Chapter 1

The Evolution of Modern Typesetting and Layout

Although I have spent most of my career in media sales, I actually started my career on the production side of the business. I recently installed the latest version of Adobe InDesign, and as I look at the amazing functions available to me with just a few clicks of a mouse, I think back to the way I first learned how to do typesetting and layout years before the invention of the personal computer.

Not that many years ago, typesetting technology was broken into two categories: hot type and cold type. Hot type referred, primarily, to the Linotype machine, a device that used molten lead poured into molds that formed the individual letters. Much of the terminology used in modern typesetting—leading, for instance, the insertion of a blank piece of lead to add space between lines of type—came from that technology. But, Linotype machines required skilled operators to run them, were expensive, and because of their size and the amount of heat generated from them (in order to keep the lead molten), they were found only in commercial facilities. Cold type came about as the photo offset printing process developed. It created a market for companies to enter the typesetting business by creating relatively low cost devices that would set type which could then be photographed and converted to offset printing plates. One of the earliest entrants of this technology was the Addressograph-Multigraph Corporation. Their machine, the Varityper, was the first typesetting machine I learned to use.

Using the Varityper was slow and tedious work. First, the pica width of the column was set with margin guides. A sheet of paper was inserted into the machine and each line of a story was typed twice, once to allow the machine to determine how much extra space was needed to be added between each word, and then after setting a dial that added that additional space, a second time to produce a justified line of type. Line after line was done this way until you created a fully justified column of type. This was then "pasted-up" on a layout sheet to create a single copy of each

page of a document which was then photographed and the negative used to create a printing plate.

With all of this typing and retyping, one was sure to have some typos in the text, which occurred often. When a mistyped word was spotted, the corrected word was typed on the border of the paper. The finished paper was then taken to a light table and the corrected word was positioned on top of the incorrect word and an X-Acto knife was used to cut through both layers at the same time. The old word was discarded, and the new one, which fit perfectly in the cutout space, was held in place by a piece of clear tape applied to the back side of the paper. This tedious process certainly taught those of us who used the machine and then had to correct our own errors how to type as accurately as possible.

Each typestyle or font came as a family, so it was easy to have a word set in bold or italic. It was just a matter of changing the font, which was a half-moon shaped metal form containing all of the characters. Picture it as the predecessor to IBM's "golf ball" font utilized on the Selectric typewriter. But, the Varityper created very sharp type that photographed clearly and printed well on a machine that required little more than basic typing skills in order to operate. Although I didn't know it at the time, this was the predecessor to desktop publishing as we came to know it when the IBM PC was introduced years later.

So, now I am going back to a document I am creating in InDesign. I don't have to type each line of type two times, I have hundreds of typestyles available to me in sizes ranging from 6 point to 72 points, if I should find a typo, I will edit it directly on the screen, and there is not a drawing board, X-Acto knife, t-square, or paste anywhere near where I am sitting. But, I do look back fondly at my time in front of a Varityper as it taught me the basic skills of typography that I can still apply today.

A Brief History of Typefaces Available in Adobe InDesign and Other Software

Many of the most popular typefaces included in today's publishing software programs are actually classic fonts used for many years throughout the publishing industry. They were designed to make the text on a page attractive and readable and worked as well in books and magazines in the 18th, 19th, and 20th centuries as they do today on digital media.

Typeface	Designer	Year Designed
Arial	Robin Nicholas (for use in Microsoft Windows	1982
Baskerville	John Baskerville	1757
Bodoni	Giambattista Bodoni	1798
Albertus	Berthold Wolpe	1932
Bookman	Ed Bemguiat	1858
Times New Roman	Stanley Morison (for the *Times of London*)	1931
Helvetica	Max Miedinger	1957
Palatino	Herman Zapf	1949
Univers	Adrian Frutiger	1957

Chapter 2

Automating the Typesetting Process

Seeing opportunity, IBM entered the typesetting market with the introduction of its Selectric Composer. Utilizing a modified version of the mechanism of its popular Selectric Typewriter, the Composer was able to set type with proportional spacing in justified columns. Like the Varityper before it, in order to justify a column each line of type had to be typed twice, once to determine the amount of additional space needed between each word and then a second time to add the required space to produce a justified line of type.

