

Bringing Typesetting to the Desktop

A study of the people and technology
that influenced the first typefaces
that were available on the computer for desktop publishing
and

A study of the history behind those typefaces

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by Lynn Damberger

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PROLOGUE

My second design position out of college, was as a designer at the largest typesetter in Cleveland in 1981. As a young designer I was open to use any of the 2000 typefaces that they had available. In fact selling the typefaces was part of working as a designer for a typesetter. At that time the company had changed over from older methods of typesetting to the photo type era of large main frame computers and phototypesetting. The old linotype equipment was still there in the back room and in the front lobby sitting like dinosaurs in a museum. It is from this early start, with what at that time was a large collection of typefaces, that I developed a strong sense of how to use typefaces in my designs.

In 1988, I had moved on to a small advertising agency, and the vice president brought in a Macintosh computer and printer. He announced that "this is going to replace the typesetting, no more sending out for type." A few months later I left, to raise my young children and move South to Ashland, without thinking that when I returned to the industry four years later, that nothing would be the same. It is this period of typography that I missed, that interests me. I guess it is because in those few years that I was busy with children I missed a part of graphic design history, and the world changed and computers took over all of the menial type specifying and layout process that I had spent so much time learning.

I came back to the graphics industry in 1992, to work nights at the Mansfield News Journal in order to make a second house payment. What I found was an industry on the verge of an explosion. I watched as the newspaper went digital, I learned how to layout ads on their custom newspaper layout program. I left when the house sold, but I continued to be drawn back to a field that now gave a designer such freedom to control every design element from the type to the image to the layout. Now I could design what I wanted, I just had to figure out how to do it. What I discovered was that many of the familiar type faces that I had used 10 years earlier now existed on my PC and Macintosh, but how did they get there?

The first personal computers used bitmap fonts and dot matrix printers. Those first combinations gave us boxy, chunky fonts. They called them word processors, and it was only one step up from the typewriter. The text was held in memory and could be changed, but you had to put in codes to print and codes to create bold and italic. The situation was not something that would be acceptable for typesetting, it was something for secretaries. My father, who had worked in graphics for 30 years bought one of these Star word processing computers and thought it was the greatest thing. He could choose from 5 different typefaces stored on large floppy drive disks, and could edit and save his documents. He never got to see the rest of the publishing revolution, I am sure he would have loved to have spent time in Photoshop and Quark.

INTRODUCTION

One can compare the invention of the printing press and moveable type to the movement of typesetting and printing to the computer desktop. There were many people involved, trying to out do one another, and many developments in technology over a short period of time. We have not seen since Guttenberg, such a proliferation of technology, typography, and freedom of expression in design and the written word. However the timeline has been shortened significantly from the much longer 400 years of change from Guttenberg's press and moveable type until offset printing and the linotype machine, to the less than 20 years for the development of typesetting in the desktop computer. Even though now we work everyday on the computer, much of what we do is still influenced by the original technology and typography of Johann Guttenberg, Aldus Manutius, Ottmar Mergenthaler, Aloys Senefelder and others. In order to study the history of this era of graphic design, typesetting and technologies we must study those that developed the computer, the interface, the software and changed the history of type by using technology.

When we look at the process of digital publishing and the typefaces that we have on the Macintosh computer and on the Windows computer we have to look beyond the typefaces and the interface to the development of the technology that enabled them to be there. The medium of the computer would not have been accepted as a solution for providing type and publishing had it not been for the quality of the letters and the selection of typefaces, the "What You See Is What You Get" preview and the ease of use. So first you must have technology, then it must be high quality and be better than the processes already in place in order to be accepted. Understanding the affects of technology on our previous type technology is essential for the designers of today to produce effective communication for tomorrow.

There are three major players in bringing high quality type and publishing to the computer. Most people only think about Microsoft and Bill Gates, Macintosh and Steve Jobs, however Adobe with the help of John Warnock and Chuck Geschke brought us PostScript. Without Postscript technology we would still be getting chunky type on our laser printers. The unusual alliance that followed, of Apple and Microsoft, brought to the computer TrueType technology. Each of these three companies all realized the key to the acceptance of the computer as a viable medium for printing and publishing is the selection of typefaces. Each put together type groups and in some cases advisors on their staffs. Some of the players were more interested in the type quality than others, but in a way it is a miracle, like the printing miracles before it, that in the end the process and the medium works. They set out to create something new, they never really new ahead of time the affect that their technology would have on the typesetting industry. Some claim that with the loss of the typesetting industry, standards are lower. Others argue that without the computer, we still would not know what a font is.

ADOBE POSTSCRIPT & APPLE'S LASERWRITER

Pamela Pfiffner in her book *Inside the Publishing Revolution* compares Postscript and Warnock and Geschke to Guttenberg as "providing a radically new approach to putting marks on paper." Emily King in her paper *New Faces* claims that "the single most impor-

tant factor determining the present type industry was the advent of the computer language PostScript." PostScript was the first software that enabled independent distribution of type fonts from the equipment that was needed to print them. A brochure could now be designed on one computer and then taken somewhere else to be output to a high resolution imagesetter. What was even better was the proof that was printed off the laser printer was very close to the same quality that was coming from the expensive typesetting systems in use at the time.

Adobe, who produced PostScript, started with John Warnock and Chuck Geschke who met at Xerox, PARC. They were working there on developing device independent graphic systems. One of their developments was a language for Xerox printers that incorporated raster graphics and bitmapped fonts. When Xerox told them that they were not going to use their development, they decided to branch off on their own in 1982. What they further refined, was a device independent software called PostScript. "The key to PostScript's breakthrough was the way it handled fonts. Instead of requiring hand-turned bitmaps to be generated for each style and size of typeface, PostScript was able to generate fonts of any size and shape from mathematical descriptions and do so automatically on the fly" (Pfiffner, 2003).

