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EDITORIAL

The Changing Information

I am very pleased, indeed humbled, to have become the new Editor of Meridian and given the task to bring Meridian back. We are back, have plans for several issues into the future, and this issue represents the diversity that we hope to bring to our readership and especially the members of the Map & Geography Round Table.

The changes in information are all around us and we would be living in a cave somewhere far away if the digital world had not impacted us. Not only do we see, almost daily, the growth of digital information from our governments but the various commercial sectors are offering a similar array of electronic formats which impact cartography from early maps to current federal and state government map production.

The Internet and WEB pages have not only increased our ability to communicate more efficiently but has also provided us with an array of maps viewable across our screens. There is little doubt that the availability of maps electronically will continue to increase and that even small libraries will be able to access rare antiquarian materials from around the world at the touch of a mouse!

It is a road of cautious transition that we may find ourselves on as we see the many wondrous electronic access points and yet wonder of the future of the paper map. Perhaps we must think of our roles as access and service links for information and not creators of that information? On the other hand, this new transition also brings us very close to the map publishing business as we create boundary and data files, choose colors for our maps, and choose the layers to map and those to ignore.

This electronic world has also made it more efficient for us to bring certain services to our users. How long ago was it when we were concerned with providing up-to-date maps for urban and rural areas beyond the standard topographic map? How many of us now use one of the many electronic street atlases to serve that same purpose today? How many of us take advantage of the electronic gazetteers that are now available?

The whole arena of electronic geographic information, whether it be a sophisticated geographic information system or a simple electronic street atlas, makes this a very exciting time to be working in a map library. In addition, the changing political world seems to have created an increasing awareness of maps and is bringing more persons into our collections. It is my hope that Meridian will be able to present articles that keep you informed of these changes and also introduces you to historical topics that will help you better understand our increasingly valuable paper collections.

David A. Cobb
Editor
Martayan Lan

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MERIDIAN 11
Copperplate Engraving for the Production of Topographic Maps at the United States Geological Survey 1890-1953

Hugh A. Phillips
Department of Geography
University of Wisconsin-Madison

Abstract

This paper describes the circumstances and map printing methodology of the copperplate engraving era of the USGS. Copperplate engraving was used to produce the linework and lettering for practically all USGS topographic maps from 1885 until 1942 and resulted in maps with a very characteristic appearance. The demand for speeded up production of topographic maps nationwide in the 1940s and 1950s caused fundamental changes in the map production process. Copperplate engraving was phased out because it couldn't keep up with the greatly increased data volume generated through aerial survey and photocompilation work. By 1956 the use of aerial photographs and a shift from copperplate engraving to positive drafting, negative scribing and photographic methods of map production had resulted in a greater than tenfold increase in yearly map production over the peak years of copperplate engraving.

Introduction

From shortly after the inception of the USGS until 1942 virtually all topographic maps produced and printed by the USGS were derived from engraved copper plates (Figure 1). These gave rise to maps of unique appearance and recognizable from the form of their lettering and the ‘water lining’ of lakes and large rivers. In time the method of copper-
The importance of copperplate engraving at the USGS was intimately linked to the history and evolution of that agency.

The inefficiency, added expense, and duplication of work... were clearly unsatisfactory.

National Surveys and the Establishment of the USGS

During the years 1867-1872, shortly after the Civil War, four major surveys were begun in the west. Clarence King directed a geologic and topographic survey of the 40th Parallel region from the Rockies to the Sierra Nevada for the War Department (Geological Exploration of the Fortieth Parallel). Dr. Ferdinand V. Hayden performed survey work including geology, topography, paleontology, and botany in the states of Wyoming, Idaho, Montana, New Mexico, and Colorado for the General Land Office and the Secretary of the Interior (Geological and Geographical Survey of the Territories). Major John Wesley Powell explored the Colorado River under funding provided primarily by academic institutions, and continued afterwards with a survey (including triangulation and establishment of geodetic control points) of southern Wyoming and central and southern Utah under the Department of the Interior (Geological and Geographical Survey of the Rocky Mountain Region). Lieutenant George M. Wheeler surveyed areas west of the 100th meridian for the War Department (Geographical Survey West of the 100th Meridian). Although mapping topography was the primary concern he was to also gather as much other scientific and historic evidence as practically allowed. Simultaneously with those surveys the Coast and Geodetic Survey was extending its triangulation network from the coasts into the interior.

The inefficiency, added expense, and duplication of work that was a result of having so many groups surveying in the same region were clearly unsatisfactory. After some recommendations to address this redundancy were presented by the National Academy of Sciences, Congress passed a bill to create a Geological Survey under the Department of the Interior and discontinue the four ongoing surveys in the west. On March 3, 1879, the USGS became official with Clarence King as its first director.

A Brief History of the Copperplate Engraving Era at USGS

It would be several years before J.W. Powell became Director of the USGS and took implicit with the mission to produce a geologic map of the US the necessity to produce a topographic base for it. It would be still several more years before the methods to produce this map were established. These methods would embrace copperplate engraving as the means to create a practical high quality base map. Copperplate engraving would be the primary method for creation and storage of base maps at the USGS for some 50 years. Because the activity and evolution of the engraving division were influenced by many events outside its control including diversion of effort, several wars, funding, and the development of other competing technology, it is essential to consider the historical context which guided its evolution. It was the conclusion of Edney that until 1925, growth, progress, and support for mapping in the U.S. hinged largely on ad hoc legislation as opposed to an overriding long-term commitment toward a national mapping program.

An abbreviated history of the early years of copperplate engraving work at USGS may be obtained from the annual reports of the USGS. The initial reports of the Engraving
Table 1. Number of Engraving and Printing Employees at the USGS\textsuperscript{18,19}

<table>
<thead>
<tr>
<th>Year ending June 30</th>
<th>Copperplate engravers &amp; assistants</th>
<th>Printers, transferrers, &amp; assistants</th>
<th>Lithographic engravers</th>
<th>Photolithographers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inception Feb 1890</td>
<td>5</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1891</td>
<td>8</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1892</td>
<td></td>
<td>23</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1896</td>
<td>17</td>
<td>32</td>
<td>6</td>
<td>2 photomechanical</td>
</tr>
<tr>
<td>1900</td>
<td>23</td>
<td>40</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>1905</td>
<td>26</td>
<td>45</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>1917</td>
<td>31</td>
<td>49</td>
<td>7</td>
<td>1</td>
</tr>
</tbody>
</table>

The act establishing the USGS charged it with landcover classification and examination of the geologic structure and mineral resources of the country.\textsuperscript{21,22} Director Powell recognized that Survey work should be useful to as many people as possible, not just those interested in mining, because the work was accomplished at taxpayer’s expense.\textsuperscript{25} The Congressional appropriations act for the 1882-1883 fiscal year charged the USGS with making a geologic map of the United States. Director Powell took this as tacit permission to also perform topographic mapping as that forms the base on which a geologic map would be portrayed.\textsuperscript{26} Due to the utility of purely topographic maps and a growing demand for them, it would not be long before the USGS would consider their production for general distribution.\textsuperscript{27}

The geologic map was a major course change for an agency only three years old. It gave the USGS a specific goal nationwide. It also required that procedures to insure the production of maps of consistent appearance and quality for this huge project be quickly defined. The quality of data gathered in earlier statewide and regional surveys was assessed to see what could be incorporated into the geologic map. For most new geologic mapping a scale of 1:250,000 was regarded as sufficient detail.\textsuperscript{28} Contour lines were suggested as the means to portray relief. The more artistic hachuring and brush shading to portray relief...
The choice for scale for any region was influenced by population density, economic importance, and geologic or topographic complexity.

The choice for scale for any region was influenced by population density, economic importance, and geologic or topographic complexity. The malleable copperplates... could be hammered out, smoothed, and re-engraved in those specific areas requiring correction.

The malleable copperplates... could be hammered out, smoothed, and re-engraved in those specific areas requiring correction.

The accuracy and immediate usefulness of topographic maps gave them an importance independent of their use as a base for geologic mapping. Topographic mapping was carried out over extensive areas in anticipation of future geological survey. The accuracy and immediate usefulness of topographic maps gave them an importance independent of their use as a base for geologic mapping. The 1888 Congress recognized this through specific appropriation for topographic work. Based on percentage of expenditures, topographic mapping was the major activity of the USGS in the early 1890's.

The accuracy and immediate usefulness of topographic maps gave them an importance independent of their use as a base for geologic mapping. The 1888 Congress recognized this through specific appropriation for topographic work. Based on percentage of expenditures, topographic mapping was the major activity of the USGS in the early 1890's.
With the economic freedom provided by the appropriations bill, the USGS established its own engraving division within the survey.

The equipment acquired by the USGS Engraving and Printing Division allowed it to print its own topographic maps...

Two methods to photographically transfer final inked drawings to the copperplates prior to engraving were developed by 1907.

An initial goal of the USGS, the production of a geologic map of the country, was refined in the plan presented in the report of 1893-1894. This Geologic Atlas of the United States was to be published as a serial of folios for specific regions and comprised of topographic maps, geologic maps and descriptive text. This report described the format of the folios, the color scheme chosen to illustrate geologic age, and the mechanics of production of the multicolor geologic map. A photolithographic branch which produced short run and odd items such as special sheets, river survey maps, and preliminary maps was formed in 1897. At that time all final topographic maps, which represented the major USGS effort and output, were still printed from lithographic transfers of the copperplate engravings. During the following year Mr. Kübel traveled to Germany to observe photolithographic technology in use there. Two methods to photographically transfer final inked drawings to the copperplates prior to engraving were developed by 1907. These were reported to save time in map production over the previous manual tracing transfer method.

In 1908 the first note is made of the significant amount of outside (not topographic map) printing done by the Engraving and Printing Division for other divisions of government. The Engraving and Printing Division had production capacity in excess of that required to complete only USGS work. It could compete with private printers for work to be performed for the many other branches of government that used maps and required engraving or printing. The rationale for this method of operation was that...
The Engraving and Printing Division . . . could compete with private printers for work to be performed for the many other branches of government that used maps . . .

production scale could be maintained high to reduce cost, the equipment and workers were more fully utilized and the capacity would be available for times of emergency production. Nonetheless, one can imagine that the focus and relative importance of the engraving staff in that Division was diluted by the printing work for 43 units of government and six state governments that was carried out in 1932, for example.53 Photolithographically produced maps for general distribution were first mentioned in 1905. These began with specialized 1:24,000 scale city maps and 1:500,000 scale state maps.56 Photolithography would not begin to encroach upon the copperplate engraved topographic maps of the geologic atlas for another ten years. During the 1917-1918 fiscal year work on geologic folios was temporarily discontinued due to the war and in a prelude to the future, 24 topographic maps were produced photolithographically.57

The Temple Act of 1925 authorized the completion of a topographical survey of the entire country within twenty years. Edney recognized this as a turning point in U.S. mapping policy because for the first time, Congress would acknowledge "that such a survey was in the national interest."58 It was symbolic rather than effectual legislation because Congress failed to provide the funds necessary to carry the goals of the Act within the 20 year time period. As a result, federal mapping proceeded at its existing rate.59

