Fonts and PostScript*

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Historical Background

Our view of fonts, of the way that they fit into publishing systems and of the ways that we use them, is shaped by the characteristics of the vanishing systems that have been in use for the past century. Digital publishing systems differ profoundly, offering possibilities that are only starting to be appreciated. The wide distribution of the page description language PostScript and the promise of the recently announced Microsoft/Apple PDL offer a standard for font distribution and use on which this realization could turn. To understand the promise of digital technology and the new PDLs we must examine the accepted perceptions of fonts, which have been largely shaped by vanishing technologies.

We normally think of a font as a fixed design. Twenty-five years ago we would have envisioned it as one size; now we typically envision a series of sizes, but in either case we think of it as a design with weight and proportions rigidly established by the creator or supplier.

Five centuries ago, before the introduction of Gutenberg's technology, this rigidity would have appeared very strange to the scribe, free to modify the proportions and weight of his hand as the work required. The fixed form of Claude Garamont's type was required by the rigid limits of Gutenberg's metalsmith technology, limits that existed one way or another for five centuries through the ages of mechanical and photocomposing equipment until the recent appearance of the digital pixel field. Donald Knuth's METAFONT, Peter Karow's Ikarus system (now appearing on the Macintosh and PC) reintroduce the concept of the font as a fluid series of hundreds of designs available to the user, varying in weight and proportion but held together by the principles common to the series as laid down by the font designer. URW is working out serif and sanserif typographic series where a full set of hundreds of changes is rung on the principles of a single design. The supply of ever growing numbers of the implied members of each type family is perhaps the most

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obvious change in the typographic world over the last thirty years.

Patterns of distribution have also been changing. A century ago, in the world of handset type, fonts from any typefoundry could be freely mixed; the only difficulty was the varying standards for type sizes between foundries — a difficulty that all but vanished with the establishment of the standard Didot and then Pica point systems. The engineering specifications of handset type can be seen as the first great page description language.

The introduction of mechanical composing machines at the end of the last century limited the user to the typefaces supplied by the manufacturer of that equipment (plus in some cases auxiliary companies). Several limited type libraries, each available on one company's composing machines, replaced the single great handset library available to everybody in common form from hundreds of foundries worldwide. This division was caused by the mechanical differences between composing machines, each of which required fonts to be manufactured in a different form. Different font libraries continued to be required through the age of photocomposing machines, and can only be reunited with the advent of digital composition and page description languages like PostScript.

During this century of competition between composing machine manufacturers, the leaders have sought to gain and maintain advantage by the introduction of new and better typefaces peculiar to one line of equipment. They have sought intellectual property protection for typefaces to reinforce their advantage. Lawmakers worldwide were faced with the choice between granting the providers of composing machines with rights to limit distribution of typefaces or denying rights in order to encourage broad distribution of typefaces. Until recently, with few exceptions, law has decided worldwide in favor of broad distribution. As the advent of the common pixel field and page description languages has opened typographic supply channels, effective protection for type designs has begun to appear.

We frequently hear from European companies that European law has granted protection unavailable in the U.S. The real difference between Europe and the U.S. has centered in a tendency for greater cross licensing and cooperation among the older companies in Europe. In the U.S., companies like Photon, Autologic and Compugraphic were formed to exploit the invention of photocomposition machines. Typically they equipped their machines with large libraries centering on unauthorized copies of their competitors' typefaces, fonts that had become

popular in the market place and were seen as necessary to achieve sales. Over the last forty years, these unauthorized copies have been, and continue to be, distributed throughout America, Europe and the world with impunity. Usually the unauthorized copies are called by an alternative name — although even this is not always so. The older European companies have been unable to block sales of their new competitors' equipment by forbidding unauthorized copying of their typefaces. However, new law in Germany, France and England is starting to change the picture.

Property Rights

Three forms of protection can be considered for typefaces — patent and copyright for the design itself, and trademark for the name.

Typefaces have been registered under design patent in the U.S. The protection offered has proved uninteresting, being largely limited to ineffective protection of commercially uninteresting typefaces. In Europe, limited protection has been available under minor sections of patent law, particularly in Germany. The period is limited to fifteen years.

There are many who believe that typefaces are an art form best protected under copyright. Protection under copyright law has not been granted to typefaces anywhere until the mid-nineteen-seventies, when activity generated by the 1973 Vienna treaty began to compel new legal analysis.