Adobe's original business plan was to build printers for work stations in offices to use their software, however that got scrapped when Steve Jobs contacted them in the spring of 1983. Although Apple was working on a similar technology, Jobs realized that Adobe's was further advanced, and better, so they entered into an agreement to license Adobe's technology for the Apple LaserWriter, which included an investment by Apple in Adobe of \$2.5 million (Pfiffner, 2003) and resulted in Adobe becoming a software company.

Adobe felt that the partnership with Apple was going to enable the "intersection of art and technology" (Pfiffner, 2003). According to Steve Jobs in Pfiffner's book "the Mac was the first computer that was commercially available with a graphical user interface. We were doing typography on screen, while the Adobe PostScript was doing type on the printed page" they made a good pair. Chuck Weger says in Pfiffner's book "PostScript did essentially two things. It gave the ordinary user with a Mac the ability to make whole pages of text and graphics. Second, it gave the technically sophisticated the opportunity to program pages" (Pfiffner, 2003).

A laser printer with PostScript is not worth much without type faces, so that became Adobe's next step in selling the professional typesetters on moving their design to the computer. In 1984, type was still being set with phototypesetting equipment and the leaders in that era were Compugraphic and Allied Linotype. Compugraphic wasn't interested because of a soured deal with Apple and Lisa, but Adobe persuaded Linotype to license its version of Times and Helvetica font families to Adobe and Apple. It also agreed to work on development of the first PostScript typesetters with Adobe and Apple. This arrangement was highly unusual because it was the beginning of the end of typesetting and gave PostScript the possibility of success. Linotype had a 100 year old history dating back to the metal typesetting. Pfiffner quotes Frank Romano, professor of digital publishing at the Rochester Institute of Technology as saying "Once they got Linotype, PostScript was destined for success."

The first two faces converted into PostScript were Helvetica and Times. Adobe digitized Times and Helvetica including four versions of each, regular, bold, italic and bold italic. In the beginning Apple was not pursuing the publishing and typesetting industry. They were looking to create the Apple office computer. So Apple pushed to use typefaces that office staff were already used to. That included type available on the IBM selectric and type available on big word processing systems used in offices. Adobe also created four styles of Courier, using oblique instead of italic to save chip space, and a version of Symbol. These 13 fonts were the first to be included with the LaserWriter (Pfiffner, 2003).

In the months before the release of the LaserWriter, Adobe also signed a deal with International Typeface Corporation, the leading type provider to advertising, to include ITC faces in future versions of the LaserWriter and PostScript. The arrangement with Linotype and ITC was the beginning of the development of Adobe's digital font library, now the largest. At the time 90% of their sales were to proprietary typesetting systems and ITC saw it as a way to get into the business market, by the 1990's, 99% of their revenues came from digital type (Pfiffner, 2003). The first ITC additions to the Adobe library included ITC Bookman, ITC Avant Garde Gothic, and ITC Zapf Chancery.

On January 23, 1985, at Apple's annual stock holder's meeting, the Apple LaserWriter was introduced. Steve Jobs is quoted in Pfiffner's book as saying "When the first page came out of the LaserWriter, I was blown away. No one had seen anything like this before." It cost \$6,995, which by today's standards is very expensive, but back then it was three times cheaper than IBM and Xerox laser printers, and it had near typeset quality (Pfiffner, 2003).

It was Paul Brainerd's Aldus PageMaker and the term "desktop publishing" that further enabled the success of digital typesetting. Brainerd, who was once a newspaper editor, was familiar with both publishing and technology. He recruited four other engineers, and stopped in to make a cold call at Apple's offices in Beaverton, Oregon, just after the Macintosh's release. The local representative followed up with them a few weeks later in Seattle and dropped off a Macintosh for them to play with. At the time it was the only "What You See Is What You Get" computer, it was the first to use a white screen with black type instead of the black screens then in use, and it was easy and fun to use (Levy, 2000). Two years later the desktop publishing industry was a multi-million dollar business. In 5 years there were not any typesetters left (Pfiffner, 2003). It took Bill Gates and Windows 3.1, 5 years to catch up.

Adobe realizing that the further success and acceptance of PostScript would ride on the availability of fonts, pursued licensing, digitizing and designing fonts. They sought out a type designer to lead the progress in Sumner Stone. They later established a font design department with Sumner Stone, Carol Twombly and Roger Slimbach in addition to hiring freelance designers like David Siegel, to add to their library.

The quickest way, however, to build a library of fonts, is to build from what already is available. So the staff at Adobe converted digital outlines from phototypesetting fonts into PostScript outlines with hinting that helped the typefaces look better at smaller sizes. The lack of precise information, put Adobe's staff in the role of acting as "an interpreter between computer scientists and type designers" (Pfiffner, 2003).

The second release of the LaserWriter in 1986, included 22 more fonts, creating the core 35 PostScript fonts. Those additional fonts included ITC's Avant Garde Gothic, ITC Bookman, Zapf Chancery, and Linotype's Palatino. The decision's surrounding these typefaces, that defined the postscript typesetting era, weren't made with history in mind, they were based on arbitrary and political decisions, according to Sumner Stone. Stone even goes on to say it was a "free for all". Steve Jobs hand picked some of the faces, he got over ruled on ITC Gorilla, instead Zapf Chancery was used. Bookman and Avant Garde were pushed by ITC, and Stone himself wanted Palatino (Pfiffner, 2003).

The first typeface designed from scratch for PostScript and not converted from an earlier design was Sumner Stone's "Stone". It was one of the first faces sold by Adobe and not included as part of a printer or software package.

In order to get more type into the market, Adobe even licensed its type development tools to font suppliers. Alytsys Fontographer enabled even lay people to design PostScript fonts. In addition to large foundries like Agfa, Monotype and Berthold, converting their fonts to PostScript, there developed a small group of independent type designers that created a international boom in typefaces designs. This also opened the door for edgier less refined faces and imposter, knock off fonts which drove the prices of fonts further down.

In 1987, Adobe signed an agreement with HP and IBM to include PostScript in their laser printers. This helped to establish PostScript as the industry standard. This power house of licensing fees for PostScript type also became the reason for the "Type Wars."