By 1934 using aerial photographs to derive information for topographic maps had begun, but funding for the USGS was at a low ebb.60 At the same time, nationwide, there was increasing demand for topographic maps to use as the base for public and private endeavors.61 Feeling this pressure, the 1936 Congress increased the funding of the USGS to improve mapping speed.62 Stereoscopic plotting for topographic mapping was first demonstrated that year63 and during the next year became a cooperative project between the USGS and the Tennessee Valley Authority.64 This new technology appeared so promising that in 1938 fifteen stereophotogrammetric instruments were installed at the Chattanooga office of the USGS.65 In 1940 the War Department joined the USGS in recommending both topographic and strategic mineral mapping as essential elements of a strategic defense program. This would act as further impetus to develop technologies to acquire topographic data more rapidly and to produce finished maps from that data in a shorter time. Three years later twice as many new topographic maps of the USGS were submitted to be produced photolithographically as were submitted to be produced by copperplate engraving.66

After the war in Europe, the 1945 Report of the Secretary of the Interior states that the U.S. was about half mapped.67 Although this report does not document the amount of mapping at any scale, early estimates for the number of sheets to comprise the finished geologic atlas of the U.S. was about 7000, at scales of 1:62,500 and smaller.68 The numbers reported for percentage of mapping completed were somewhat plastic and it was possible for the percentage to go down. The percent completion numbers were based on a fuzzy definition of the adequacy of the existing maps; a low number might stimulate funding.69 Existing maps could be deemed inadequate for reasons of accuracy, scale, or being out of date.70

In 1947, the USGS outlined a 20-year plan to complete the topographic mapping of the U.S. that would require acceleration of the map production process.71 In acknowledgement of changing map production technology the word 'Engraving' was dropped from the title of the Map Printing Division and it became a part of the Topographic Division on July 1, 1947.72
Technological improvements in aerial photographic equipment gleaned from examination of captured German aerial camera lenses was accompanied by major changes in the map production process. The Section of Cartography and Map Editing investigated new plastic films for drawings, inks, and means to improve the map lettering process. Early plastic films for map production had not been very successful because they suffered from dimensional instability and were incompatible with existing inks. It appears that cellophane stick-on patterns for geologic maps represented the first highly successful plastic medium to be utilized by the USGS for map production. Stick-on patterns allowed the Division of Geologic Cartography to eliminate some work formerly carried out by the Division of Engraving and Printing.

Reorganization plans of the USGS dictated that as much of the map production as possible was to be performed in the regional offices. With the exception of map lettering and photography of the final drawings, this did not represent a huge change in work accomplished in the regional offices. Now instead of turning their carefully inked drawings of hydrography and contours over to the engraver, the offices photographed them at production size instead. The films produced at the regional offices were still checked over at the Washington office to see if they met USGS standards before printing. By 1949 map production at the USGS had been almost totally decentralized to the regional offices. Copy cameras, stick-on type, and positive drafting of linework on improved plastics made the production of high clarity maps possible without the need for copperplate engraving. In that year 21 topographic maps were produced by engraving and 536 were produced photolithographically. The report of 1950 acknowledged the switchover from copperplate engraving to the faster photolithographic methods to produce standard topographic maps which had commenced some ten years before.

By 1952 demands for mapping were still increasing and made more acute by the introduction of the 1:24,000 series maps. Map production was increased by contracting some tasks of aerial surveying and map compilation to private firms and by purchase of additional stereoplotting equipment for the regional offices. In 1953, the last year for copperplate engraving, only three maps were produced by that method, but 1301 were produced photolithographically. By 1956, negative scribing had replaced positive drafting and had been extended to be used directly with stereocompilation equipment. The end of this period had ushered in the second revolution in map reproduction described by Koeman - a shift in the map production process from the imperfect manual drafting on plastic films to the more refined scribing process. When scribing was combined with photo composed stick-on lettering, film screens for tints and patterns, and color proofing, it made possible the production of high quality maps without necessitating the artistic skills of the copperplate engraver.

Despite the increased number of copperplate engravers from 1890 to

---

**Figure 2.** Number of new topographic maps produced from copperplate engravings by the USGS. The 77 maps produced in 1893 undoubtedly also includes those produced under contract by private engraving firms. The highest one year production was 140 in 1919.
The USGS Topographic Instruction manual of 1928 indicates transfers from the engraved plates to the lithographic stones to be standard procedure.

A short lifetime for a plate results from the large amount of pressure necessary to force the printing paper into the grooves of the plate to pick up the ink and the wear caused by wiping between impressions.

Printing of Copperplate Engraved Maps at USGS

The usual output produced from an engraved map is an intaglio printed map. However, the evidence indicates that virtually all copperplate engraved maps produced by the USGS from its inception have been printed lithographically (later this was probably offset printing) using a paper transfer to reproduce the image of the copperplate engraving on a lithographic stone.

Even before the USGS began to engrave and print its own maps, there is evidence that the transfer process was known and accepted. In 1884 a cooperative agreement between the USGS and the Commonwealth of Massachusetts for a topographic survey of the state was begun. Among the agreements was that the USGS was to engrave the maps and give transfers of the plates to the state. The annual reports of the USGS reveal that from its inception the Engraving Division possessed lithographic printing equipment and the usual procedure involved a transfer from the copperplate engraving onto lithographic stone for printing. The USGS Topographic Instruction manual of 1928 indicates transfers from the engraved plates to the lithographic stones to be standard procedure.

The Fifteenth Annual Report of the USGS (1894) states that 'all final map printing in the Geological Survey is done by the lithographic process... Lithographic printing would be a favorable procedure for the USGS to employ, considering the demand for map sheets. Printing a map by the intaglio process directly from the copperplate is a slow procedure. The plate must be inked and wiped clean of ink not in the engraved grooves before each map is printed. A short lifetime for a plate results from the large amount of pressure necessary to force the printing paper into the grooves of the plate to pick up the ink and the wear caused by wiping between impressions. The actual lifetime of course is dictated by the fineness of the linework and what is considered unreasonable degradation of the image - however a number like 500 impressions might be an average lifetime of a copper plate used for intaglio printing. This would not be acceptable for the USGS which had put much time into the engraving of the plate and would hope to produce many maps from it. By making a transfer to lithographic stone, the valuable engraved copper plate could be preserved as a master in nearly pristine condition. Lithographic printing was faster than intaglio printing because of the simpler inking process, and with the advent of the steam powered lithographic press, the printing speed gap widened immensely to lithography's favor.

There are also physical signs on a printed map which give clues about its printing method. The pressure required for intaglio printing makes an impression of the plate into the paper. In contrast, lithographic printing does not produce such a mark. A random sampling of USGS topographical maps from early in the copperplate engraving era were examined, and they showed no signs of the embossing, known as the plate mark. This in itself is not evidence for lithographic printing because the plate mark could be trimmed off.

The way the ink lies on the surface of the paper can also be a key to the printing method although this characteristic proved inconclusive for this investigation. Lithographic (sometimes known as planographic)
Maps printed from copper-plate engravings were the result of a several step process. The copper plates used were about 1/16" in thickness and were made from an alloy harder than pure electrolytic copper.

The copper plate was coated with a thin layer of wax, a sheet of carbon paper was placed on top and the field data was traced over from the back side...
Using the transferred image as a guide the engraver created the lines and lettering which comprise the map.

Culture was placed on the 'black' plate, contours on the 'brown' plate and hydrography on the 'blue' plate.

Using the transferred image as a guide the engraver created the lines and lettering which comprise the map. The major tool of use for engraving is called a burin, a very sharp chisel-like tool which was pushed across the plate with the heel of the palm. From a variety of chisel point profiles the various types of linework were produced. Several years of engraving apprenticeship might be required before the skill required to produce the lettering portion of a map (which had to be engraved backwards) could be gained (Figure 3). Corrections to the engraving were accomplished with a burnisher, a tool rubbed over the plate surface to redistribute the copper, or by using an anvil and a small hammer on the opposite side of the plate (Figure 4). Following such corrections, considerably more work with an abrasive stone and polishing materials would be necessary to polish the plate smooth so that the marks made to achieve the corrections wouldn't show up in the final printed map. Further details on the tools and methods for engraving on copper may be found in Brunner,111 Verner,112 and Cooney.113

Usually three copper plates were engraved for each map. Culture was placed on the 'black' plate, contours on the 'brown' plate and hydrography on the 'blue' plate. For geologic maps to be produced in many colors, there would be a fourth copper plate, the preparation of which will be described shortly.114

After engraving, a proof map was made from the plates via intaglio printing. This was returned to the inspection division for examination and approval.115 When the plate was deemed correct a transfer for the

Figure 3. All lettering was hand engraved. A lettering gage was used to bruise the surface of the plate with faint guide lines. After lettering was engraved, the guide lines were burnished out. (Photo courtesy USGS)

Figure 4. Making corrections to an engraved copperplate with a bumping machine. The image to be corrected was first scraped off, and the scraped surface was bumped, or leveled, and then polished with charcoal and oil for re-engraving. (Photo courtesy USGS)
Areas of the stone that have absorbed grease will pick up lithographic ink and produce the inked part of a printed map.

The colors required for a geologic map can add up to 20 additional lithographic stones to the standard three required for topographic maps. Its creation is described in the 15th Annual Report of the USGS (1894). A copy of the black plate was created by electrotyping. This can be accomplished by electroplating a thin layer of copper on a wax-like impression taken from the black plate. This thin plated shell is then backed by a lead casting and the waxy impression material removed. Into this plate were cut the mine symbols and boundaries of the various rock types. A proof map made with this plate serves as a guide for the preparation of the lithographic stones to portray the rock types of the geologic map.

The colors required for a geologic map can add up to 20 additional lithographic stones to the standard three required for topographic maps. Portraying a rock type and its age on a geologic map involved a defined combination of color and pattern, although patterns could be repeated in different colors and colors could be repeated in different patterns. The patterns of lines or stippling would be tedious and difficult to prepare manually in a highly regular manner so a ruling machine or photolithography was used to prepare large plates of regular pattern. A separate stone was prepared for each different color. A temporary print of the geologic black plate was made on each stone. Using the rock boundary lines as guides, all areas except those to be printed in the color of the stone were painted out with a surface sealing gum. The next step was the transfer of the stock patterns into the appropriate unsealed areas of the lithographic stone. Transferring just one pattern was not too difficult, but transferring several different patterns, each to its correct open area(s), added considerably to the difficulty. At the printing stage, each additional color stone multiplied the printing work since the map sheet had to pass through the printing press as many times as there were colors on the map.

Despite the advantages of lithography over intaglio printing, there was
Despite the advantages of lithography over intaglio printing, there was a still more advanced printing method on the horizon by 1904 and probably soon used by the USGS. This was offset printing, attributed to Rubel in the US, but invented years earlier in Europe. Offset printing utilized flexible metal plates instead of the lithographic stone to hold the ink. They were wrapped around a cylinder and contacted a second cylinder covered by rubber. The rubber picked the ink off the plate and transferred it to the paper being printed upon. The rubber was conformable and thus allowed clear printing, even on paper that was not perfectly smooth. As another advantage, the circular operation of cylinders allowed much higher speed operation than the old lithographic presses that operated in a back and forth motion. Paper transfers from the engraved copper plates could be made directly onto the flexible zinc or aluminum rotary printing plates. Eventually an image of the engraving would have been transferred to film media which could be used with photosensitive lithographic plates.

**Characteristic Features of Engraved Maps**

The unique appearance of copperplate engraved maps is most noticeable upon examination of the lettering and areal hydrographic features. In Figures 5, 6 and 7 examples of both are given.