But, IBM took the technology one step further by connecting the Composer to a magnetic tape driven device which allowed the operator to enter text once on a standard Selectric typewriter, have those keystrokes captured and stored on a magnetic tape cartridge, and then played back as justified columns of type on the Composer, which was connected to the tape reading device. The system, called the MTSC, Magnetic Tape Selectric Composer, was a major advance in cold type technology. It offered a number of type styles and sizes, each molded onto IBM's "golf ball" element. In order to go from Roman to Italic, for instance, the operator had to simply change the element and type the needed words in Italic, then change the element again to return to Roman. For automated playback, "stop" codes were embedded into the text and recorded on the tape which allowed the operator to change elements at the appropriate place as the document played out. Typos were corrected directly onto the magnetic tape before final playback, as well. This technology was the precursor to what we now call "word processing."

In order to achieve the look of proportional spacing, each character was assigned a number of "units." Wide characters, such as the letter "M", were given more units, and narrow characters, such as the letter "I", were given fewer. The width of each column was determined in picas and the system came with a chart that converted those picas into "units." The number of units of each line of an article was entered onto the magnetic tape and the internal computer calculated the amount of additional units required between words in order to produce a justified column of type.

The system produced sharp, clean type, and was faster and more efficient than was the Varityper, but it was also limited to the size and typestyles available. Only a few typestyles were available on the "golf balls" and the type ranged in size between 8 and 12 point. It was because of these limitations that the MTSC system was displaced by the next generation of cold typesetting systems: phototypesetting. Companies including Addressograph-Multigraph (AM) and Compugraphic aggressively entered the market with faster, more flexible systems that offered a wider range of type styles and sizes than were ever offered by their predecessors.

Chapter 3

Moving to Phototypesetting Technologies

The typesetting systems described in previous chapters all have had one thing in common: the image of each character was created by a font striking a black ribbon and imprinting the character on plain white paper. Although this produced sharp type, it was limited in the size and styles of fonts available. The introduction of phototypesetting technology rapidly changed that by offering broader selections of type available in sizes from 6 point to 72 point. There were several companies that perfected phototypesetting technologies in the early to mid 1970s including AM International (formerly Addressograph-Multigraph), Compugraphic Corp., Linotype Corp. and others.

Phototypesetting is a projection system whereby the flash of a strobe light is aimed through a negative image of each character and projected through a lens onto photographic paper. The size of each character is determined by either the distance from the paper to the lens or by the characteristics of each lens used. Some systems employed only one or two lenses and the operator either manually adjusted the distances or, as in later models, the distances were controlled by internal stepping motors. Coding for all characters and commands were embedded onto some type of storage medium. The first systems utilized paper tape with combinations of holes punched into it to drive the selection of each letter. Specialized keyboard devices, such as the device manufactured by Friden Corp. shown above, were used to create the coded paper tape. This technology was cumbersome, not easily correctable, and was quickly replaced by the use of magnetic medium, primarily in the form of large floppy discs. As each line of type was set, the machine inserted the exposed photosensitive paper into a light-proof cassette which, in turn was removed from the machine and put onto a chemical developing machine which safely fed the paper through a series of photographic development chemicals. The damp paper was then allowed to dry before it was able to be used.

The quality of the type was excellent, but if exposed to light, had a relatively short useful life. The paper would readily yellow and the characters would quickly fade, and the developing chemicals left an acrid aroma in the room in which they were used. The next generation of photographic paper was introduced which eliminated most of these problems. Called RC (resin coated) paper, type set on it was very clear, the image didn't fade, and the paper was a bright white rather than the off white to yellowish color of its predecessor.

Whether type was set using a ribbon on paper or a photographic process, the result was the production of long columns of type, called galleys. The final pages were then created by "pasting up" the publication. The galleys were cut into columns, an adhesive applied to the back and the type was positioned into columns, headlines, captions, and the other elements of the printed page. The work was done on a drawing board and a t-square and triangle were used to properly line up the type. It still amazes me to remember the time spent in creating pages this way compared to how easily and quickly it is now done in InDesign.