Adobe had developed its PostScript fonts in two different types, Type 1 and Type 3. Type 1 font technology contained more specific font hinting and information and was saved for only Adobe and those that licensed its faces to Adobe. Type 3 was free and released to the public. Adobe wanted to keep an advantage for using its fonts. This made a lot of money for Adobe, but developed a resentment amongst the industry, particularly with Apple and Microsoft. Apple was also upset that Adobe had licensed its font technology to its competitors, HP and IBM. Microsoft and then Apple looked for a way to produce typefaces that looked like PostScript. Although PostScript printed crisply it had a very rough preview on screen. There was a push for development of an on screen font rasterizer. Adobe had ignored the noise about better screen previewing until Microsoft and Apple announced their development of TrueType, which they proposed with would like PostScript and preview sharp on the screen.

ADOBE TYPE MANAGER AND THE "TYPE WARS"

In 1989, Apple, who was working on an on screen type rasterizer called Royal and Microsoft made an agreement to develop an alternative to PostScript. Adobe, was caught off guard. In response Adobe returned with its announcement for upcoming on screen type rasterizer, later to be called Adobe Type Manager (ATM). When Adobe made its announcement it had not even started on it. Meanwhile Apple's agreement with Microsoft included Apple to develop its alternative font technology, while Microsoft would develop a competitive printing technology. Apple's product became TrueType, but Microsoft's buggy printing technology never made it off the ground. This was the beginning of what was to be called the "Font Wars."

The result of the "Font Wars" was the release of PostScript Type 1 documentation, the development and release of Adobe Type Manager, by Adobe, and the development and release of True Type by Apple. Most people give Microsoft the credit for True Type, but it was created and written at Apple.

Some other things were happening at this time to also influence Adobe's actions. First is the fact that Bitstream announced that it had cracked Adobe's encryption of its PostScript 1 fonts, so that Bitstream fonts would print from PostScript printers without licensing the software. Also F3 a competing technology, opened their format, and was pushing type producers to convert their fonts to F3 (King, 1999).

Prior to ATM, type on the screen appeared as rough pixels with jaggy bitmapped edges. In 6 months Adobe's Advanced Technology Group pressed hard to develop a type manager that would be built into the operating system, that would rasterize type on screen for "What You See Is What You Get" display. Adobe's product came to market one year before Apple's product, TrueType was released.

While TrueType is the default font type on both Windows and Macintosh systems, professional designers prefer PostScript fonts because they work better with the output devices for high quality printing. In 1991, Apple agreed to include ATM with its release of System 7. In order to create a demand for ATM, Adobe included a group of fonts in addition to the PostScript fonts offered with the LaserWriter. By version 3.8 of ATM the fonts then available with ATM were Berthold Baskerville, Botton, Poppl-Laudito, ITC Anna, Boulevard, Giddyup and Giddyup Thangs and Tekton. In early 1990 there was an announcement of the end to the "Font Wars", no one was proclaimed a winner, instead it was recognized that multiple formats could exist together (King, 1999).

APPLE, MICROSOFT AND TRUETYPE

As a way to avoid per font royalty from Adobe, Apple and Microsoft paired up to develop TrueType. Sampo Kasila was the creator of TrueType. Hired by Apple in 1987, he worked on the TrueType rasterizer, almost the entire two years that he worked for Apple. Most times he worked from home so that he could complete the work quicker. He finished it in 1989, but it was not until 1991 that it was released by Apple, and in 1992 by Microsoft. Charlton Lui integrated the TrueType Rasterizer with the Macintosh font manager and Mike Reed developed Royal, the first font production tool, to produce TrueType fonts.

Windows prior to 3.1 mapped any printer font to Helvetica or Times Roman. Windows 3.1 was only a 16 bit program and that provided some hurdles for adaptation of Kasila's 32 bit program. The type hinting programs that Kasila wrote, failed in Windows and made type conversion more difficult. Type foundries that had made commitments to release their type in TrueType backed off. It was not until Windows 95 that Microsoft's TrueType engine became 32 bit, complete, and reliable (Penney, 1996). The TrueType fonts that did come to market for the Windows were not of high quality, giving TrueType and overall image of being inferior to PostScript.

TrueType's code name was "Bass" since it is scalable and then later Royal. In the beginning they were not even certain that it was going to be used by Apple. Kathryn Weisberg was instrumental in convincing Apple to use it.

TrueType is based on a collection of font shapes of points and hints in well-organized tables, instead of the bézier curves and the vector shapes of PostScript. TrueType uses the outline and the hints to render a bitmap in the size requested. Hints are the algorithms that distort the scaled font outlines to improve how the bitmaps look at specific resolutions (Edson, 1993) especially small sizes.

Apple first included TrueType in System 7, in 1991, and Microsoft included TrueType in Windows 3.1 in 1992. The first TrueType fonts for the Macintosh, were Times Roman, Helvetica, and Courier. Monotype helped Microsoft provide the core set of fonts for Windows, including Times New Roman, Arial and Courier (Penney, 1996).

THE TYPOGRAPHY ADVISORY GROUPS & DESIGN TEAMS

Each group involved in bringing type and technology to the computer realized the importance of type to its acceptance and developed type groups to either work with the technology and implementation, purchase and license, or hire designers to develop type-faces.

ADOBE

Adobe was the first to decide and develop their Typography Design Group in 1984 when they hired Sumner Stone, to head the department. Stone developed a Type Advisory Group as well as established a staff of type designers and created the Adobe Originals program. "We had the ideas of fonts not as derivatives of what had gone before, but as something fresh and new designed just for this technology," describes Carol Twombly and the idea behind the Adobe Originals program (Pfiffner, 2003). However, the quickest solution, to the demand for digital type faces, was not to start from scratch, but for Adobe to make digital revivals of centuries of old classic typefaces. Carol Twombly says "Our objective was to prove to the book world that digital type could be of high quality. Back then digital type had a poor reputation" (Sine, 1996).

