen print) and photographic techniques or processes. The primary objective was to select images, in color if possible, that were representative of
the methods used during the time of the development of that specific process. Due to the availability of some type materials and interest in providing a variety of forms, the examples of screen-prints, one of the woodcuts and a wood engraving date from the later 20th century.

The images in the collection cover a broad range of subjects and content material, and have been selected in an attempt to also depict the progression of mass reproduced images as they were used to provide information to an intended audience. It should be noted that the earliest examples are primarily religious in nature whereas those shown by examples from the period starting in the early 19th century (actually the period started in the later 18th century) contain a much wider variety of subject matter and are contained in publications with fictional, historical, educational, and more esoteric content. The increased quantity, quality and varied subject matter of print images through the history of their use can generally be attributed to advancement of the technologies used and the resultant change in cultures. The dissemination of these mass-produced printed materials also expanded the subject matter and increased their use by a broader group of the general public. [2][3]

EQUIPMENT and SOFTWARE USED

Following is a list of the primary equipment and software used for equipment calibration and the image acquisition process. The basic equipment specifications are also listed along with the specific software associated with each of the devices. Calibration of the equipment was accomplished to standardize the color accuracy of the monitors and acquisition equipment. The spectrophotometer and software listed were used with the specified color targets to create International Color Consortium (ICC) standard profiles that would later be applied to the acquired image files to more accurately represent the original print image. [4] Photoshop was used during the process to view, crop, retrieve image data and manipulate the images where necessary. All “archival” files are in tagged image file format (TIFF / TIF) files as detailed in the metadata associated with each individual image. The LUNA Insight system, used to display the selected examples, processes the TIFF originals for viewing by creating four (4) Joint Photographic Experts Group (JPEG / JPG) and one (1) JPEG 2000 / JP2 (wavelet-based image compression) type files. Specific file information can be seen in the “File Data” tab of the image metadata.

Microtek ScanMaker 1000XL – flatbed scanner, resolution 3200 x 6400 dpi, 48-bit color depth, 4.0 Dmax (Scan Density Range), A3 page size -- SilverFast Ai version 6.5.5r2

IDEAL/contex Chroma XL 42 Plus, Wide Format Scanner – 508 dpi Optical Resolution, 48-bit color, 42 inch wide, .6 inch thick media -- IDEAL JETimage NET version 6.3.1 software (using the scan to file function)

Hasselblad H2/CF-39MS Camera and Digital Back, with either HC 80mm or HC Macro 120mm lens. 39 Megapixels (5412 x 7212 pixels) full frame 8 bit TIFF of 117 MB. (Multi-shot Mode) Hasselblad FlexColor Software version 4.7.1 for image acquisition

GretagMacbeth (x-rite) eye-one (i1) Pro Spectrophotometer with i1Match (software) for Monitor and Camera Calibration (Digital ColorChecker SG, target)
IMAGE ACQUISITION and PROCESSING

Due to the varied size, fragility and specific requirements it was necessary to utilize the three (3) different image acquisition technologies to digitize the selected print images. The specific procedures necessary to acquire an image differ between the different devices but in general the end result is the same. The acquisition process produced an “archival” file in tiff format that can be both maintained for preservation purposes and processed to create the final master files. These files were then ingested into the image database where the iterative files were generated and made available for access and display. The requirement to “post process” the basic images was necessary to make them more consistent with the desired end result. This included cropping, rotating if necessary, calculating the actual pixels per inch (ppi) for images acquired with the camera and adding the ICC color profile data to the images.

“Color management is usually based on profiles that conform to the internationally accepted ICC profile specification.” Color management is not a trivial subject and relies on fairly advanced color science and imaging concepts which make it difficult to easily understand.[4] As stated previously color profiles were created for each of the devices and were utilized in conjunction with the image processing. The normal method for “color correcting” an image would be to “attach” the “input profile” i.e. scanner profile, to the appropriate image so that data about inconsistencies in the device are available when the image is viewed or printed. Unfortunately, current image databases such as this one (LUNA Insight), remove profile information from the TIFF file (header) during the conversion process of the original image to the JPEG iterations. This becomes a problem if a relative accurate representation of the original subject material is desired. In the creation of this collection and processing of the selected images an investigation was made to see if another method could be used to apply the profile information to the image files. The desired results required that the image files be modified so that the processed files contained the profile data making them visually more accurate as compared to the original. This “experiment” consisted of attaching the ICC color profile to the image in Photoshop and then “converting” it to the Adobe RGB (1998) color space which modified the image data to “include” the profile information. Comparisons of the differences between the uncorrected files, files with the profile attached, converted files and the original in most cases exhibited a discernible improvement from the unconverted files, which would be the way images would normally be viewed in a collection. A caveat to this is that for the best representation the collection must be viewed with the Insight JAVA Client on a color calibrated monitor.

(The possibilities of this method must be researched further and detailed analysis must be done to determine the best means to achieve the desired results. Additionally, use of the Insight Browser interface may require a different color space such as sRGB to more accurately represent the original. The method applied provided for a “general” improvement...
to the image quality and color accuracy but is more comparative than specific as to quantifiable results.)

The Microtek flatbed scanner was used for items that could be placed face down on the scanning glass without damage. This scanner is able to acquire image data at very high optical resolutions providing the most accurate method available for the digitization process. The required procedures are the easiest to manage and the resulting images are processed directly into Photoshop for the “post processing” operations. The use of this type device would be the method of choice for digitization of any materials that could be accommodated with the required parameters and would provide for the fastest most efficient workflow.