Chapter 4

From Gallies to Pages

P revious articles have described how type was set into columns utilizing several systems which evolved over time. But, whether they type was produced on plain paper or through a photographic process, the end result was the same. The long columns of type, called galleys, had to be cut apart and precisely positioned into the columns, headlines, and captions which made up each finished page of a document. The resulting camera-ready copy was then photographed by the printer utilizing a horizontal flat bed camera to create a full-size negative which, in turn was used to "burn" the plate used to print the finished product. The creation of the finished page was done by graphic artists on a drawing board who utilized a variety of tools and products to create the finished "pasted-up" document. Following are some of the tools that were used:

Each column was created by cutting the galleys to the specific length of each column and accurately aligning them using a t-square and triangle. The type was held in place utilizing a removable adhesive which allowed the layout artist to position and reposition the type as necessary. Rubber cement was the adhesive most widely used although many artists preferred to use a molten wax adhesive. In both cases, the adhesive was affixed to the back of the galley of type and placed into position.

Because the making of plates for the offset printing process required a separate negative for each color, screen, and photograph to be printed, each object had to be pasted up on its own sheet in order to be phtographed. In order to be sure these elements were properly positioned, they were pasted onto a clear acetate sheet, each layer on top of the previous. In order to create areas of color or tint, a product called Rubylith (and its cousin Amberlith) were used. This product was a clear sheet of acetate on which was a thin red film that could be cut into the needed shape and then peeled away from the acetate base as needed. For instance, if the artist wanted a 20% tint of black behind a box of type, the type and border for the box were pasted onto the base sheet, the Rubylith was placed over the area and the red film was cut along the lines of the box and all of it peeled off except for the area covering the box. Interestingly, this can be seen today as a function in Photoshop. When selecting a portion of a picture and then pressing the "Quick Mask" button, the selected area is highlighted in a transparent red which can then be further edited as necessary—Adobe's tip-of-the-hat to the Ulano Company's product.

Rules and boxes were created using a variety of products including some called Formaline. Available in a wide variety of sizes and designs, think of it as the rules that are available in InDesign, but in the form of an adhesive tape on a roll. Each line was put into place on the layout and held in place by the adhesive material on the back of the product. Boxes were made by placing four lengths of the rule perpendicular to each other (forming the four sides) and then cutting a 45 degree angle at each of the corners where two pieces intersected. If done accurately, this created a perfect corner. Thin lines, one point or less, were hand drawn using special ruling pens, the best of which were manufactured by Koh-I-Nor. The very fine tip created thin solid black lines and it required some skill to create lines of consistent weight.

Photographs were reproduced as halftones utilizing a screen and special photographic film in the print shop's darkroom. The positioning of each

photo required a "window", usually cut from Ruby-lith or a similar product called Zipatone, which was the size and shape of the printed photo. Photos had to be cropped and scaled in proportion to the size of the window and each photo had to have crop marks and percentage of reduction clearly marked on it. The Proportion Scale was the tool used to quickly make the necessary calculation. Shaped like a wheel and not much more than a basic slide rule with two scales, the artist aligned the original size of the photo with its reproduction size and the resulting percentage appeared in a cutout area of the scale. For instance, if the length of the original picture was 8" and it was going to be reproduced at 3", the proportion scale would indicate that the picture was to be photographed at 37.5% of its original size. Crop marks were affixed to the border o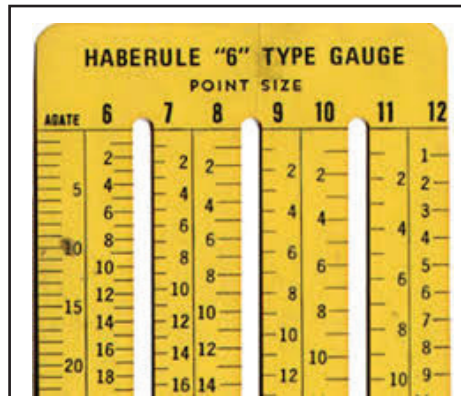f the original indicating the area of the photo to be reproduced and while maintaining the proportions of the window that was made for it. It was a tedious process, but there was no option for either the graphic artists or the printers.