The core of the Adobe Type Design Department started out with Sumner Stone and then in 1987 and 1988 added Roger Slimbach and Carol Twombly who had been working as freelance designers for Adobe. They were later joined by Fred Brady and David Lemon. They also commissioned freelance designers to create typefaces which included David Siegel and Tekton. Sumner put together a Type Advisory Board that included publication designer Roger Black, Yale University Design School chair Alvin Eisenman, stone carver and letterer Stephen Harvard, and letterpress printer Jack Stauffacher. The group also included Lance Hidy, Fred Brady, Jim Wasco and some international type designers such as Gerard Unger and Erik Spiekerman (Pfiffner, 2003).

Sumner Stone became one of the first and one of the biggest players in the development of digital type faces. He helped decide on the 13 typefaces that would be included with the original LaserWriters. Stone developed his love of design and typography while taking calligraphy classes at Reed College in Portland, Oregon. After stints at Hallmark and designing wine labels he decided to go into type design. He agreed to come to Adobe, if he could still pursue designing his own type. He left Adobe in 1989 to start his own digital foundry, called Stone Type Foundry. Some of the typefaces that he designed include Arepo, Silica, the Stone and ITC Stone Serif and Sans series.

Carol Twombly a graduate of Rhode Island School of Design and Stanford's Digital Typography program was hired by Adobe as a freelance designer, becoming a member of the Adobe Originals program in 1988. She likes to base her designs on history and is inspired by the out of doors. Carol takes up to two years to design a typeface. She does not like to see her typefaces overly stretched or condensed, because it distorts them and she gets very upset when she sees her designs pirated. Some of the faces she has helped to digitize and designed include Trajan, Charlemagne, Lithos, Adobe Caslon, Viva, Nueva and Myriad, which she designed with Roger Slimbach.

Roger Slimbach is another type designer on the Adobe staff. He joined Adobe in 1987 after working seriously on type and calligraphy in the type drawing department of Autologic in Newbury Park, California. He draws his inspiration from classical sources. He has designed faces for ITC and Adobe. His original designs include Cronos, Adobe Garamond, Adobe Jenson, Kepler, Minion, Poetica, Utopia and Myriad, which he designed with Carol Twombly.

Steve Jobs was never one to leave things alone and was also influential in the decisions made about the fonts included in the 35 PostScript LaserWriter fonts. He had quirky tastes in type and a strong personality, and had to be involved in the process, so it was a challenge for Adobe's Type Group to keep him under control.

Adobe started out with the original 13 faces in the PostScript printer in 1985, then it grew with the LaserWriter to 35 fonts. By 1986 the Adobe type library had grown to 100 fonts. "By 1990" Roger Black says "it felt like we had all the fonts. By 1993 there were 10,000 PostScript fonts. By now it must be 100,000" (Pfiﬀner, 2003). "Not since the beginning of hot metal type had there been such a prolific period of type development—and the digital-type era quickly surpassed even that in terms of the number of fonts produced and the number of people designing them. Adobe's library alone today carries more than 3,000 typefaces" (Pfiﬀner, 2003).

Never completely focused on typography as its main goal in its business plan, Adobe in 1992 cut its type group in half and eliminated its type advisory board (King, 1999). This was probably as a result of Sumner Stone leaving in 1989. He had been the leader in keeping Adobe focused on type and typography. Although the largest holder of type designs, Adobe still considered itself a software company, and the type faces just an off shoot of PostScript.

APPLE

The Role of the Apple Fonts Group was much different than Adobe's. They were not interested in designing typefaces or distributing them and instead pursued licensing fonts already available and developing the new technology of TrueType. In some cases the type they licensed was to be used, to specifically emphasize their current type technology. They licensed fonts from all of the major developers. Their type staff was in charge of the hinting and adaptation of the licensed fonts to TrueType.

Their Fonts Group mostly consisted of their TrueType team of programmers and staff. That included Sampo Kaasila, the Technical Lead; Kathryn Weisberg, management and worked on hinting the first fonts; Charlton Lui, worked on integrating the TrueType rasterizer with the Mac OS system; Mike Reed, worked on Royal - TrueType design tool (Penney, 1996).

MICROSOFT

The role of the Type Group at Microsoft was similar to Apple's. They were responsible for licensing agreements with type foundries and freelance designers and adapting those fonts to TrueType, including hinting.

Roger Norton was hired in 1991, by Steve Shairman, the head of typography at Microsoft, at first to review the hinting in the core TrueType fonts. So intrigued, he stayed until 1997, and had a significant influence on preserving the letter forms within the confines of Microsoft, which was almost an impossible task. Norton came from London, England where he first had a phototypesetting and instant print service. He partnered with Alphatype to produce photo matrixes for fonts for the first multi-font phototypesetters. Then when the laser printer arrived he put together a type design school and designed and sold typefaces of his own. His first type face was Else while he was working for Alphatype. Some of the other type fonts that Robert Norton designed include Horley, and Raleigh.

Bill Hill headed up the typography group at Microsoft from 1994 to 1998. He had a strong background in the early days of desktop publishing and concentrated on increasing readability of type on screen. He commissioned Matthew Carter to create Verdana and Georgia typefaces, specifically designed for screen readability.

Some other members of the type group at Microsoft include David Glenn, Andrew Pennock and in house designer Vincent Connare designer of Trebuchet and Comic Sans. Their type advisory group was different than Adobe's in that they developed an alliance with Monotype for most of their typefaces and worked with type designers on a freelance basis, instead of developing an inside type design team. Some of the designers involved in typefaces offered in Windows or sold by Monotype include Kris Holmes, and Charles Bigelow.

HISTORY OF THE FONTS

Although the Apple II computer was first sold in 1977 it wasn't until the Apple Macintosh in 1984, with its mouse and graphic user interface that the Macintosh had the potential to become the leader in the graphics industry. It is the early alliance with Adobe and PostScript, and PageMaker that put graphics on the desktop in 1985. Adobe introduced its 13 PostScript LaserWriter fonts in 1985 and another 22 in 1986. Then in 1990 Adobe released ATM, and its expanded selection of postscript fonts. Apple's system for fonts from the beginning until System 7 was what they called QuickDraw. It used bitmap fonts only, and the printer driver switched out higher resolution typefaces for the screen fonts when the print job was sent. System 7 and its True Type fonts were released in 1991.