The difficulties of protecting type designs cause serious concern at A Typ I, the International Typographic Association, headquartered in Switzerland. Until the mid 1970s, A Typ I required its member companies to abide by the A Typ I Moral Code, which forbade any member to copy typefaces cut by another. Linotype caused Berthold and A Typ I serious problems by refusing to license Helvetica to Berthold for text use (after having granted Berthold a license for display use). Berthold was faced with the choice of losing sales on their new text machines, or of resigning from A Typ I. Legal opinion warned A Typ I that the requirements of the A Typ I Moral Code exceeded the requirements of the law– and indicated possible consequences. A Typ I altered the Moral Code to allow members who were refused a license by another member to re-apply after the typeface became fifteen years old (a period based on European minimal patent rights possibly applying to the typeface), and if refused, copy the design and call it by another name (due to the long period of protection possibly offered to the original name under trademark law).

Faced with inadequacy of existing law, A Typ I persuaded WIPO, the World Intellectual Property Organization in Geneva, to sponsor the Vienna Treaty for the Protection of Typefaces. The treaty was executed in June 1973. The Vienna Treaty requires nations who ratify the treaty to offer at least the protection defined in the treaty, including a minimum period of fifteen years protection. The treaty permits protection under full patent or copyright, although special legislation country by country, a slow procedure, was envisioned as the most likely method. Protection in each country was to be granted to typefaces designed after the date on which protection was legislated. Retroactive protection was not envisioned. Twelve nations signed the treaty. The U.S. was not one of the signatories.

In the mid-seventies, probably influenced by the Vienna Treaty activity, a Frankfurt court decided that the typeface Futura created by the German designer Paul Renner in 1927 was a work of art protected under copyright, and that the heirs of Paul Renner were entitled to royalties. The decision implied that major designs by other German type designers working in Germany would be similarly protected by German copyright. In the early nineteen-eighties Germany passed special legislation protecting new typeface designs, and ratified the Vienna Treaty.

France followed with similar legislation, and ratified.

In November 1988, Parliament in England passed an Act which stated that typefaces designed by English designers working in England were covered under copyright, with certain limitations. Users of typefaces (typesetters, printers, publishers) were held harmless. Creators of illegal copies in England or importers of illegal copies are to be held liable. Protection is to be limited to twenty-five years. Status of typefaces that are at present covered by copyright is not clear to me. This legislation took effect in August 1989, with ratification of the Vienna Treaty to follow. Reciprocal rights will be granted to countries offering similar rights; at present this would be limited to Germany, possibly France.

Dominions like Australia and Canada normally follow Britain's lead in international law. When five nations have ratified, the Vienna Treaty will become international law, with a common repository for new type designs in Geneva.

In the U.S., the Typeface Design Coalition and the Font Software Association, stimulated by this activity, plan to reopen the question of protection for digital fonts under U.S. copyright. A bill

for protection of industrial designs at present in committee in Congress contains wording that would offer ten years of non-retroactive protection for original type designs.

A Typ I has now replaced 'fifteen years' in the Moral Code with 'appropriate period', as the period of protection lengthens.

Growing protection, centering in Europe, will encourage purchase of each series from the original manufacturer wherever open systems are found.

Typeface names have been broadly claimed and indeed registered as trademarks through most of this century. However, in spite of broad and frequent claims, in twenty years I have been unable to find case law anywhere in the world. Internationally a true trademark must be an adjective modifying a generic noun that defines the product. No generic descriptions of typefaces are in general use. The only description of the face normally available is the name claimed as a trademark. This situation threatens validity of typeface names as trademarks to the point where suits are seldom pursued; somehow a settlement is reached. While the reality of typographic names as trademarks may be in question, the source of the reputation conferred by licensing is real, and keeps the practice alive.

Fonts for PostScript Engines

The publishing world that buys digital typefaces consists of three main groups:

- the Professional publishing elite growing out of the traditional publishing world;
- the Aware people, desktop publishers who used to buy typeset work from the professionals but now buy digital tools instead to gain control, beat deadlines and save money; and
- the Unaware who were turned off by the expense and delays involved in working with the professionals; accepting lesser quality, they bought typewriters, then word processors, and would benefit today from better typographic imagery, if only they knew it.

The page description language PostScript ties the first two together and with the Microsoft/Apple PDL may prove powerful in the third.

PostScript was initially envisioned as a means of bringing into being the Aware world we now know as Desktop Publishing, with a link to high quality Professional service centers in the professional world. While the Professionals initially regarded PostScript and the Desktop world with

suspicion, this view is rapidly changing, with typesetter manufacturers competing to adopt PostScript as the standard for typesetting centers serving the Desktop world with high resolution pages, using typefaces on Adobe metrics.

The typographic lesson to be drawn from PostScript: the part of the system used by the specifier controls the rest. Traditionally the designer saw proofs from the typesetter — so the screen and proof printer had to match the typesetter in metrics and, as far as possible, in appearance. Now that so many designers have LaserWriters, the typesetter must match the LaserWriter. Adobe has the world by the proofer.