The IDEAL Contex wide format scanner was used for the digitization of relative non-fragile items that were not bound but were too large to fit on the bed of the Microtek scanner. This device is capable if accepting items up to 42 inches wide and has an optical resolution of 508 ppi. In most cases files created with this quality are more than acceptable for many uses. Considering the possible width and basically unlimited length of items that can be scanned, extremely large files can be generated. Two items were digitized at 600 ppi using this device and were both temporarily encapsulated between mylar sheets to protect them from any possible damage. A third (The Bell Tower - broadside) was attempted but due to it being in a non-removable frame the results were less that adequate and it was imaged with the “camera” at a lower resolution. This type device provides a means to digitize larger items providing they are not too fragile or can be protected from the necessary movement through the scanning mechanism. Due to the special requirements, the workflow of this device would generally be slower than with a flatbed scanner, although materials such as maps and documents that do not require special handling could be scanned at relatively high speed especially considering the large sizes possible.

The Hasselblad H2/CF-39MS camera with digital back mounted on a Kaiser copy stand with high frequency fluorescent lighting was used to image the majority of the bound materials and the one broadside mentioned earlier. This device is one of the highest resolution digital capture devices available at 39 megapixels and with a maximum image size of 7212 pixels by 5412 pixels which results in a TIFF file of approximately 112 megabytes. The system is used to create the best possible color reproductions of bound and fragile materials such as manuscripts, incunables and larger pieces that are not appropriate for the wide format scanner. Due to its capabilities it is also able to capture items with three-dimensional qualities such as coins or textiles. The main difference with this type device is that it does not allow for a fixed scanning resolution but a fixed capture size. This equates to higher resolutions for smaller objects and lower resolutions for larger ones. Examples in the collection digitized with this device range from 375 ppi for the broadside to 1305 ppi for a small engraved plate. Except for the small plate (that was digitized originally for another project) all images captured utilized the “multi-shot” capability of the digital back that moves the image sensor to capture individual color channels providing a slightly higher quality image. The workflow associated with this device is the most time consuming due the nature of the materials being digitized; their handling requirements (for example the 1735 combination intaglio and relief print required a glass plate to flatten and hold the page) and the necessity to make adjustments to the camera settings associated with lighting, etc. before every capture sequence.
In all cases specific data relative to the individual images acquired with each device are contained in the associated metadata.

DESCRIPTION and ANALYSIS

The selection process and subsequent digital acquisition of the examples for this collection of print images, as previously discussed, consisted of specific requirements that determined the actions necessary to assemble the visual portion of the collection. Following this it was necessary to investigate the sources and available information associated with each of the selected examples to properly compile the necessary information needed to accurately describe them. This process, the creation and assembly of the metadata, was by far the most time consuming and detail orientated aspect of the project. Construction of the image database framework and publishing of the “collection” was completed after all necessary elements were available in final form. The processes necessary to make this collection available for viewing were based on standardized guidelines and best practices that were used during all aspects of the collection creation.\[5\]

During the process of compiling the metadata for the collection, each image was studied in detail and available information on the source was reviewed. Many of the images could be described directly from the catalog record and were verified as representative examples of the type print selected. In studying the digital versions of the selected prints there were a few examples that revealed details requiring further investigation that after analysis revealed them to be examples of print methods different from what was originally thought. The guide How to Identify Prints\[6\] proved invaluable in determining the most probable technique used to reproduce the example images. Additionally, research into the source for a number of the items uncovered inaccuracies in the original cataloged data.

The 1752 example of a devotional originally appeared to be an engraving, but on closer review appears to have been created with more than one method, which may have included etching, and stippling. The use of mixed techniques was common during the period that this example was published.

Originally thought to be an engraving because of the caption “Drawn & Engraved by I.R. & G. Cruickshank.” the 1820 print from the 1823 book Life in London, proved to be a combination aquatint and etching. Close study of the digital image reveals the background shading to have been done with the aquatint technique. It can be assumed that although the Cruickshank’s were originally engravers that they probably started using etching and other techniques as these methods became more popular.

An early process lithograph of “Scheherazade” by Edmond Dulac, indicated that the actual date of publication was unknown. Investigation of the source reveals that the book with included plate was most likely published in 1907.\[7\]

The two page spread in the book France: son Histoire by the illustrator known as “Job” was selected as an example of a lithograph. By studying both the digital image and the original, this example was determined to be a relief print. Because of the period and composition of the image it is probably a chromotypograph or line block print. In trying to find definitive data
about this print the only readily available sources seem to be online book sellers that reference versions of the book as containing lithographs and one that references the illustrator as having done chromotypographs for the same publisher in a slightly earlier work circa 1905. Also, various printing dates are referenced, 1910 being the earliest and most probable date for this example. Since this example seems to be a relief print it would most probably be an earlier example if printing methods were changes for later editions.

Another example, the broadside *Bayou: for Pete Karr* is not numbered and has an annotation “Hungry Mind Number 4” indicating that it was part of that series when in fact it was part of the first series. This indicates that it is most likely a reprint made during the printing of the fourth series in 2000.

References:


[8] [http://biblion.co.uk/books/1515605.html](http://biblion.co.uk/books/1515605.html) (accessed, December, 13, 2007)

References List: (Course Readings)

I. Scholarly traditions and tools for book description:


II. Technology and Techniques


III. History and significance


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[Technological Tasks and Philosophical Ideas]

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[Interactions Between Techniques and Ideas]


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http://www.loc.gov/rr/print/tgm1/

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Paul Howell, for the course: History 6500 (Directed Reading: History of Print Images)  
Instructors: Miranda Howard, Professor, Family and Consumer Sciences and Art Librarian  
Susan Steuer, Assistant Professor and Rare Book Librarian

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