While Adobe and Apple have been working on expanding the Macintosh platform and pushing the interest in desktop publishing, the sleeping giant of Microsoft and the Windows platform was working hard to catch up. Although the first IBM PC was released in 1981, Windows 1.0 in 1985, and PageMaker for the PC in 1987. It wasn't until the release of Windows 3.1 in 1992, with its 13 True Type fonts, that the PC and Windows could even produce quality printing of typefaces.

In the chart on page 12 are lists of systems, software, fonts, and versions of fonts released. Screen fonts are in white boxes, since they are monospaced and only used as system fonts. The history behind the fonts, designers, developers and others that influenced their position on the computer is an interesting study.

THE TYPEFACES AND THEIR SOURCES

The speed at which the typefaces were brought to the computer was incredible compared to the years needed to design a typeface and the time it took in the early 1500s to punch cut a typeface out of metal and punches. There is a story behind each typeface including where the font came from, and who designed the font.

However there is one major legal problem with typefaces, type names can be protected, but the designs can not, by copyright laws. Judges consider the letter shapes in the public domain. This enables a lot of piracy and knock off versions. Many times a font is pirated within a few months of being released. Richard Sine in his on line article *Type Minds* quotes Cynthia Hollandsworth, type distributor for Agfa Compugraphic, and an industry expert as saying that her opinion "is that 80% of all fonts in use are illegally produced" (Sines 1996). This legal flaw leaves a loop hole for fonts to be copied, pirated, imitated and renamed. So in the end they may look a like, but come under a different name.

Most of this started with the old hot metal type foundries and proprietary equipment. Each different piece of typesetting equipment had to license fonts from the foundries for their machines. Linotype had their equipment and typefaces and Monotype had theirs. If your client specified a font that belonged to the other equipment manufacturer you were out of luck to set that type unless you developed your own similar but different version with another name for your equipment. This same system continued on with phototype-setting equipment.

When Adobe went to license typefaces for PostScript, they realized getting type from the most highly acclaimed foundries would give them a greater chance of acceptance among the advertising world. They first approached Compugraphic, then the leader in phototype. They turned them down, but Linotype was more agreeable. They then pursued International Type Corporation (ITC), the leading provider of type fonts to New York's advertising agencies. ITC's faces had a reputation for being high quality. Although it would seem like ITC was selling out, in the end it enabled ITC to survive the digital transition.

ITC, founded in 1973, by Aaron Burns and Herb Lubalin had developed a new way of marketing their type fonts. They sold licenses to different typesetting system manufacturers to use ITC type on their machines. This business model has become the standard for digital type. Bitstream, with Matthew Carter, followed them in 1981, as the first digital type foundry. They also were designing typefaces and licensing their use to phototypesetting manufacturers.

Monotype was slow to jump on the digital bandwagon and was on the verge of bankruptcy before it came to agreement with Microsoft to provide its faces for use in True Type. Microsoft, never one to spend more than it had to, or obtain license agreements,

Early Digital Font Sets

Macintosh System 7 TrueType		Adobe Type Manager 3.8 PostScript		LaserWriter 35 PostScript		Windows 3.1 TrueType	
Times	Times Roman	Times	Times	Times New Roman	Times New Roman		
Courier Regular	Courier	Courier	Courier	Courier New	Courier New		
Helvetica	Helvetica	Helvetica	Helvetica	Arial	Arial		
Symbol	Symbol	Symbol	Symbol	Symbol	Symbol		
				Wingdings	Wingdings		
Palatino	Palatino	Palatino	Palatino	Book Antiqua	Book Antiqua		
			New Century Schoolbook	Century Schoolbook	Century Schoolbook		
			ITC Bookman	Bookman Old Style	Bookman Old Style		
			ITC Avant Garde				
			Zapf Chancery	Monotype Corsiva	Monotype Corsiva		
Chicago	Boton						
Geneva	Berthold Baskerville						
London	Poppl-Laudatio						
New York	ITC Anna						
Monaco	Boulevard						
	Giddyup & Giddyup Thangs						
	Tekton - R/I/B/BI						

Released in
1991

ATM 1.0 first released in
1991

Released in
1986

Released in
1992



Fonts Supplied in Software



Additional Fonts Supplied in Additional
Microsoft Products Included for Comparison



System Fonts

Sources: <http://www.microsoft.com/typography/fonts/atm.htm> and Inside The Publishing Revolution by Pamela Pfiffner (2003)
Only font family names are included for clarity not variations of font families.

got a deal from Monotype. Now Microsoft, like typesetting equipment owners before it, wanted to have the same type faces in Windows, that were on the Macintosh. Monotype didn't have licenses to Linotype fonts, but had developed plenty of close, but different knock offs for their Monotype typesetting equipment, to compete with Linotype's. It also had licenses for some fonts from ITC that were included in the TrueType Windows 3.1 core fonts. "ITC sued Monotype for breach of contract after the release of Windows TrueType Fonts. Monotypes contract with ITC specified that it was not allowed to sell "similar" designs in the same markets. They found someone to testify that the typefaces were not similar and the court bought it" (Lemon, 1996). In 1992, the company was split up. The half of the company that included type, continued on as Monotype Typography and in 1998 was purchased by Agfa.

Many of the fonts first chosen to be converted to digital were already in use in the first office printers during the early 1980s. "The early machines developed by IBM used fonts supplied by Monotype, the early fonts on the Xerox machines came from Linotype. Some of the typefaces included in the IBM 4250 were Courier, Prestige, Letter Gothic, ITC Avant Garde, Mono Baskerville, Mono Bodoni, Mono Century, and Cent Schoolbook, Helvetica (from Linotype), Optima, Palatino, Rockwell, Souvenir, Times New Roman, and Universe. With IBM's 3800 laser printer, IBM wanted a functional equivalent to Helvetica, so the original Arial bitmaps started here. However IBM named all of the fonts after rivers in Colorado so it was initially called Sonoran Sans" (Boag, 1996). The goal at first with personal computers was to be accepted as business machines. The typeface choices for the computer were based on that tradition and that business goal. The result was a set of core fonts of Times/Times New Roman, Courier/Courier New, Helvetica/Arial, Symbol, Palatino/Book Antiqua, Century/New Century Schoolbook and ITC Bookman/Bookman across Macintosh System 7, Adobe Type Manager, PostScript LaserWriter and Windows 3.1.