The lettering can be broken into

---

**Figure 5.** USGS copperplate engraved topographical map, Portland Sheet, Maine, 1906.
These differences can be attributed to the 'signature' of different engravers.

serif and sans serif groups. The serif group includes large capital Roman (upright) letters only for labeling civil divisions and large cities ('CAPE ELIZABETH' and 'PORTLAND' in Figure 5), lowercase Roman letters to label towns and schools ('Dillon' in Figure 6), and italic letters to label hydrography ('BACK COVE' in Figure 5 and 'Tenmile Creek' in Figure 6). Members of this group have hairline serifs and a large amount of contrast between thick and thin parts of letters. Since the letters of the text are all created individually, small differences can be noted between instances of the same letter. Sheet to sheet comparisons frequently reveal subtle, but consistent differences in lettering style; these differences can be attributed to the 'signature' of different engravers. The spacing for the lettering of hydrographic features is the most noticeable indicator of this. The lettering for hydrography was an area in which engravers demonstrated the mastery of their art. Italic lettering was made to flow letter to letter like script. When the lettering was on a curve the shape and slant of the letters themselves would be changed. Very sharp tails are present on some of the lower case italic letters, e.g. on c, d, e, and h. This lower case italics, known to engravers as 'stump,' was used for small rivers and lakes; capital italics were used for larger hydrographic features. The closest modern approximation of these typefaces found were: capital Roman = Engravers Bold Face; lowercase Roman = Bauer Bodoni Roman; and stump = Bauer Bodoni Italic.

A sans serif style of lettering ('Ryan Gulch' in Figure 6) was used to label geographic features such as mountains and drainages. The lower case form was applied to small or isolated features; an all capitals form was
used to label extended features such as mountain ranges. This lettering is of very simple form and has uniform stroke width throughout the letter. The ends of many of these letters appear square and may have been produced by the burin shape called a 'skorper.' In its simplicity and uniform stroke width this sans serif font is much like Univers, however several characters make it distinctly different. The lowercase 't' has no tail and the lowercase 'g' is an old style form, two connected ovals with a quail topknot (an 'ear'). This style of lettering was known to engravers as 'block' and to printers as 'gothic.' An oblique, all capitals version of block lettering was used to label (among other things) roads, tunnels and mining related features (see for example 'STATE HIGHWAY NO 9' in Figure 6). Figure 7 is an example of the hairline version of block that was used in the map margin to indicate characteristic that sets them apart from maps produced more recently. This is a result of the fact that intaglio printing cannot effectively reproduce large areas in a solid color. The excess ink is wiped off the plate before printing or making a transfer. It would be difficult to prevent wiping the ink out of wide shallow depressions from areal features such as lakes. The method used to portray the areal nature of large water bodies which avoided this ink loss problem was known as 'water lining.' In practice, a series of concentric (and increasingly simplified) facsimiles of the shoreline were produced inwardly toward the center of the lake (or river). A small spacing was used between the first few sets of lines and it was gradually increased toward the center of the water body. An example of water lining is shown in Figure 5.

Figure 7. USGS copperplate engraved topographical map, Cottonwood Special Map, Utah, 1907.

The net result of graduating from copperplate engraving for map production was an increase in map production speed and lowering of cost at some sacrifice in the artistry of the maps.

Epilogue
An era of mapmaking in the U.S. ended about 1943 when the switchover from copperplate engraving to photographic methods of topographic map production at the USGS seemed assured. The net result of graduating from copperplate engraving for map production was an
The thousands of these plates still held by the USGS have been carefully inventoried and packed away in a USGS warehouse in Herndon, VA.

increase in map production speed and lowering of cost at some sacrifice in the artistry of the maps. At a time when a generation of map engravers may have been at retirement age and the demand for completed maps was exploding this was an expedient course of action for the USGS.140

The USGS will probably never again produce new maps that display artistry equal to the hand engraved copperplate map. On June 1, 1994 the USGS ceased distribution of 15' maps in favor of the more detailed and more up-to-date 7.5’ map series. Because nearly all of the (until recently) available copperplate maps were of the 15' size, this action closes the last chapter on copperplate engraving at the USGS, and puts away the book. Soon, printed copperplate maps will only be found in map libraries and dusty drawers. (Film copies of the color separates used for 15’ maps are still available for sale through the USGS.)

For many years maps have been the storage medium for spatial data. As the USGS cartographers move into an era when spatial data is stored on optical or magnetic media, and custom maps can be produced in minutes, the copper plates have been put away. The thousands of these plates still held by the USGS have been carefully inventoried and packed away in a USGS warehouse in Herndon, Virginia.141 Some copper plates are on display, like those of Madison in the Robinson Map Library at the University of Wisconsin. Some were made available at nominal cost to those who did the original survey work. Some of the lithographic printing stones were stored for a time in the courtyard at the ‘Old’ Interior Building (now the General Services Building) after they were phased out of use. These large stones which had been quarried in Austria were typically several square feet in area, bore on their surfaces the last image they had printed, and awaited a buyer who would take the lot.142 Most of the lithographic stones which remained stored in the basement Printing Plant at the ‘Old’ Interior Building were not moved when the USGS relocated to Reston in 1972. In time however, most of those stones disappeared and it is said that some may be found in paths and patios in the Washington, D.C. area.143

Considering the hundred-year history of USGS map production and the tremendous number of maps produced it is surprising that so little has been published documenting USGS map production technology and history. This paper represents research on those topics, but is based primarily on summary reports of the USGS. In some cases methodology and causes could only be inferred from that information. A much fuller coverage of the personalities, events and forces driving the era of copperplate map engraving at the USGS might be obtained by a researcher utilizing the internal reports and memos of that time period from the USGS archives.

Acknowledgement
I would like to thank Professor David Woodward for his encouragement and ideas for the completion of this paper, the reviewers and editors who offered helpful suggestions for its improvement, and Hal Shelton for relating his personal recollections of this time period at the USGS.

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7 USGS History, p. 4.


USGS History, p. 12.
65 Rpt. USGS, 15:86.
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70 Gascoigne, 51b-c.
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78 Brunner, p. 74,76.
80 Curwen, p. 25.
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102 Beaman, p. 337-339.
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116 Curwen, p. 28-29.
118 Beaman, p. 339.
120 Beaman, p. 189.
121 Beaman, p. 277-278.
122 Beaman, p. 317-318.
127 Beaman, p. 189.
128 Beaman, p. 277-278.
129 Beaman, p. 317-318.
132 Beaman, p. 337-339.
133 Rpt. USGS, 15:84.
134 Beaman, p. 337-339.
135 Hackleman, p. 488,497.
136 Curwen, p. 28-29.
138 Beaman, p. 339.
139 Rpt. USGS, 15:85.
140 Beaman, p. 337-339.
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153 Beaman, Plate 15, p.332-333.
155 Rpt. USGS, 6:xviii.
156 Ridgway, p. 52.
158 Anonymous reviewer, USGS.
159 Shelton.
160 Anonymous reviewer, USGS.
Whatever the reason, the young women made a great impression on the Vollbehrs, who were struck by their demeanor and intelligence...
Vollbehr also gave the Library its first incunabulum, a copy of the Hartman Schedel's *Liber Chronicarum*, printed at Nuremberg in 1493. A diligent search of the old accession records, which until 1926 were entered in an elegant library hand in great ledgers and later - more practically but less esthetically - in hundreds of typed pages, failed to turn up any entries on maps, perhaps because maps were listed separately, although no special accession record for maps is now discoverable. However, in a letter sent in February, 1931, to the Chancellor, Vollbehr wrote: "Enclosed please find an offer of old American maps from a German dealer. Kindly mark the items you have not in your collection and return the list to me," and a telegram dated June 24, 1931, among the papers of the Librarian announces the purchase at auction in London of 59 more maps which were to be dispatched to Lawrence. The Librarian's biennial report for 1930-1932 notes the continuation of Vollbehr's gifts, with the maps then totalling 210, thus the first shipment of maps must have come some years earlier. Vollbehr also gave the Library its first incunabulum, a copy of the Hartman Schedel's *Liber Chronicarum*, printed at Nuremberg in 1493, which contains a fine example of a Ptolemaic world map.

Vollbehr visited Kansas on several occasions, once bringing many of his treasures with him. The Kansas City Journal-Post (long defunct) for May 15, 1927, carried a long article on the display of Vollbehr incunabula at the Kansas City Art Institute, noting that while space in Kansas City did not permit showing the entire collection, "attendance at the exhibit has gone far beyond expectations." Interestingly, in the glowing account of the Vollbehr rarities on display the paper noted that Dr. Vollbehr owned a copy of the Gutenberg Bible, but it was not for sale. Several years later, in 1930, he changed his mind and sold the Bible and his entire collection of 3,000 incunabula to the Library of Congress for $1,500,000, an enormous sum of money in Depression-era America.

This sale hit the national news media, and it is the reason Vollbehr's name may still be known today. His gift of maps to the University of Kansas seems to have been little remarked on by the national press, although a lengthy article on Vollbehr in a short-lived publication, *The Nation's Capital Magazine*, (which ran for only eight numbers November 1930-September 1931), in reporting on other Vollbehr gifts noted "On another occasion he also gave [the University of Kansas] the largest collection of early maps concerning America anywhere outside the Library of Congress, Harvard, and the University of Michigan."

Alas, possibly due to the world situation in the 1930s, and his own politics, Vollbehr's connection with the University of Kansas ceased long before his stated goal of making the map collection pre-eminent was reached. A period of fiscal austerity followed, then the years of WWII, and maps no longer flowed into Lawrence. The collection assembled and given by Vollbehr remained largely uncatalogued and unused.

Several things happened to breathe new life into the collection. In 1953 the Department of Special Collections was established at the University, and the maps were transferred to its keeping. Thanks to the newly appointed Special Collections librarian, Joseph Rubinstein, the new department flourished and some important additions were acquired - including the purchase of the first ms. map, a portolan chart by Nicolas Comerford. A geography professor, Thomas R. Smith, began working with the collection, which spurred his interest in the history of cartography and stimulated him to offer a seminar in the subject. [N.B. The writer's own interest in the subject, which has guided her work ever since, began in this seminar, which Tom used to refer to as "Hysterical Cartography"]. His research on the maps of the Vollbehr collection resulted in *Maps of the 16th to 19th Centuries in the University of Kansas Libraries*, published by the Library in 1963. Professor Smith's ground-breaking study of the group of English chart makers of the 16th-
17th centuries, culminating in his discovery of the interconnections between a group of chartmakers to whom he gave the now widely-recognized name "Thames School" was a direct result of the purchase of the Comberford chart, about which little was known at the time. KU has since acquired two other Comberford charts. In support of the University's strong interest in Latin America, a sizeable group of early maps of Central America and the Caribbean was purchased from Professor Lines of the University of Costa Rica. More maps were acquired as gifts or purchased to support other areas of research and teaching. The holdings are particularly good for Central and Eastern Europe. In 1968 the Department of Special Collections moved into the splendid new Kenneth Spencer Research Library and the maps became the core around which the Orbis Collection in historical cartography was formed. There are now some 500 16th-19th century maps, 150 important maps in facsimile, and the extensive Orbis reference collection.

The collection is an unexpected small gem, unusual in a midwestern
The Kenneth Spencer Research Library University of Kansas.