Adobe chose to follow two font paths in releasing the Adobe PostScript implementation. The first comprises a limited group of fonts supplied from Adobe and its chosen suppliers in encrypted format which gave them a favored position at the heart of the system. These Type 1 fonts carry encoded hints that stretch and fit the outlines to give good results on laser printers and, in Display PostScript and the Adobe Type Manager, on screens.

The second group of fonts can be supplied by anyone. Type 3 [sic] fonts can be downloaded into PostScript systems, but suffer disadvantages in the number that can be used at one time, in speed, and above all in quality on laser printers and screens.

Initially Adobe offered Type 1 fonts from Linotype for Linotype faces, from artwork supplied by URW for ITC faces, and for faces of their own design. This limited library has been offered in the fashion typical of composing machine manufacturers over the last century. Instead of the number of sources being limited by the requirements of equipment, the concealment of the hints and encryption of the fonts have limited the supply of Type 1 PostScript fonts to sources licensed by Adobe.

In response to recent pressures for open systems, Adobe partially opened their system at the March Seybold. They announced the licensing of their font technology to Monotype, Compugraphic and Varityper to prepare libraries in hinted PostScript Type 1 format, with further discussions continuing with other major suppliers.

Adobe went the rest of the way at the September Seybold. In response to the Microsoft/Apple announcement of their new page description language, upwardly compatible from PostScript, with wholly open font technology, John Warnock announced the publication of Adobe's font standards for all to use. Adobe's tools for manufacturing PostScript fonts are still to be sold.

The library offered by Apple on the Laser-Writer, driven by the Macintosh, consists of hinted Adobe Type 1 fonts. This equipment has been the leading choice of the Aware segment of the market, selling into Desktop Publishing, with over 200,000 now in use. The effect can most clearly be seen in the adoption of Adobe metrics, or character widths, as a standard across the Aware industry. One of two packages is found at every installation: either the original basic LaserWriter set of thirteen fonts, or the larger LaserWriter Plus set of thirty-five. The widths of the characters in these thirteen or thirty-five fonts are all but required of every manufacturer of applications packages who wishes to sell products into Desktop Publishing.

Because Desktop Publishing installations are using this limited LaserWriter library on this single set of widths, anyone wishing to offer high resolution output must also offer the same fonts on the same metrics if the high resolution page from the service center is to match the page created on the LaserWriter. Instead of the proofer having to match the high resolution imagesetter, the ubiquitous proofer now requires all imagesetters to conform, a measure of the power of PostScript as a standard.

As others beside Adobe bring PostScript systems to market, what is the current outlook for fonts? The need of the PostScript and clone manufacturers for hinted outline-to-bitmap algorithms was initially met by the licensing of Bitstream's Fontware and Compugraphic's Intellifont. Licensees of both these systems were limited to fonts provided by the supplier.

Pressure for open font systems led URW to release Nimbus R, Folio to release TypeScaler and The Company to release Nimbus Q as open systems. Bitstream has announced that outside manufacturers will be permitted to provide fonts for Fontware under appropriate conditions, and Compugraphic has announced that they will similarly open Intellifont.

Folio has been bought by Sun Microsystems and is concentrating on the creation of a display PostScript for Sun. They have no library of their own, but offer the type source of your choice with the Folio TypeScaler algorithm; Monotype, Linotype, Berthold, Bigelow & Holmes have agreed to produce fonts to the F-3 format. They offer an encrypted format, preferred by major foundries as well as an open format that anyone may use. They provide the type source with TypeMaker, an automatic algorithm running on a Sun workstation that transfers the font to their proprietary form

of general conics and automatically adds hints. TypeScaler requires the general conics format.

The Company offers the URW library for Nimbus Q in the standard PostScript Bezier format recommended for PostScript. The Company publishes their format, and also offers to sell all major foundries their PC-based hint insertion software for use and distribution down to the end-user level.

All of the six hint-based systems, the Adobe PostScript implementation, Fontware, Intellifont, TypeScaler, Nimbus R and Nimbus Q, offer comparable quality. Conographics offers a fast hintless algorithm whose quality is said to fall somewhat short of the others.

Berthold and Bitstream share a belief that the real market for a large variety of fonts lies in the high resolution market. They have stated that for this work the laserprinter will be used only as a proofer, with rough, unhinted quality adequate for proofing work that will later be typeset on high resolution systems. Berthold makes a package of 400 Berthold fonts available in unhinted Bezier form for this market. Bitstream goes one step further: having obtained Adobe's encryption they offer a growing library in hintless (at present) Type 1 format. RIPS has also announced fonts in Type 1 format, with more expected to follow.