As the stories of the fonts unfold, past typesetting history, legalities of copyrighting fonts, and competition between the foundries and the platforms, makes for some interesting type tales. A comparison of these core fonts, history and differences can give us insight into how to use them. Some of the additional choices that did not have duplicates in other systems and software are also interesting to study. These include Boton, Berthold Baskerville, Poppl-Laudito, ITC Anna, Boulevard, Tekton, ITC Avant Garde, ITC Bookman, Zapf Chancery and Lucida Bright.

TIMES & TIMES NEW ROMAN

"Times" was originally designed by Victor Lardent and supervised by Stanley Morison, for use by *The Times* newspaper in London in 1931, (Livingston, 1998) and originally cut by Monotype Corporation in England. Stanley Morison was the supervisor of the type cutting program at Monotype and influential in the return of many classic revivals of type faces such as Gill Sans, Bembo, Baskerville and Fournier. The design was also licensed to Linotype, because *The Times* used Linotype equipment. "Times Roman" is the name used by Linotype and registered as a trademark in the United States.

American Linotype Company applied during World War II for registration and trademark of the name "Times Roman" as its own. Linotype, not Monotype received the registration in 1945. In the 1980s, someone applied to Rupert Murdoch who owned *The Times*

to use the name. Legal action resulted in clarification that Monotype has the rights to use the name in the U.S., despite Linotype's registration.

The result of all this legalese can be seen on the computer today. Linotype and its licensees like Adobe and Apple continue to use the name "Times Roman" while Monotype and its licensees like Microsoft, use the name "Times New Roman".

"Times" was originally designed with short ascenders and descenders to save space. After using it exclusively for its first year *The Times* released the type, in 1933, for general use. During the transfer of faces from metal to phototype and to digital the versions changed between Linotype and Monotype. Particularly with the PostScript version by Adobe. It was one of the first typefaces to be used with the LaserWriter and was quickly transferred to PostScript. However, the width metrics, and various details were different, as a result of PostScript implementation.

In the late 1980's, Monotype redrew its version to match the Adobe Linotype proportions and metrics, and claimed it was better. At the same time, using digital masters from Linotype, Adobe upgraded its version of "Times", and claimed its version was better. These subtle differences could hardly be noticed by the average user.

Then came the TrueType versions, Microsoft produced its version of "Times New Roman" licensed from Monotype and Apple produced its version of "Times Roman," licensed from Linotype. They both spent a great deal of time trying to prove their TrueType version was better than the PostScript one. Just about the same time Adobe released ATM with another updated version of the font and improved rasterization on the screen. As a result of this competition, of who can produce the best, "it became the litmus test for the quality of font formats. Never before, and probably never again would so many engineers and computer scientists, pay so much attention to the precise placement of pixels in 's' serifs or 's' curves" (Bigelow, 1994).

COURIER & COURIER NEW

Courier New was created by Howard Kettler and sold to Microsoft through Monotype. It was originally designed as a typewriter face for IBM, it was redrawn by Adrian Frutiger for the IBM Selectric series. Courier was chosen for inclusion in by Adobe in PostScript based on the tradition of business typefaces in use at the time. Courier was also in the public domain and did not require a license fee.

It has a the typical pitched face design from the typewriter and monotone in weight and slab serif (Microsoft, 2003).

Adrian Frutiger was born in 1928 in Switzerland. He created some of the first typefaces for the photocomposition typesetting system. He served as a consultant to IBM and the Stempel Foundry in Germany. Some of his most famous typefaces includes Frutiger, Avenir, and Univers.

Courier

ABCDEFGHIJKLMNPOQ
RSTUVWXYZÀÁÊËÏÖÜ
abcdefghijklmnpq
rstuvwxyzàáéîöü&
1234567890 (\$£., !?)

identifont.com

HELVETICA & ARIAL

Helvetica is a revised Swiss version of a German realist face. Max Miedinger originally drew the face in 1956, based on Berthold foundry's old Odd-job San serif, or in German Akzidenz Grotesk. It was developed by the Haas foundry of Switzerland, which later merged with Linotype, who heavily promoted it. Helvetica became an icon of the Swiss

school of typography and was very popular in the '60s "as a symbol of modern, progressive and cosmopolitan attitudes" (Simonson, 2002). It was used for nearly everything in the '70s. So it is no wonder that Adobe included it as one of the four faces in the original PostScript software. Adobe licensed its version from Linotype.

As a result of Adobe's PostScript and its Type 1 protected format, designers could only obtain a true Helvetica from Adobe. This created a big demand in knock offs and imitations of the first PostScript typefaces. One PostScript clone sold by Birmy included a Helvetica imitation called Arial, developed by Monotype (Simonson, 2002).

Arial is a loose adaptation of Monotype's Grotesque series, redrawn to match the proportions and weight of Helvetica. From afar Arial's appearance matched, and it was easy to substitute Arial when Helvetica was specified. "Now Monotype could have made an exact copy of Helvetica and gotten away with it, like the many other foundries that developed faces called Triumvirate, Helios, or Megaron, but they were too respectable. So instead they designed a typeface that had the exact same proportions and weight but was slightly different (Simonson, 2002)." So instead of a copy it is an imitation.

Microsoft included Arial as part of TrueType in Windows 3.1. Probably because it was cheaper, and most people would not be able to tell the difference (Simonson, 2002). Apple paid Linotype's fee and included Helvetica in its TrueType font set. The popularity of Windows has created an atmosphere where people now think that Helvetica is an imitation of Arial rather than the other way around. Arial has replaced Helvetica as the standard font in practically everything done by nonprofessionals in print (Simonson, 2002). Arial has a stigma in the world of professional designers as a cheap knock off, but the rest of the world including clients request it, because it is on their computer, and they want their materials to match. It has spread throughout the digital realm as a result of Microsoft's success.