Since the collection embraces four centuries, its maps can be consulted not just for geographical information but also for insights into changing styles in art forms and in map reproduction.

Colonies in North America”, both the first edition of 1755 and the edition of 1775 which was used in the negotiations for the Treaty of Paris, 1783, establishing the boundaries of the new United States; 19th-century maps of Preuss, Disturnell, and the 1878/79 set of General Land Office maps delineating the westward spread of settlement. An important addition is a copy of the rare, 8-sheet map of South America by Juan de la Cruz Cano, 1771-1775. Most of the major cartographers of the 16th-19th centuries are represented: Anville, Arrowsmith, Blaeu, Hondius, Homann, Mercator, Ortelius, Sanson, Seutter, (including that cartographer with the extraordinarily incongruous name of Franz Johann Joseph von Reilly!), to list but a few. Since the collection embraces four centuries, its maps can be consulted not just for geographical information but also for insights into changing styles in art forms and in map reproduction.

The cartographical resources of the Kenneth Spencer Research Library are not limited to the sheet maps described above. The Library has several significant collections which need to be mentioned: the Summerfield Collection of books of the European Renaissance, and the Ellis Collection, which includes strong holdings in ornithology, natural history, and works on exploration and discovery. Some four thousand important maps found in volumes in these and other collections have been noted, and are entered in a special file by area and date, making them easily retrievable.

Also housed in the Kenneth Spencer Research Library is the Kansas Collection, which includes several hundred 19th and 20th century maps of the state, Sanborn Insurance maps for 243 towns and cities in Kansas, and over a hundred county atlases, making it probably the best resource for the study of the state’s development outside of the Library of Congress.

All of these collections are available to serious researchers. The Library is open 8 a.m. to 6 p.m. Monday through Friday year-round, and 9 a.m. to 1 p.m. on Saturdays in the Fall and Spring Semesters.
This article attempts to survey some of the major issues involved in managing federal information in electronic format.

1. Introduction

It is no understatement to say that the impact of electronic information has now been felt in Federal Depository Libraries. Electronic format has had nothing less than a massive influence on the information itself, on the way that we find information, the way we attempt to provide public access to Federal information, and the way that users access and use the information. More broadly, electronic format has influenced all of the players in Federal information and Federal information policy.

This article attempts to survey some of the major issues involved in managing Federal information in electronic format that is available through the Federal Depository Library Program, with a focus on problems and solutions that may be unique to a documents department.

2. The Federal Depository Library Program

The Federal Depository Library Program (FDLP) is a partnership between the Federal government and depository libraries whose mission is “to provide equitable, efficient, timely and dependable no-fee public access to Federal Government information within the scope of the program.” The FDLP is currently administered by the Government Printing Office (GPO).

With encouragement from depository libraries, GPO began distributing information in CD-ROM format in 1988 with the first depository CD-ROM, “Census Test Disk #2” from the Bureau of the Census. GPO has now distributed over 1100 CD-ROM and 360 floppy disk issues. In 1994, GPO began to directly provide information services over the Internet via GPO Access, which includes searchable full-text databases like the Federal Register, Congressional Record, Congressional Bills, and GAO Reports.

3. Hardware and software

“Guidelines for the Federal Depository Library Program” provides outcome-based statements of responsibility for public access to and services for FDLP information. Selected guidelines specifically mentioning electronic information are listed in Appendix I. The following...
The following guideline...necessitates that all Federal Depository Libraries (FDLs) be able to provide access to electronic information, both in tangible form and via the Internet. However, the means by which this may be accomplished is not a part of the requirement. That is, the library may choose to provide direct or mediated public access using whatever hardware and software that are adequate for the task, given local conditions.

Appropriate hardware and software must be provided for public users accessing electronic information available through the Federal Depository Library Program (e.g., CD-ROMs, online databases, etc.). This hardware and software should include computer workstations capable of providing Internet access that includes GILS-aware software, CD-ROM readers, and printers.

3.1 Recommended Minimum Specifications

Given then that FDLs are required to provide access to electronic FDLP information, then the first priority for a FDL is to make sure that adequate hardware is available to satisfy this functional requirement.

Because of "the large variation in the size of Federal depository libraries and the number of users served [GPO’s Library Programs Service (LPS)] can not recommend a universal standard for the number of public access workstations in any given library". Similarly, because "LPS cannot anticipate or address every possible depository library computer scenario", LPS declines to require a particular configuration for workstations in FDLs. Instead, LPS provides "Recommended Minimum Specifications for Public Access Work Stations in Federal Depository Libraries", last revised in May 1996. It should be emphasized that these minimum specifications are not requirements, but are instead intended only to provide baseline specifications for the purchase of new equipment for public use in FDLs.

Recognizing that the Recommended Minimum Specifications would not necessarily be adequate for electronic spatial data, geographic information systems (GIS), or printing maps from electronic sources, LPS worked with the Cartographic Users Advisory Council (CUAC) to develop the “Spatial Data Supplement to Recommended Minimum Specifications for Public Access Work Stations in Federal Depository Libraries”, published in June 1996. A selective comparison of some of the basic recommended specifications follows.

Depending on a myriad of factors, some listed below, FDLs may be able to satisfy the access requirement by using a varying number of workstations with a variety of different configurations, none of which may be as powerful as the ones described in LPS’ Recommended Minimum Specifications.

Factors that influence the configuration and number of workstations needed
- type of library (academic, public, etc.)
- mission of library and needs of users served
- size of library
- percent selected
- number of CD-ROMs selected
- use statistics; whether users experience extended waiting times for access
- whether the equipment is also used for GIS
- how much users use the Internet relative to CD-ROMs
- whether the workstations are also used for non-FDLP purposes
- whether the workstations are also used for word processors, spreadsheets, etc.
- whether the computers are networked
- whether the CD-ROMs and applications are running off a network or local drive.
<table>
<thead>
<tr>
<th>Computer</th>
<th>IBM-compatible Pentium 100 MHz or higher</th>
<th>IBM-compatible Pentium 100 MHz or higher</th>
</tr>
</thead>
<tbody>
<tr>
<td>Memory</td>
<td>16 MB of RAM</td>
<td>32 MB of RAM</td>
</tr>
<tr>
<td>Hard Disk</td>
<td>1.2 GB</td>
<td>2 GB, with access to additional storage.</td>
</tr>
<tr>
<td>CD-ROM drive</td>
<td>For standalone, single or multiple platter. Quadruple speed (4x).</td>
<td>For standalone, single or multiple platter. Quadruple speed (4x).</td>
</tr>
<tr>
<td>Printer</td>
<td>Ink jet or laser printer which supports Postscript. Consider color. 2 MBI memory.</td>
<td>Color ink jet plotter, 36&quot;, 300 dpi, 68 MB or more memory.</td>
</tr>
<tr>
<td>Monitor</td>
<td>Super VGA (SVGA). 15&quot; minimum, but consider 17&quot;. Consider 21&quot; to display full page images.</td>
<td>Super VGA (SVGA). 21&quot;, 4 MB video RAM.</td>
</tr>
<tr>
<td>Network Connection or Modem</td>
<td>Direct Internet or SLIP/PPP connection or 28.8 kbps modem.</td>
<td>Direct Internet of SLIP/PPP connection or 28.8 kbps modem.</td>
</tr>
<tr>
<td>Platform</td>
<td>Microsoft Windows 3.1 or later.</td>
<td>Microsoft Windows 3.1 or later.</td>
</tr>
<tr>
<td>Communications</td>
<td>Package which supports multiple file transfer protocols, terminal emulations. Manages telnet sessions.</td>
<td>Package which supports multiple file transfer protocols, terminal emulations. Manages telnet sessions.</td>
</tr>
<tr>
<td>Viewers</td>
<td>PDF file viewer. GIF and JPEG graphics viewers.</td>
<td>PDF file viewer. GIF, GEOTIFF, TIFF, and JPEG graphics viewers.</td>
</tr>
<tr>
<td>Applications Software Options</td>
<td>Database, spreadsheet, word processing.</td>
<td>Database, spreadsheet, word processing, viewing software for raster data, data manipulation package such as ArcView 2.1 or higher, Landview, MapInfo, or other similar packages.</td>
</tr>
</tbody>
</table>

- whether MS-DOS and Windows applications are available on the same equipment
- whether CD-ROMs and Internet applications are available on the same equipment
- whether there are other access points to electronic FDLP products outside of the documents area and outside of the library
- availability of funds
- library priorities

LPS recommends that the Recommended Minimum Specifications be considered minimums that should be exceeded if possible. This is especially important when working with spatial data. Libraries considering an investment in new equipment would do well to consult with technical staff, other depositories, and/or maps libraries to gain a better understanding of what hardware configurations may be required and in what numbers.

3.2 Planning

The burden may be on the documents librarian to make the case with her/his library administration for the staff and the quantity and configuration of equipment needed to serve the library’s users and thus fulfill FDLP requirements. Since the equipment request cycle may be a long one, it may be necessary to plan one year or more into the future. Unfortu-
Keeping in close contact with technology expert staff is critical in anticipating general trends in technology. For equipment and software to be used with spatial data, the Interior Department is obviously another good agency to watch.

What types of public services should FDLs offer for electronic information?

Issues and policies discussed at the national level have a great impact on libraries, both now and in the future. Thus, being well-informed about these discussions will also assist in long-term planning. Conversely, it is essential that high-level discussions be informed about trends in electronic information policies and capabilities in depository libraries. Many national policy-level issues were discussed in the Ad Hoc Committee on the Internet’s GODORT Whitepaper. GPO’s recent report to Congress, Study to Identify Measures Necessary for a Successful Transition to a More Electronic Federal Depository Program, reflects broad input and deep and critical thinking about many of the most important issues during this time of transition. Some of the topics currently under discussion include:

- What are the roles of a FDL, the FDLP, GPO, and the agencies in the provision of information to the public when more and more information is available to the public over the Internet without the direct involvement of several of the traditional players?
- What changes in Title 44 of the United States Code are necessary to reflect changing roles and responsibilities within the FDLP?
- How can we ensure that the information now available in electronic format, either via the Internet or in tangible form, will be accessible in some useful form when needed in the future?
- What types of public services should FDLs offer for electronic information?
- As the amount of information available only in electronic format increases, helping users access the needed information becomes more and more the responsibility of the library, whether it be via reading off the screen, printout, downloaded electronic file, etc. As a result, there is a cost-shift from the Federal government to depository libraries and to end-users. How will this cost-shift be dealt with?

In a time of such rapid transition to a more electronic FDLP, documents librarians require comprehensive information sources. On a day-to-day basis, nothing is more useful than govdoc-l, a listserv for librarians . . . on topics related to government documents and information issues.
Some products do not come with adequate documentation...

Supplement, the newsletters of the FDLP provided by GPO, are fairly current resources containing news essential for FDL management; articles from AN and ANTS are available on the GPO Web site.12 Of course, the professional journals are also required reading, including: Documents to the People, the newsletter of the Government Documents Round Table (GODORT) of the American Library Association (ALA); Journal of Government Information; Government Information Quarterly; and regional association publications.

However, for quickly becoming immersed in the major issues under current discussion, nothing is more valuable than attending the meetings of GODORT, held in the winter and summer; the Depository Library Council, an advisory group to the Public Printer of the United States, held in the spring and fall; and the Federal Depository Conference, sponsored by GPO and held in conjunction with the spring meeting of the Depository Library Council. These meetings provide opportunity for training; and learning about the current state of affairs, future trends and plans, and problems and issues affecting public access, electronic information, GPO, the FDLP, and other FDLs.