Other tools we used included the Haberule (used to measure leading), the X-Acto Knife (for cutting), Bestine (for thinning rubber cement), Zipatone (for placing screens, patterns, rules, and dingbats on camera-ready art), Presstype (for manually setting headlines), and process printing color charts (for specifying which percentages of the four printing inks were needed to attain a color).

It's fun to look back at the way we created pages not too long ago and how easily each of these functions are now available at the click of a mouse in products like InDesign.

Old Typesetting Terms Still Used in Today's Desktop Publishing Programs

Many of the words and functions used in hot metal typesetting are still found in today's desktop publishing programs. Here are some examples:

Leading: The additional space, measured in points, between lines of type. The term comes rom the thin strips of lead (or aluminium) that were inserted between lines of type in the composing stick to increase the vertical distance between them.

Kerning: The adjustment of the spacing between two characters in a proportional font, usually to achieve a visually pleasing result.

Tracking: Tracking adjusts the spacing between letters evenly across the whole word.

Glyph: A special character or symbol such as a bullet, ampersand, or pound sign originally used in handset typesetting.

Who We Are
Robert Silverstein, Principal. Robert has over 30 years of experience in all aspects of publications and tradeshow sales and management. He has worked for both commercial and association publishing organizations and has led national sales teams which have consistently exceeded their sales goals. He has also been an active member of the association community including serving as Chair of the ASAE Communications Section Council and has been a frequent speaker at ASAE and other industry events. In addition, Robert is a member of the adjunct faculty at the University of Maryland where he teaches courses on marketing and sales management. Robert can be reached at: rsilverstein@adsalesexperts.net, by visiting www.adsalesexperts.net, or calling 240-498-9674.

Chapter 5

Throwing Away My T-Square

I was invited into a dimly lit conference room and offered a seat at the far end of the table. Positioned at the opposite end was an IBM-AT computer upon which sat what looked like a computer monitor sitting on its side so that the image would be presented in "portrait" rather than "landscape" configuration. Then, right before my eyes, the operator turned the computer on and I watched in amazement as I saw him create a magazine page onto which he placed three columns of perfectly justified type, several headlines, rules, and a window for the placement of a photo. This was all done in a matter of minutes without the need for the tools which I had come to rely upon to "paste up" a magazine page layout. When the demonstration was complete I was asked if I had any questions. I only had one, "how do you get the page out of there?" was all I could think to ask. But, what I had just witnessed was my introduction to the digital prepress revolution that was rapidly taking place right before my eyes.

     The year was 1987 and the software I had seen demonstrated was called "SuperPage." After the vendor answered many additional questions (including how to get the pages "out of there") I jumped head first into the deep end of the technology pool and purchased the software for an exorbitantly high price of $8,000. In addition, I had to purchase the specially configured monitor which was available only from a company located in Seattle, as well as an IBM-AT PC. But, I had a contract to produce a directory of several hundred pages, and the investment in the new technology was quickly recouped. Shortly afterwards,

Screenshot of early version of Aldus PageMaker, an early entrant into the desktop publishing market.

the vendor contacted me to inform me that there was an upgrade available for the software, but it would require the addition of a new device without which the program wouldn't properly work. The device was called a "mouse" and it also required that I increase the memory in the computer to support it, so I purchased the mouse as well as added some additional memory to the computer to its maximum capacity of 640K of RAM. But, I also knew I would never again have a need for my faithful t-square, drawing board, adhesive waxer, and X-Acto knife. I had entered the world of digital publishing and there was no turning back.

     Several companies introduced competitive products as the market for "desktop publishing" exploded. SuperPage was quickly replaced by such products as PageMaker, QuarkXpress, and InDesign and the various upgrades and new versions of each which seemed to be introduced almost daily. I continue to be amazed at the functions built into the current version of InDesign, functions that didn't seem possible only a few years ago. The elements of good design, typography, and the use of color are just as important today as they have been for years. But, those of us in the publishing business have powerful tools literally available to us at our fingertips which make our jobs easier, faster, and which allow us to readily express our creativity. During my career in publishing I have been witness to a revolution in typesetting and layout, but also a revolution in new electronic media which utilizes the tools we take for granted today. I can't wait to see what's next.