We have seen four new page description languages emerge in competition with the PostScript rasterizer:

The closest is the version of Display PostScript announced by Sun. The PDL appears to follow Adobe — but the spline used to describe the outlines of the characters in the fonts is the General Conics format provided by Sun's subsidiary, Folio. Sun is expected to offer fonts from all suppliers who subscribe to Folio's F-3 format, encrypted or open, Linotype, Monotype, Berthold, ITC, and Bigelow & Holmes to date. Sun will be under increasing pressure to adopt the Apple Royal or Adobe PostScript rasterizer.

Hewlett-Packard continues to plan PCL-5, a mature version of the original H-P PCL, with font scaling based upon Compugraphic's Intellifont, which to date has been limited to a Line and Arc format. H-P is expected to distribute CG fonts and offer access to CG typesetters. CG has promised to open the format to other font suppliers. Hewlett-Packard is pressed to join the Apple Royal font format.

The most interesting announcement came from Microsoft and Apple at the September Seybold conference. In the spring, Microsoft had announced a new page description language upwardly compatible

from PostScript, while Apple announced their new font scaling technology, called both System 7 and Royal. System 7 can be used to equal the quality and power of present rasterizers at a basic level, but promises advances in screen quality, non-linear font scaling and innovative forms of font manipulation at the expense of complex font preparation. The new PDL promises to run existing PostScript files while adding as yet undefined advances and refinements.

IBM must decide whether to cement their alliance with Next and Adobe by favoring Display PostScript and the Adobe Type Manager, or whether to favor Microsoft and Royal.

The new combination is promised for release in 1990 to the Apple and Microsoft world. The price will be low, the market measured in tens of millions of installations. All font suppliers have been invited to provide fonts in the new public format.

A couple of Seybolds ago, Steve Jobs opened the seminar with four slides:

- A big old $20,000 Wang system from several years before.
- A $200 floppy disc, successor to number one.
- Contemporary desktop publishing technology, Macintosh, LaserWriter and Linotronic L-300, a $50,000 package.
- A $500 floppy disk containing everything necessary for future desktop publishing.

The Microsoft/Apple PDL could be that reality.

One year ago each RIP maker found an attractive font supplier and established a monogamous relationship — Adobe/Linotype, Hewlett-Packard/ Compugraphic, Phoenix/Bitstream, etc. We are witnessing the breakdown of these relationships as, led by Microsoft and Apple, each PDL and RIP maker pursues fonts from all major font suppliers and each major font supplier pursues entry to all major RIPs and PDLs.

Meanwhile, specialist type designers who once concentrated on analog niches (special designs for magazines, ad agencies, corporations, technical composition, non-romans, etc., conventionally produced as 2" film strips) now buy tooling to speed their production of digital outlines to be distributed across the PostScript world and the budding new PDLs. We expect them to be the typographic phenomenon of the early nineties.

Close behind them are the end-users with specialized needs of their own, who with new tools and open systems could conveniently digitize, hint and slip a logotype or a group of special characters into a system in a matter of hours.

As for fonts and PDLs, to quote Jonathan Seybold, "We think that the ultimate answer will have to lie in the domain of marketing, not law. Good designs that are aimed at the mass market — priced low, packaged conveniently, distributed widely and compatible with lots of screens and printers — will generate more revenue than equally good expensive, encrypted, narrowly marketed fonts that only work with one brand of printer."

Where are the PostScript and Royal font markets going?

1. PostScript and the forthcoming Microsoft/ Apple PDL offer the page description languages of choice, capable of providing a unifying link between Desktop and Professional publishing, now that fonts from the necessary manufacturers can be offered in convenient form across systems and typesetters open to all players.

2. Closed font policies have favored a few centralized font manufacturers. The movement of Professional digital font creation and manipulation tools down the market is starting to create many desktop digital typefoundries offering ever greater variety of fonts, down to the personalized level. Open-font PDLs and rasterizers will support and benefit this growth.

3. Growing protection of original type designs can be expected to encourage supply of fonts from many original sources across open markets centering on open, commonly available page description languages.

The need is for imaginatively designed and competently executed series of typefaces. The names of suppliers of good fonts are the real trademarks: ITC, Linotype, Monotype, Berthold, Bitstream, URW, The Font Bureau, etc. The real commodity is the creativity (now under growing protection), the competence and the reputation of the supplier. Truly open PDLs offer a worldwide opportunity for establishing and furthering the position of those suppliers and their reputations, each supplying their own original contributions across the market to a broad range of output devices. Niche players will come into being, specializing in fonts of a given kind. Font publishers are being formed to distribute them to users. Increasingly fonts will be designed by typographers and graphic designers for the world to use.

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