Of course, a successful planner needs the support of library administration at the highest level. This requires that the administration be regularly informed about the issues affecting the FDLP and the potential impact on the depository library. GPO has recently participated in meetings for library directors held at the summer meetings of ALA designed to complement the efforts of documents librarians to keep their administrators informed.

4. Twin challenges for the provision of public access

Two major challenges for the provision of public access to electronic information products, (1) tangible electronic information that it is difficult or impossible to support and (2) the Big File Problem, have a similar set of problems and solutions. We begin with outlines of these twin challenges.

4.1 Electronic products that are difficult to support

There are a number of characteristics of some of the Federal information products that we receive in tangible electronic format that makes it very difficult to install and provide meaningful public access and services for them. Some products:

- do not come with adequate documentation that describes content, installation, or use.
- do not include adequate access software, and may require that the user have access to software such as WordPerfect, Lotus 1-2-3, or Photoshop.
- have very demanding hardware requirements.
- have antiquated hardware requirements.
- have hardware requirements that are incompatible with those of another product, requiring that the products be installed on different machines or that installation or configuration be done “on the fly”.
- have buggy software and thus do not run properly.
- have security holes that require that the products be installed on stand-alone workstations or not be installed at all.
- have restrictions on how the product may be installed or on how many users may use it simultaneously.
- are outside of the subject areas which the library normally supports. This is especially a problem in regional depositories.

Under some of these circumstances, a product may not be installed, but staff may choose instead to install
Technical problems may themselves impose constraints on the type or level of service... 

4.2 The Big File Problem

Electronic format places more of a burden on both the user and the library when accessing and using electronic information. Expensive, appropriately configured hardware and software for which the user and/or staff must be trained is required. The library staff must be prepared to assist the user in accessing the needed information, displaying the material on the monitor, downloading it, printing it out, etc. Electronic files that are very big are especially difficult to deal with, whether reading from the monitor, downloading, or printing — this is what we call the Big File Problem.

How can the FDL serve the user who wants to read a very current omnibus bill in electronic format (not yet available in print), that may take up several inches of shelf space if it were in print format? Reading from the monitor ties up the equipment and forces the user to remain in the library while accessing the electronic document (if not remotely accessible). One solution to the Big File Problem for the user who wants to read a big file from the monitor involves setting up a dedicated computer with appropriate viewing software for just such special purposes. Of course, such a solution may be a luxury beyond the means of all but a few libraries.

How can the FDL serve the user who wants to take such a document home? Printing out a large document also takes time and is costly to the library, although there may be a page limit imposed or the cost can be passed on to the user.

Downloading is an attractive option, since it involves little cost and less time than reading from the monitor or printing. (Although the time involved in downloading a big file, especially off the Internet, may be great in absolute terms.) However, the big files for which downloading is an attractive option may not fit on a floppy disk and thus may require a hard disk with enough available storage space to accommodate them. Other mechanisms can be made available to users to get big files home with them, including emailing the file to the user, compression software, file splitters, cut and paste, copy across the campus network (if there is one), ftp, downloading onto a removable cartridge drive, or writing onto a recordable CD-ROM. The removable cartridge drive and CD-R (recordable CD-ROM unit) can also be pressed into service for making backup copies of CD-ROMs and multiple floppy disks, if in accordance with any license agreements.

Most Federal government information is not copyrighted, by law, nor subject to other restrictions that affect distribution or redistribution. One of the pleasures of working with such information is that it can be provided to users who may then make copies of all or part of it without fear of copyright violation. The fact that users commonly want full copies of such documents makes the Big File Problem one that is likely to be encountered when accessing Federal information.

4.3 Some solutions for these challenges

There are two immediate solutions and two more involved solutions to the twin challenges posed by tangible electronic products that are difficult to support and by the Big File Problem.

The first solution is to circulate the product, relieving the library of the burden of installing and supporting the product and of the Big File Problem. LPS encourages depositories to
LPS encourages depositories to circulate their electronic products. If well-distributed geographically, these electronic depositories may serve as the libraries of last-resort in the same way that regional depositories traditionally have for the print and microfiche formats.

This leads us towards a second immediate solution to the twin challenges. The Guidelines listed in Appendix I allow that a library that cannot provide access to a given information product can refer the user to one that can. This provision introduces the possibility of an Electronic Federal Depository Library that may have a special commitment to the provision of access and services in support of electronic information. If well-distributed geographically, these electronic depositories may serve as the libraries of last-resort in the same way that regional depositories traditionally have for the print and microfiche formats. However, there is some irony in the fact that while print and microfiche can be easily copied and/or interlibrary loaned to another FDL to serve a user locally, the FDL referring the user to the Electronic Depository must often ask the user to physically go to the Electronic Depository to access the information in tangible electronic format, the format that we would like to be easily accessible to the public wherever they live!

Thus, the computer have-nots are the big losers if the library cannot provide in-house access to big files or to a given electronic product. While serving such users is one strong argument for the continued viability of the FDLP, it is also clear that libraries must be prepared to deal with these special and very demanding situations, either in-house or by referral.

There are two other more involved solutions to the twin challenges. First, note that LPS' "Recommended Minimum Specifications for Public Access Work Stations in Federal Depository Libraries" includes database, spreadsheet, and word processing software as options left as a local management decision. Provision of public access to such applications has been seen as far outside the missions or capabilities of many FDLs. However, users who want to access Federal information that requires such software but who otherwise lack access would be meaningfully served by the FDL that provides public access to it.

Another solution to the twin challenges is exemplified by the fine services that provide interactive access to information on CD-ROMs over the Internet: Government Information Sharing Project, a variety of demographic, economic, and education databases via Oregon State University; the databases available from University of Virginia Social Sciences Data Center; and 1990 U.S. Census LOOKUP via the Census Bureau, Lawrence Berkeley National Laboratory, and California State University at Monterey Bay. Such services can be used by anyone with the appropriate equipment and access to the Internet. They do not require local installation of the CD-ROMs, although users may benefit from local support services. Thus, they may be more likely to be supportable within the library, making the information more accessible to the computer have-nots as well as to those fully equipped.
Although Federal information itself may not be copyrighted, the software used to access the information may be commercially produced and may have a license agreement attached.

It is critical that vendors and the agencies receive constructive feedback on the technical repercussions of the language used in license agreements.

It is important to realize that electronic products available through the FDLP do not have standardized access software, interfaces, platforms, or file formats.

5. License agreements

Although Federal information itself may not be copyrighted, the software used to access the information may be commercially produced and may have a license agreement attached. This is the case, for instance, with the U.S. Code's access software provided by Personal Library Software, the World Factbook's software provided by Electronic Book Technologies, Inc., or the many CD-ROM titles now packaged with Adobe Acrobat Reader or Adobe Acrobat Exchange LE. For instance, the license agreement may specify how many simultaneous users may use the product, how many machines it may be installed on, whether the product may be installed on or run from a network drive, or whether a backup copy of the product may be made.

The existence of license agreements restricting the installation or use of access software or the need to use passwords may have the effect of making public access to some government information much less convenient. A license agreement sometimes has the effect, intentional or unintentional, of restricting what the library's network is designed to do. For instance, it is possible, technologically speaking, to install access software on a local-area network drive accessible by multiple computers but to use metering software to ensure that only one user at a time can actually use the access software. In this way, the library can take advantage of the network to permit a user to access the software from any computer that happens to be available, while also restricting use to a single simultaneous user. However, the language in some license agreements restricts installation of access software to a single standalone workstation. In such a case, the library might try to negotiate with the software vendor to see whether a more convenient license agreement could be agreed on. It is critical that vendors and the agencies receive constructive feedback on the technical repercussions of the language used in license agreements. The increasing use of license agreements on FDLP products also requires that documents librarians arrange with technical, administrative, and legal staff to ensure that license agreement provisions are complied with.

6. Documentation

Some electronic information products do not come with documentation about their content, how to use them, where the data comes from, whether there is a print equivalent, what format the files are in, etc. It is necessary to try to track down and record information like this so that the library considers essential to have available for easy reference. There are a number of sources of information about CD-ROMs listed in Appendix II where one can look for information about this type of product.

There are two especially important types of documentation about an electronic information product or service. A description of content is essential for evaluating whether a product or service can really satisfy a user's need. Because users typically need to make a quick evaluation of relevance, a prepared content description is especially important for those products that lack an accompanying content description that is available without installing the product. It is very useful to keep a notebook or database of content descriptions for all holdings and for important remote electronic information services.

It important to realize that electron-
One advantage of having staff prepare a help sheet for the most important electronic products is that then at least one staff member is familiar with the product.

Regionals and large selectives may not have the resources necessary to write help sheets for each of the titles in their depository collection.

... it is important that all staff are aware of the level of service that general reference staff are expected to provide ... before referring users to documents specialists.

While many Federal products come with help information, they may contain too little or too much information too obscurely presented to be of immediate use in the library setting. Thus, a help sheet is another important type of documentation, especially for products that are difficult to use for some reason. The most basic — and most useful — help sheet contains information about how to get into the product, access the information most often needed or use features that are especially useful, display results, download, print, and quit. It is possible to get a user started with a product and then leave her/him with a good help sheet, being available to answer questions as they come up. One advantage of having staff prepare a help sheet for the most important electronic products is that then at least one staff member is familiar with the product.

Customized help sheets can be prepared from scratch or can be based on help sheets made available at one of the places listed in Appendix II. Regionals and large selectives may not have the resources necessary to write help sheets for each of the titles in their depository collection. However, given the level of use or ease of use of some of the materials, it may not be necessary to do so.

It may be worthwhile to maintain a fully searchable database that includes the content and management-related information that it is useful to keep for CD-ROMs: bibliographic information, content description, analyzed content, supersession status, installation information, etc. To be able to access such information remotely, the Government Information Technology Committee (GITCO) of GODORT is coordinating efforts to collect and organize documentation for tangible electronic products and to make that information available via the GODORT home page. A database that is able to output records already marked-up in HTML could generate this documentation for the WWW very easily.

7. Staff training

The importance and value of staff training is at least as great for electronic documents products as it is for other electronic products in the library. However, there are several characteristics of FDLP electronic products that are noteworthy.

First, in library settings in which general reference staff have some degree of responsibility for assisting users with documents in electronic format, it is important that all staff are aware of the level of service that general reference staff are expected to provide for a given product before referring users to documents specialists. Of course, reference staff must be adequately trained to provide this level of service.

Staff training is essential given the variety of information types and software interfaces that documents staff must provide public access to. However, it is becoming more and more apparent that it is inefficient for every staff member to be equally competent with every electronic product, especially in large collections. Rather, staff may need to specialize, perhaps by subject area or means of access (CD-ROM vs. Internet).
However, it is becoming more and more apparent that it is inefficient for every staff member to be equally competent with every electronic product. There are several services and software applications that are becoming so important that staff may want to make them priorities for creating documentation and staff training. These include the GPO Access service; the Department of Commerce's STAT-USA/Internet service; the Census Bureau’s Go and EXTRACT software; and Adobe Acrobat Reader, and Adobe Acrobat Exchange LE access software for PDF files. In support of the depository collection, Internet applications such as World Wide Web browsers, telnet clients, and search engines; viewers; and other utilities also deserve training and documentation. Finally, staff may benefit from more technical training on file formats (such as comma-delimited, flat file, dBASE, PDF, GIF, etc.), how they are different, and what software application is used to access them; or procedural topics such as how to format a floppy disk, check to see how much space is left on a floppy disk, download to a floppy or hard disk, or email to yourself.