The most noticeable differences between Arial and Helvetica occur in a few letters, lower case a, t, upper case C, S, G, R. In the "a" there is a difference in the tail (Helvetica is bigger and curves up) and where the top stroke of the bowl of the a joins the stem. The top of the lower case t in Arial is cut off at an angle. The ends of the strokes of the Cs and Ss are horizontal in Helvetica and angled in Arial. The cap G in Helvetica has a tail. The leg of cap R in Helvetica is more rounded, where the Arial version sticks out straighter.

aa tt CC SS GG RR
Arial vs Helvetica

SYMBOL

Symbol is also a typeface in the public domain of which Adobe has an untrademarked version and Monotype has their version created in 1989. It contains the "Times New Roman" version of Greek capitals and lower case, figures and basic punctuation with an assortment of mathematical symbols, and Pi characters. Aldo Norvarese is credited with designing ITC's version of this font.

Aldo was born in 1920 and grew up in Italy, where he began his studies in printing trades in Turin. At 16 he joined the Nebilolo Foundry in Turin, which dates back to the 14th century. He was imprisoned during the war. After the war he returned to be and Art Director at Nebilolo. In 1975 he left Nebilolo to work as a freelance typeface designer. During this time he developed an international reputation for type design and he continued to work up until his death in 1995.

PALATINO & BOOK ANTIQUA

One of the earliest and most successful typefaces designed by Hermann Zapf, Palatino has been produced in more formats than many other faces. Those formats include foundry metal, Linotype, phototype film, transfer sheets, digital forms include PostScript Type 1, TrueType and countless other proprietary formats. Palatino is found on almost every PostScript printer and comes standard with Apple Macintosh operating systems.

The name Palatino relates to the 16th century Italian calligrapher, Giovanni Battista Palatino, but the typeface was not based on any alphabet by Palatino. The real origin of the name is actually Mons Palatinus – the Palatine hill in Rome (Bringhurst, 2002).

Herman Zapf designed Palatino following World War II in 1948, and based its design forms on Italian Renaissance letter forms. August Rosenberger at Stempel Foundry in Frankfurt first cut the letter forms by hand. Palatino is a text and a display face with the distinct characteristics of Zapf's calligraphic style. Robert Bringhurst in his book *The Elements of Typographic Style*, describes "Palatino is superbly balanced, powerful and graceful."

Herman Zapf was born at the end of World War I in Germany. He started work as a photo retoucher, but changed to lettering after seeing an exhibit by Rudolph Koch. He went to work for Stempel Foundry and ended up in charge of its typefaces. It was a trip to Italy that gave him his inspiration. He designed many fonts, most during the 1950s in addition to Palatino, they include Optima, Aldus, Melior, still all considered classic typeface designs.

Adobe's digitized version is based on the updated Linotype version made for phototypesetting equipment in the '60s. Zapf complained that they should have used more updated forms for conversion, and Adobe updated its letter shapes a few years later. The original version designed for Linotype composing equipment had different lower case v, w, p, and q. The version we now see everywhere is a more rigid and crisp interpretation, made necessary by today's technologies. Palatino of today still carries the charm and calligraphic style of Zapf's typefaces.

Bitstream's digital version of Palatino, is called Zapf Calligraphic, which the digital conversion was overseen by Zapf himself, and was packaged with CorelDraw 4, 5, 6, and 7. This version has longer descenders than the metal type version.

URW foundry has its own version of Palatino, called Palladio. Sanctioned by Herman Zapf, but they were unable to purchase the name from Linotype.

Microsoft's knock off of Palatino is Book Antiqua from Monotype. Herman Zapf was so upset with its release, because it was such a close out right copy. Palatino holds the distinction of being the most pirated type style out there, because of its popularity.

Zapf oversaw the OpenType (discussed in the last section) release of Palatino, which was issued in 2000, it includes Greek, and Cyrillic character sets.

NEW CENTURY SCHOOLBOOK AND MONOTYPE CENTURY SCHOOLBOOK

The original schoolbook type was designed by Morris Fuller Benton. The American Type Founders were originally commissioned by Ginn & Company to design a typeface with maximum legibility for elementary school texts. The New Century Schoolbook ver-

sion is a Linotype's reversion of ATF's design. This typeface dates back to the era from 1917 to 1923 and is sufficiently old that it can not be covered under copyright law.

Morris Fuller Benton was the son of a type founder and the inventor of the matrix cutting machine. He produced over 180 different type faces showing a broad spectrum in the design of his typefaces. He is also known for his designs of Hobo, and Broadway.

ITC BOOKMAN AND BOOKMAN OLD STYLE

ITC Bookman was designed by Edward Benguiat with a large x-height and moderate stroke for contrast and high readability. Bookman Old Style is Monotype's version and does not appear as dark or as heavy as the ITC version.

Edward Benguiat, designer of Bookman, is an American type designer who was educated at Columbia University and Workshop School of Advertising Art. He joined ITC in 1970, and was heavily influenced in his typeface designs, by the revival of Art Nouveau.

ITC AVANT GARDE GOTHIC

Avant Garde was based on the distinctive logo designed for Avant Garde magazine in 1967, designed by Herb Lubalin. It was redrawn in 1970 to include lower case letters, by Herb Lubalin and Tom Carnase.

Herb Lubalin was an American designer and typographer who worked in New York City. He was born in 1918, went to Cooper Union School and was Art Director and later Vice President at Sudler & Hennessey. He left in 1964 to form his own design firm. He was very an innovative typographer and rejected the European functional design philosophy. He exploited the possibilities of photocomposition and used his editorial positions as an outlet for his design. Lubalin was a co-founder of International Typeface Corporation. He died in 1981.