As mentioned above, GODORT, Depository Library Council, and especially the Federal Depository Conference provide opportunities for training for documents staff. Some regional associations also play an important role in continuing education.

8. Tangible electronic products: CD-ROMs and floppy disks
The tangible electronic products, CD-ROMs and floppy disks, may be much easier for many librarians to incorporate into existing procedures and systems than Internet products and services... It may be prudent to keep an important superseded CD-ROM just in case the new issue is lost or damaged.

It may be prudent to keep an important superseded CD-ROM just in case the new issue is lost or damaged, especially if the depository circulates its electronic products. A depository may also want to keep a superseded issue if it may contain information that may not have made it into the issue that officially supersedes it, keeping in mind that this may be very difficult to discern. For example, issues of National Trade Data Bank are superseded as follows: “keep March issue for each year plus current year to date”. However, John Stevenson notes that his “library has been keeping ALL issues because we have users who need the monthly data and not just the annual cumulation”.

8.2 New titles
It is also useful to keep records of whether a recent arrival is in fact a new title, or just a new issue of a serial, since a new title will need a brand new installation and new documentation prepared for it. Because new titles may involve considerably more staff time to process, install, and prepare documentation for, it may be important to keep statistics on the number of new titles as opposed to continuing titles that have arrived.

8.3 Installation
A regional depository currently holds about 350 different CD-ROMs and floppy disks...
To make sure that the installation is done in accordance with any license agreement, license agreement searches for each issue of each tangible product should be ... a part of processing procedures.

Regional depositories which elect to receive all optional items expect to receive a total of over 4000 more CD-ROMS in two large sets alone.

8.4 Storage and preservation

One of the great advantages of electronic format is that the physical space needed to store the information is much smaller than that required to store the equivalent information in print or even microfiche format. Of course, electronic products require special storage facilities.

A regional depository in May 1996 had about 1100 CD-ROMs, 90 3.5" floppy disks, and 270 5 1/4" floppy disks, for a total of about 1460 units to provide storage for (including all superseded products). Regional depositories which elect to receive all optional items expect to receive a total of over 4000 more CD-ROMs in two large sets alone. One type of storage cabinet especially designed for CD-ROMs holds about 1180 jewel cases. Five of these cabinets, with a combined footprint of 119" x 29", will be required to hold just the CD-ROMs that we expect and can plan for in the immediate future.

Those of us who are inclined to keep every superseded CD-ROM that has come through the FDLP, just in case, will be relieved to know that those superseded CD-ROMs can be moved from the caddy or jewel case into a sleeve that is more compact, marked "superseded", and transferred to a separate cabinet for storage. For this, the preservation librarian at the University of North Carolina at Chapel Hill suggests the use of TYVEK® sleeves, which are less potentially harmful than vinyl sleeves.

Storage cabinets can be placed in a staff location or in a publicly accessible location. Of course, the trade-off involves the users' need to browse, staff time needed to retrieve items, and security. One way to compromise is to place the cabinets in a public area that is near staff and to lock the cabinets when the area is not staffed.

One very common question recently has been whether it is wise to tattle tape CD-ROMs with a product specially designed to be placed on the label side of the CD-ROM itself. In discussions with a number of CD-ROM experts and a preservation librarian, none could guarantee that the CD-ROM would not be damaged by the tattle tape over the long term. However, one viable alternative is to tattle tape not the CD-ROM itself, but the jewel case. Place a piece of 5" tattle tape on a piece of paper cut to fit below the insert onto which the CD-ROM fits. If positioned off-center, the tattle tape is not visible either from the back nor from the inside of the jewel case.

Unfortunately, this security trick is incompatible with another trick that can be used to protect CD-ROMs. If the library uses CD-ROM drives that require that the CD-ROM be placed in a special caddy before being placed in a drive, then the CD-ROMs can be stored in the caddies instead of the jewel cases. This eliminates the step required to move the CD-ROM from the jewel case into the caddy, often ignored or done haphazardly by users, resulting in a scratched CD-ROM and/or one stuck inside a 5 1/4" floppy drive and retrievable only by skilled use of a piece of tape.
While the day-to-day management of remote products is not as immediate an issue... trying to find the information is.

The Federal Web Locator is the most comprehensive service to provide access by agency.

Of course, the data on floppy disks must be renewed periodically. As 5 1/4” floppy disks are renewed, consider copying them onto 3.5” disks to eventually eliminate the need to have 5 1/4” floppy drives on every computer. Another possibility is to copy all floppy disks onto a removable cartridge drive or a recordable CD-ROM. Either of these products can also be used to make a backup copy of a CD-ROM (in accordance with any license agreement).

9. Internet and Bulletin Board products and services

9.1 Internet tools for finding Federal information

Federal electronic products and services available via the Internet or via Bulletin Boards are typically made available and maintained by the agency that produces the information or by their designated agent. While the day-to-day management of remote products is not as immediate an issue as that of tangible products in depository libraries, trying to find the information is. Efforts to organize Federal information have made the process of finding sites and information in them considerably easier. Some of the most useful first stops include those listed in Appendix III.

Many librarians rely on the home pages or bookmarks of their own documents departments to organize the sites they find most useful, while others rely on home pages that are generally highly regarded, such as that of the University of Michigan. Larry Schankman has delivered a selective annotated guide to Federal information that is a very useful first stop. Maggie Parhamovich Farrell’s Federal Government Information on the Internet is the oldest well-maintained guide to government sites available.

Another set of tools has been developed to access sites by agency. The Federal Web Locator is the most comprehensive service to provide access by agency. Many services provide selective lists of sites organized by subject, but GPO’s Pathway Services Browse Topics, still in development, appears to be a more comprehensive effort than most. The Pathway Services project also plans for the Pathway Indexer to be able to search Federal government sites by keyword. NTIS’ U.S. Business Advisor also provides searching of government sites.

Despite these fine tools, a depository may also need to maintain a local home page to organize sites and to make available information about local resources, etc. to be better able to serve users.

9.2 GPO Access Gateways

GPO Access is a service of GPO which includes a large set of very current searchable full-text databases such as the Federal Register, Congressional Record, all published versions of Congressional bills, GAO Reports, etc. Initially, GPO provided for no-fee access to GPO Access only via the FDLP. GPO Access was available via a WAIS client running on a computer having a direct Internet connection, but remote access to that particular client was not available.

GPO issued a call for new Gateways in July 1996. GPO still wanted users to be able to access GPO Access via a local phone call to the Gateway’s computer. GPO also recognized that the Gateway could
Many documents formerly available only in print or microfiche have already migrated or are expected to migrate soon.

Many depository librarians have their favorite Gateway just like they have their favorite home page to use. GPO provides a hot-linked list of Gateways. The most frequently accessed Gateways are WWW services, including the University of California, Purdue, and North Carolina State University. The University of North Carolina at Chapel Hill remains the only Gateway to provide a text-only lynx interface. The other Gateways are text-only SWAIS services.

10. Migrating documents

Many documents formerly available only in print or microfiche have already migrated or are expected to migrate soon to electronic format, either CD-ROM/floppy or Internet. Some examples will illustrate the variety of relationships between the documents in the traditional print/microfiche formats and the electronic formats and the difficulties in trying to find the information that may have migrated to electronic format.

10.1 The problem with migrating titles

Survey of Current Business is a document available in print, on CD-ROM, and on the Internet. Since GPO catalogs tangible products, the print and CD-ROM formats are easy to find, using the traditional finding aids, including the Monthly Catalog, available in the library or remotely.

The Bureau of Economic Analysis documents the fact that two versions of the Survey of Current Business are provided via STAT-USA/Internet, the full issue and a shorter "virtual" issue. This source for the Survey of Current Business is usually more current than the ones now in print or CD-ROM. Although GPO has begun to catalog Internet products, a search of the Monthly Catalog via GPO did not find a record for this particular item.

OTA Legacy is a wonderful comprehensive compilation of Office of Technology Assessment (OTA) documents on CD-ROM, many not available in depositories in print. If a user wants a particular OTA document that is not otherwise available in the print collection, then staff must somehow know to consult OTA Legacy. The most efficient way to accomplish this would be to search by the known title of the document, but unless the contents of OTA Legacy have been analyzed, the local holdings will not necessarily be discovered. In fact, a search of OTA titles in the Monthly Catalog does not turn up OTA Legacy as a source for the documents. There are many other CD-ROMs that are compilations of publications formerly available only in print/microfiche, or even on floppy disk, including 1992 Economic Census CD-ROM, Education Statistics on Disk, Energy InfoDisc, National Trade Data Bank, Publications from the National Center for Health Statistics, and U.S. Foreign Affairs on CD-ROM.

10.2 Migrating title solutions

During this time of transition, depositories and GPO are trying out many techniques for trying to keep track of migrating documents. Clearly, a way to track migrating publications by title or SuDoc number is needed. This is not a problem for tangible documents in print that do not change titles, like Survey of Current Business, since they are already cataloged.

GPO has recently begun to catalog electronic products on the Internet, with the URL in the 856 field which is hot-linked in the Monthly Catalog Web site. The results of this effort have been impressive; as of October 1996, there were 353 hot-linked URLs in Monthly Catalog records on the Web site. However, the Survey of Current Business example illustrates that no effort to catalog the Internet will be complete.

Thus, parallel efforts are underway to track migrating documents. Some depositories are making shelf-list or cataloging records for Internet products in order to track migrating documents and/or documents available only on the Internet. Some services,
The simplest solution involves creating a list of titles that have migrated into a CD-ROM compilation for one's own use.

Libraries that track migrating documents
- The University of Memphis: http://www.people.memphis.edu/~mapepin/migrate3.htm
- GPO Library Programs Service, Browse Electronic Titles: http://www.access.gpo.gov/su_docs/dpos/btitles.html
- University of Michigan: http://www.lib.umich.edu/libhome/Documents.center/fedelec.html
- University of North Carolina at Chapel Hill: http://sunsite.unc.edu/reference/docs/fedpubs.html
- University of Virginia: http://www.lib.virginia.edu/govdocs/refshelf/walt_ref.html
- Electronic Data Dissemination of Census Publications from Larry Schankman: http://www.clark.net/pub/lschank/web/cendoc.html

The Survey of Current Business example illustrates how these tools can be used. The STAT-USA/Internet source was listed on GPO's Browse Electronic Titles service and on some of the Web pages that list migrating documents by title. A search of the Internet using a search tool (Open Text) also finds it. Thus, this item rates as fairly easy to find, but it is clear that one must first include the Internet in the search strategy and then know what Internet tools are available and how to use them to find this item.

There has not been as much effort devoted to track materials such as the OTA documents that have migrated to CD-ROM with a change in title or SuDoc number. The simplest solution involves creating a list of titles that have migrated into a CD-ROM compilation for one's own use. A more sophisticated local solution is to maintain a fully searchable database that may contain not only analyzed contents of compilations, but also the other content and management-related information that it is useful to keep for CD-ROMs. As discussed above, this database can be put up on the Web and made available to others to use. INFOMINE is one such resource.

10.3 Problem of content
A publication migrating to electronic format may have the same, less, or more content than the original print/microfiche version. The Census Bureau tells us that the County and City Data Book, 1994 CD-ROM contains more information about small towns than does the print version. Although both formats should be easy to find, staff may not know or remember to refer users who need this additional information to the CD-ROM format unless prompted.

Migration to electronic format may coincide with relative loss of information. For instance, the Census Bureau announced that many of its products would be reduced in content, with many tables available on the Internet. Clearly, for a librarian or user to find the most recent information from a given publication, the information on the Internet should be accessible when searching or browsing by agency, title, series number, or subject.

The statistical agencies are often careful about documenting their information products. However, for those migrating publications that are not as carefully documented, it can be quite difficult and frustrating to determine the exact content relationship between the print/microfiche version and the electronic version, if there is one, in order to find a known title or known content that may have migrated.

This problem of content has not
The traditional close relationship between documents and maps collections has intensified with the growth of interest in GIS.

It is advantageous to start a library of preprocessed files for the geographical areas most often needed by users.

Hard disk space is never adequate when working with GIS.

been fully solved. The most important thing an agency can do is to provide in the documentation for the product detailed information about (a) whether the product has a print or microfiche counterpart; and if so, whether the content is identical or different; and if different, how; (b) whether a product is related to another electronic product; and if so, how (e.g. serial, correction, etc.).

11. Geographic information systems (GIS)
The traditional close relationship between documents and maps collections has intensified with the growth of interest in geographic information systems (GIS) as a tool, in FDLs as well as in map libraries. The Federal government is an important producer of the spatial data intended for use in a GIS as well as the statistical data that may be used in conjunction with the spatial data.

What is arguably the most useful spatial data product, at least in an FDL, is the Census Bureau's TIGER/Line files which contain census geographic areas (census tracts, block groups, blocks, etc.), streets, landmarks, etc. TIGER/Line 1992 is intended to be used in conjunction with 1990 census data. TIGER/Line 1994 includes updated spatial data, including improved street and address coverage. TIGER/Line 1995 is due in depositories soon. Other depository spatial data products include data from the U.S. Geological Survey: DOQ: Digital Orthophoto Quadrangle Data, digital images of aerial photographs; DRG: Digital Raster Graphic Data, scanned images of topographic maps; and Digital Line Graph (DLG) Data. Some useful sources of information about spatial and census data products and GIS software are outlined in Appendix IV.

To make the TIGER/Line files usable, a two-step process is necessary. First, software must be run on the raw TIGER/Line files to extract the spatial data needed and to create the files that can then be imported into GIS software. Although this can be done with a single piece of software, it can be a time consuming process and may require some understanding of census geography. The second step is to actually import the files into the GIS software application, such as ArcView, ArcInfo, MapInfo, Atlas GIS, etc.

Thus, it is advantageous to start a library of preprocessed files for the geographical areas most often needed by users; for instance, files for all census tracts, block groups, and blocks within each county in North Carolina, in addition to each county itself and a joined file of all North Carolina counties. Once these files are made up, they can be easily accessed, used in-house, or distributed to users (in accordance with any license agreement imposed by the translation/extraction software). Our library of North Carolina files is about 130MB, including imported and unimported files, but not including any street files, which can be 10MB for just a medium-sized county.

Users will need room on the hard disk to store their files, since they typically will not fit on a floppy. Hard disk space will also be consumed by the proprietary spatial data that usually comes with the GIS software. Very quickly, hard disk space becomes a valuable commodity. Hard disk space is never adequate when working with GIS; LPS' recommended minimum should be exceeded if possible. Hard disk space can be expanded by storing files on a removable cartridge drive, or writing them onto a recordable CD-ROM.

Security is also an issue, but not necessarily because users are malicious. Many users enjoy exploring what spatial data is available and can innocently make undesirable changes in the files. Many solutions are available. The library and proprietary
These commercial packages have the advantage that the data is already in the native format.

Some of the procedural problems in working with TIGER/Line files can be solved by using commercial products. For example, MapInfo Corporation; Environmental Systems Research Institute (ESRI), which produces ArcView, ArcInfo, and Atlas GIS; and other vendors such as Wessex, Inc. all provide spatial data that can be used with GIS applications. These commercial packages have the advantage that the data is already in the native format; all one has to do is extract the geographical entities desired. Also, the data is on a CD-ROM, does not have to be stored on a hard disk, and thus is somewhat more secure. In addition, census data is also available commercially, preprocessed to include the FIPS codes necessary to join seamlessly with commercial spatial data.

On the other hand, commercial data comes with a license agreement. The depository may want to investigate a site license for spatial and/or census data in order to be able to distribute it freely to users who wish to use it on their own equipment outside of the library.

The ARL GIS Literacy Project was designed in order to “introduce, educate and equip librarians with GIS skills.” At the inception, 31 libraries were participating; now there are over 100. Environmental Systems Research Institute (ESRI) and Wessex, Inc. have been especially generous in this endeavor in donating ArcView software and spatial data from the TIGER/Line files in ArcView-compatible format, respectively, to ARL GIS Literacy Project libraries. These products have provided both the means and incentive for the Project libraries to become deeply involved in GIS.

12. Electronic Documents Specialist

Several FDLs now have a position which includes as a substantial part of its job description the provision of public access and support services for Federal information in electronic format. Let’s call this position the “Electronic Documents Specialist”. The exact nature of this position varies considerably. In some documents departments, the Electronic Documents Specialist is concerned only with documents; in others, the Electronic Documents Specialist is shared with general reference. Sometimes the Electronic Documents Specialist is responsible only for the technical aspects of access; sometimes both the technical and the content aspects are a part of the job. The Electronic Documents Specialist may or may not have managerial or supervisory responsibilities. Accordingly, the Electronic Documents Specialist can be a professional librarian or a paraprofessional.

The need for someone to bear the responsibility for the technical aspects of Federal electronic information is undeniable. The inclusion of professional documents-related responsibilities in the job description for the Electronic Documents Specialist allows the individual in that position to participate fully in the planning process that is so critical during this time of transition, as well as to develop the expertise, systems, procedures, documentation, training, etc. in support of electronic information that have been discussed in this article.

13. Summary

Federal electronic products and services are becoming more and more numerous, important, and sought after, so that no librarian can afford to ignore the trend either within documents or in the library as a whole. This rather lengthy summary of some
Federal electronic products and services are becoming more and more numerous, important, and sought after... of the major issues involved in managing Federal information in electronic format hopefully stands as testimony to the importance of having a full-time staff member, experienced in matters electronic, to manage it.

No less than in the rest of the information field, GPO, FDLs, and documents librarians are in a period of transition to electronic information involving tremendous growth, education, and planning. The problems being addressed today will surely be solved and replaced by others. Therein lies the excitement and challenge in attempting to contribute to our understanding of how we can best provide meaningful public access to Federal electronic information.

14. Appendix I: Selected Guidelines for the Federal Depository Library Program

7-8 Appropriate hardware and software must be provided for public users accessing electronic information available through the Federal Depository Library Program (e.g. CD-ROMs, on-line databases, etc.). This hardware and software should include computer workstations capable of providing Internet access that includes GILS-aware software, CD-ROM readers, and printers (see “Required Minimum Technical Guidelines for Workstations”).

8-3 The selection of items in electronic format assumes that the library will take reasonable steps to assist the public in their use. When appropriate, this includes providing the user with instruction in running the application and developing search strategies. If the library does not own the appropriate hardware or software, it should be willing to help the user locate a site at which the product can be used.

8-5 The library should provide facilities for using materials within the library, including photocopy-

ing facilities, equipment for reading and reproducing microforms and for accessing, printing, and downloading electronically-formatted materials received through the Federal Depository Library Program.

9-7 Depository libraries shall consult with Government agencies, libraries, public interest groups, and with the Superintendent of Documents, to encourage widespread, free public access to Federal agency information resources through telecommunications networks and ultimately through the Federal Depository Library Program.

10-1 Regional depositories will coordinate in their region the retention of at least one copy of all Government publications distributed in paper, microform, CD-ROM, floppy diskette, or other tangible format through the Federal Depository Library Program – except those authorized to be discarded by the Superintendent of Documents. Retained copies may be in paper, microform, or electronic format. Regional depositories are not expected to house or coordinate the retention of any current or future GPO online services or other remotely accessed Federal Government databases. The establishment of such centralized, remote databases will alleviate other sites (such as regional depositories) of archival responsibilities.

10-2 Regional depositories will work with selective depositories in their region, with the Superintendent of Documents, and with depository libraries from other regions to assure that all depositories in their region have free access — either directly, through a telecommunications network, or through interlibrary loan — to all depository materials distributed or made...
remotely accessible in electronic formats, e.g. floppy disks, CD-ROMs, etc.

15. Appendix II: Documentation for tangible electronic products

15.1 Included with the product or tangible publication
- File on CD-ROM/floppy.
- Accompanying booklet or cover within jewel case of CD-ROM.
- Information accessible from the access software provided.
- Technical documentation.
- Print or microform equivalent or near-equivalent.
- Current awareness publication issued by agency.

15.2 Lists of CD-ROMs and documentation, available via the Internet
  The Monthly Catalog in any of its electronic versions may be searched for electronic products. To search for any electronic product, try searching by keyword in title for “computer file”. To search for just CD-ROMs, try doing a Boolean search by keyword in title for “computer file” and by keyword “CD-ROM” or “CD-ROMs”. Records include bibliographic information, system requirements, and file format; many include a summary of content. The most current cataloging is available via GPO: http://www.access.gpo.gov/su_docs/dpos/advpos400.html.
  Access to lists of computer products since 1990, more than 1200 titles arranged by subject. (It is also possible to search the NTIS database for just computer products.) Provides: title, ordering information, abstract, format, system requirements, and topics areas and keywords. Available at: http://www.ntis.gov/fcpc/.
- GODORT Handout Exchange. Government Documents Round Table.
  The GODORT Handout Exchange, originated by Larry Romans and since fueled by his enthusiasm and dedication, includes guides to government information resources written by librarians. Available at: gopher://una.hh.lib.umn.edu:70/11/socsci/polisci/godort/guides.

15.3 Some library holdings which are available via the Internet
- Carleton College. CD ROMS from the
Provides: title, SuDoc number, “a description of the contents, file format, machine requirements, the availability of software and documentation. In addition some items contain links to the abstracts or other documentation.” Available at: http://www.library.carleton.edu/govdocs/list/THELIST.html.
- Colorado State University. Government Documents Department CD-ROMs.
Selective list of CD-ROMs. Provides title, abstract, and link to Internet site where CD-ROM is available, if any. Available at: http://www.colostate.edu/Depts/LTS/docs/cds.html.
- Penn State University. Electronic Resources in Documents.
Provides: title, format, call number, print equivalent, Internet equivalent, lending policy, description of content, documentation availability, notes, contact person at Penn State. Available at: http://www.libraries.psu.edu/crsweb/docs/testelec.htm.
- San Diego State University. Government Publications & Maps Electronic Information Resources.
Provides title, short description, and link to Internet site where CD-ROM is available, if any. Available at: http://libweb.sdsu.edu/gov/gpmeres.html.
- University of California, Berkeley. CD-ROM and Diskette Titles in GSSI.
Provides: title, local availability. Some titles are linked to more detailed records including: dates, description, print equivalent, and local contact information. Available at: http://www.lib.berkeley.edu/GSSI/cdl3.html.
- University of California, Davis. Government Documents and Map Department.
- University of California, Riverside. INFOMINE.
Access Internet sites and records for local CD-ROMs by detailed subject, keyword, or title; browse the table of contents; or search. Available at: http://lib-www.ucr.edu/govpub/
- CD-ROM records include title, short abstract, and location within the library. Contents of compilations such as NTDB are analyzed.
- Western Kentucky University. CD-ROM Databases Available at the University Libraries on Stand-alone Workstations; CD-ROM Databases Available on WKUNet.
- Western Washington University. Docbase CD-ROM Program and Guides for Government CDs.
Long maintained by Robert Lopresti, provides: title, description, agency, availability of guide locally, whether the product is updated, whether it circulates, contact information, SuDoc number, whether there is a paper equivalent locally, whether the product is for sale, and how to use the product. Available at: http://www.d.umn.edu/~mgerber/edd/docbase.html.