ITC ZAPF CHANCERY AND MONOTYPE CORSIVA

ITC Zapf Chancery is one of the many fonts designed by Herman Zapf. He based this face on the chancery handwriting, developed during the Italian Renaissance for use by the scribes in the papal offices. This type font barely won out over Steve Job's choice of Gorilla to be included in the Adobe LaserWriter 35. Herbert Zapf's biography was covered under Palatino. Monotype Corsiva is of course Monotype's version of Zapf Chancery.

LUCIDA BRIGHT & WINGDINGS

The Lucida family of type faces is according to Robert Bringhurst in his book *The Elements of Typographic Style* the "largest family of typefaces". It includes not only serifed and unserifed faces but also Greek, Cyrillic, Hebrew, a phonetic character set, a set of math symbols, swash, black letter, script, a casual version, the Bright, Fax and a fixed pitch Console version."

Lucida Bright was designed by Charles Bigelow and Kris Holmes and included in Microsoft products. The bright group had a higher contrast and was designed to be used under low resolution. It was designed to look and print well under low resolution.

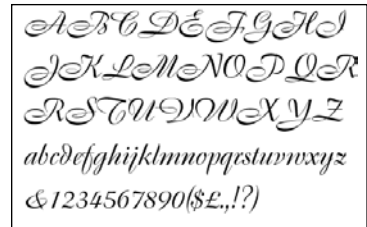
Charles Bigelow was a professor of digital typography at Stanford from 1982-1997. Some of his students included Carol Twombly, David Siegel and Tom Rickner. Bigelow and Holmes also developed an accompanying font to Lucida called Wingdings.

BOULEVARD

Boulevard is a combination of a brush script and calligraphy style typeface, designed by Günther Gerhard Lange. This font is an unusual addition to the ATM group of typefaces.

Günther Lange was born in Germany in 1921. He served in the military and lost his leg. He returned to his studies in Leipzig under George Belwe, served as a professor at the Leipzig Institute and then worked as a freelance artist in Leipzig. In 1949 he moved to Berlin, studied further at the University of Pictorial Arts and then returned to freelance work with his first major client being Berthold AG. He served as artistic director there from 1961 until 1990.

Boulevard



identifont.com

TEKTON

David Siegel of Palo Alto, made Frank Ching's handwriting into Tekton. He admired Ching's writing and drawing and asked him to write out several sheets of letters so that Siegel could scan them in and convert them. Siegel says "many of the final letters were not actually Ching's, they were a combination of the letters from the multiple versions that Chang wrote of each letter. It took him seven weeks to design the face. He claims the hardest part was coming up with a name. It was released by Adobe in 1989, and was a huge hit. Although initially designed for use by architects, they almost never use it. Instead it has appeared as the opening for "Home Alone" and been used in McDonald's commercials (Sine, 1996).

Tekton Medium

a b c d e f g h i j k l m n o p q r s t u v w x y z
A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

THE FUTURE TYPE TECHNOLOGY - OPEN TYPE

While True Type has been a staple for fonts on Windows since version 3.1, Apple has changed technology more than a few times. They started out with QuickDraw, picked up PostScript and later ATM, adapted to TrueType, developed multiple masters and tried to bring back QuickDraw in a GX format. Multiple Masters, never caught on, allowed each font to be converted in to different versions, such as bold and extra bold from the same font set. QuickDrawGX died an even quicker death when Adobe refused to support it in its software, and other type developers did not want to take the time to convert their fonts. Another font technology announced in 1998 is ClearType, which delivers better readability on LCD screens, and will be a crucial element in eBook technology.

The latest in font technologies is Open Type. In 1996 Adobe and Microsoft agreed to partner in developing what they believe to be the next font technology. Based on Apple's TrueType and covering Adobe's PostScript 1, it puts all the font folders in a TrueType wrapper and enables it to be used across platforms. One of the biggest advantages is it is designed to provide superior type rendering on the computer screen. The other is the expanded font set. Prior technology only allowed 256 characters in a font set. Open Type will support Unicode, which allows for 64,000 characters in a font set. This allows for all the characters for every language, each with its own identification. Apple and Adobe are claiming this as the final end to the "font wars".

IN CONCLUSION

Understanding where and how the typefaces on the computer evolved, helps everyone who works with those typefaces to use them effectively. To understand why clients request Arial, why there are so many different typefaces that look the same but have different names, enables us to design better.

The type technologies of yesterday, helps one to understand the technologies of today and the technology needs of tomorrow. When you sit down next to your PC or Mac, look for the core fonts, they are still there working hard for you, they are just completely surrounded by the thousands of faces that followed their migration and development to the computer.

Many of the old school typographers state that there was a decline in type quality and typesetting when it migrated to the computer. That may be the case, but never has there been a more educated general public on the fonts they see on the computer. One of the responsibilities of today's design professors is to develop a knowledge and love for typography in our students. Who can say which type technology was the best? We do know that because of the computer we have more typefaces, good or bad and can do more things with our type, good or bad, than was ever available before. Understanding what came before will help them to understand how to design with type in the future.

AFTER THOUGHT

I watched the migration to computer for typesetting. I returned in time to see the old typesetting machines move out and the computers, slow at first and now much faster replace them. At the newspaper, employees who had worked in paste up or the dark room for more than 20 years, had to learn to set type or use Photoshop. Most left. The typesetter in Cleveland, that was in its third generation when I first worked there in 1982, converted to a service bureau and finally closed its doors. They were on the 8th floor of the Caxton Building, at the time a building for the graphics industry. Now behind Jacob's field the building was empty when the stadium was completed. All of the graphics industries housed their in the '80s had left or folded. They renovated the building and new technology moved in, but that old graphics era was gone for good. I wish my father could see some of my work today. His little Word Star word processing system was just a small glimpse of what was to come with Quark, Photoshop, Freehand and the Internet.

The type used for this paper is Verdana, designed by Matthew Carter for better viewing on the screen. It makes for easier writing on the screen as well, and is easy to read on paper with a large x-height. I could not bring myself to use the type fonts covered in this paper to type this paper. Times and Helvetica are so over used, and Courier is the default when you do not have the correct type face loaded, and makes me feel like I have made a mistake.

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