15.4 Other publications
For Federal statistical publications, provides: agency, publication type, ASI accession number, title, periodicity, date, report number, item number, stock number, SuDoc, abstract, table listing, etc.
- Lesko, Matthew. The Federal Database Finder: A Directory of Free and Fee-Based Databases & Files


- Reviews in professional publications.

16. **Appendix III: First stops for Federal information on the Internet and via Bulletin Boards**

16.1 **On the Internet**


  Sites are arranged by subject and agency. "This guide was compiled primarily for librarians who provide reference assistance for United States government documents and lists Internet sites which provide information from or about the U.S. Federal Government." Available at: http://www.nscee.edu/unlv/Libraries/services/govpub/rsrce/usgovres/.

- University of Michigan Documents Center. Grace York.

  Access sites by subject, browse the directory, or search. Available at: http://www.lib.umich.edu/libhome/Documents.center/index.html.

- US Government and Politics. Larry Schankman.


  A guide to Federal and State sites available via the Internet, with "an expanded section in non-classified military sites, WEBs and webmaster addresses and e-mail, Gopher, Bulletin Board Systems (BBS) [...] and CD-ROMs." Sent to depositories in summer 1996; also available at http://www.sbaonline.sba.gov/ACE/.


- Government Information Xchange. General Services Administration.

  Provides access by agency and by very broad subject. Available at: http://www.info.gov/info.html.

- The Federal Web Locator. The Villanova Center for Information Law and Policy.

  The most detailed arrangement by agency and subagency. The lists are searchable. Available at: http://www.law.vill.edu/Fed-Agency/fedwebloc.html.


  Federal sites relating to business. Includes: search the Govbot database of over 100,000 government Web pages, browse broad subject, news. Available at: http://www.business.gov.
• **Monthly Catalog.** U.S. Government Printing Office
   The Monthly Catalog in any of its electronic versions may be searched for electronic products, including those on the Internet that GPO has just begun to catalog. To search for any electronic product, try searching by keyword in title for “computer file”. To search for just Internet products, try doing a Boolean search by keyword in title for “computer file” and by keyword “Internet”. The most current cataloging is available via GPO where many records are now hot-linked: http://www.access.gpo.gov/su_docs/dpos/adpos400.html.
• **INFOMINE.** University of California, Riverside.
   Access Internet sites and records for local CD-ROMs by detailed subject, keyword, or title; browse the table of contents; or search. Available at: http://lib-www.ucr.edu/govpub/16.2
• **Some recent print resources**
   - **Farrell, Maggie Parhamovich.** "Internet Waves”. Documents to the People. Regular column.
   - **The Internet Connection: Your Guide to Government Resources.** Lanham, MD: Bernan Press, published 10 times per year.
• **Stratford, Jean Slemmons and Juri Stratford.** “Computerized and Networked Government Information”. Journal of Government Information. Column 3 times/year beginning with vol. 22, no. 3.

17. **Appendix IV: Sources of information about GIS**

17.1 **Data products and software**
• **TIGER/Line** http://tiger.census.gov/
• **DOQ, DRG, DLG** http://nsdi.usgs.gov/nsdi/pages/nsdi005.html
• **1990 Census** http://www.census.gov/
• **Wessex** http://www.wessex.com/
• **ArcView, ArcInfo, Atlas GIS** http://www.esri.com/
• **MapInfo** http://www.mapinfo.com/

17.2 **Listservs**
• **maps-l** Send e-mail to: listserv@uga.cc.uga.edu. Put in the message body: subscribe maps-l <your name>. Purpose: Maps and Air Photo Systems Forum, for maps librarians and those interested in cartographic information.
• **arcview-l** Send e-mail to: arcview-l-request@esri.com. Put in the message body: subscribe arcview-l <your name>. Purpose: “The ARCVIEW-L discussion list on the Internet is a forum for you to communicate with other users about ArcView technical software issues.”
• **mapinfo-l** Send e-mail to: majordomo@csn.org. Put in the message body: subscribe mapinfo-l. Purpose: “A world-wide E-mail forum for discussing issues of interest to
users, dealers, and developers of MapInfo software, applications and data sets. Topics can range from narrow technical details of using MapInfo to broad issues about GIS and Mapping.”

- gis-l — Send e-mail to: listserver@idi.net. Put in the message body: subscribe gis-l <your name>. Purpose: Discussion of geographic information systems.

1 As I was finishing this article, I became aware of Ryan, Susan M. Downloading Democracy: Government Information in an Electronic Age. Creskill, NJ: Hampton Press, 1996. Ryan treats many of the topics discussed in this paper in a book-length form.


10 For a recent proposal from GPO, see “Changes Proposed to Title 44, United States Code”. Administrative Notes, vol. 17, no. 12, August 30, 1996, pp. 1-2; and “Changes to Chapters 17 and 19, Title 44”. Administrative Notes, vol. 17, no. 12, August 30, 1996, pp. 4-19.

11 To subscribe to govdoc-l, send an e-mail message to: listserv@psuvvm.psu.edu, with the following in the message: subscribe govdoc-l <your firstname> <your lastname>.

12 GPO’s FDLP Program Administration: http://www.access.gpo.gov/su_docs/dpos/fdlppro.html.

13 17 USC 105.


16 Some electronic products are provided with two or more options. For example, U.S. Foreign Affairs on CD-ROM and U.S. Imports of Merchandise are currently provided with access software for both MS-DOS and Windows platforms.


*Administrative Notes*, vol. 14, no. 7, March 31, 1993, p. 20


The author’s understanding of Internet tools has been greatly influenced by discussions with Raeann Dossett, who is hereby officially thanked.


*STAT-USA/Internet*: http://www.stat-usa.gov/.


Downing, Tad, Cataloging Branch Update, Depository Library Council, Salt Lake City, October 21, 1996.


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**George D. Glazer**

28 East 72nd Street
New York, New York 10021
Phone: (212) 535-5706
Fax: (212) 988-3992
E Mail: Worldglobe@aol.com

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Ohioans are an enthusiastic and appreciative audience for maps. Through its universities and major public libraries, the state is endowed with large institutional map collections. The “map community,” particularly in Northern Ohio, has tended to be a friendly but an unorganized network of map dealers, historians, librarians, and just plain “map lovers.”

The current Northern Ohio map group owes its existence to the enthusiasm and organizational skills of several dedicated individuals. In 1984, a group of book collectors and dealers organized the Northern Ohio Bibliophilic Society (NOBS), which now meets monthly, and annually sponsors the Akron Antiquarian Book Fair. Several NOBS dealers and members also had a keen interest in maps and atlases. With the blessings of the NOBS Board, a group of “cartophiles” met May 11, 1994 in Bay Village, Ohio, to organize a map interest group within NOBS.

The meeting was hosted by Dave Harbaugh of Bay Books. Dave, and Frank Klein, of The Bookseller, in Akron, have routinely stocked nineteenth-century Ohio county atlases and maps. Frank had earlier been instrumental in the founding of NOBS. Bill Barrow, a map enthusiast who had recently returned to the area from Tucson, was another prime “mover” for the group. Also in attendance were Dan Harbaugh, a local real estate appraiser; James & Cynthia O’Malley, publishers of local historical maps; Duncan Gardiner, a local author and family historian specializing in Eastern Europe; Kate McCormick and Wes Williams, local antiquarian map and book dealers. Bill Barrow, who occupied the only “chair with arms,” was, of course, elected “chair” of the group at this first meeting.

The group is very informal, despite its rather cumbersome official name, Northern Ohio Bibliographic Society Map Interest Group. We draw from across Northeast Ohio for our membership. Meetings are generally held on Wednesday evenings but we vary the location from universities, libraries, historical societies, title bureaus, archives, etc., to retail map stores or antiquarian shops. Map enthusiasts don’t mind travel, or at least they use it as an excuse for getting their maps out. We find that distance and location have very little impact on our meeting attendance.

We began by mailing one-page meeting announcements, which could also be posted at area libraries and stores. (These flyers always included a map, although none has been quite as imaginative as the T-O map of the suburban interstate system which Bill Barrow designed for our second meeting). We have now progressed to a two-page newsletter which contains a meeting announcement and location map; a short report on the previous meeting; notes on new maps, new books, new web sites; lectures; exhibits; and other “map-world” news. The newsletter also carries phone numbers for at least two board members so that interested parties may contact us personally. The Cleveland Public Library allows us to use the Library’s Map Collection as another contact point. Our parent group, NOBS, continues to pay for the mailing of approximately 65 newsletters quarterly (usually about three weeks before a meeting). The map group
...it's amazing how often we draw on the group's combined expertise to help with complex map questions.

Meeting are planned by a three-member board which meets twice a year. Board members keep in close contact via E-mail. While many of the group's members are interested in older maps, most are intrigued by any map-related topic. We try to vary topics from historical to high-tech to attract as many current and new members as possible. Topics for our first meetings were drawn from our own members' strengths: Austro-Hungarian mapping; library resources for map collectors; plat books and land titles; GIS labs. Local antiquarian dealer Kate McCormick (Orbis Maps) even hosted a family cookout at her home. NOBS agreed in our second year to provide funds to bring David Bosse, then Curator of Maps at the William L. Clements Library, University of Michigan, for a presentation on Civil War maps, which was co-sponsored by the Western Reserve Historical Society.

For our August meeting, we scheduled two "hands-on" sessions on "Maps on the Internet," one for area librarians and the second for map group members. The meeting was co-hosted by Cleveland State University Library. We hope to encourage more such co-sponsorship with local institutions. Attendance usually averages 15-20 per meeting with a small corps of "regulars" who seem to make it to every meeting.

The map group continues to fulfill several important functions. It has developed a local resource network for cartographic information, and it's amazing how often we draw on the group's combined expertise to help with a complex map question. It provides a warm, friendly welcome to other map enthusiasts, and there's certainly no lack of conversation at our meetings. The group encourages research, especially into local map history. We are all aware of other members' map interests and we exchange information frequently, but as yet, the group has no formal publications.

We post meeting announcements on MAPS-L and MAP-HIST (if the topic is historical), so please join us if you are going to be visiting Northern Ohio. Our members are always glad to "talk maps"!

Contact:
NOBS Map Interest Group
c/o Cleveland Public Library Map Collection
325 Superior Ave. NE
Cleveland, Ohio 44114-1271
(216) 623-2880