

Histoire de l'Écriture Typographique — le XXIème siècle
(*The History of Typographic Writing — The 20th century*).

Jacques André, editorial direction.

Atelier Perrousseaux, Gap, France, 2016.

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Review and summaries by Charles Bigelow (TUGboat vol. 38, 2017).

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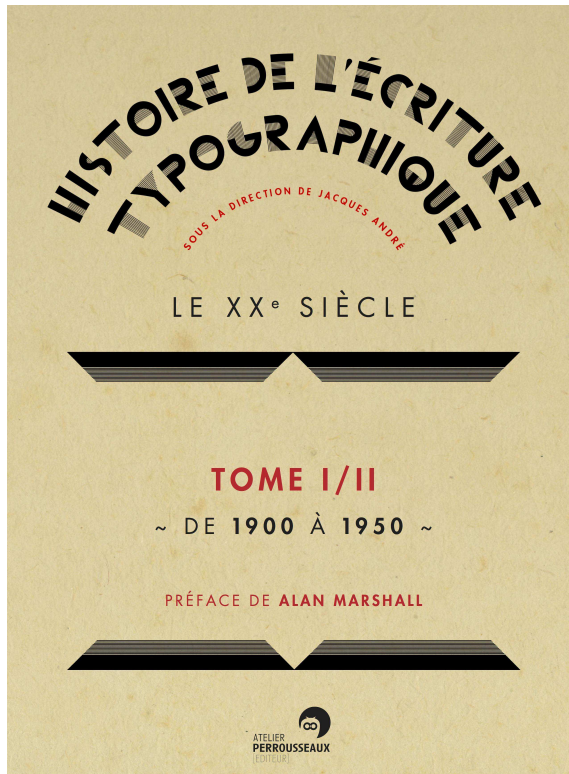
These are the last two volumes in the series *The History of Typographical Writing*, comprised of seven volumes in all, from the beginning of printing with Gutenberg through the 20th century. All are in French. The individual volumes and the series as a whole are available in various electronic and print formats; please see the publisher's web site for current offerings.



**Review and summaries: *The History of Typographic Writing — The 20th century*
Volume 1, from 1900 to 1950**

Charles Bigelow

Histoire de l'Écriture Typographique — le XXIème siècle; tome I/II, de 1900 à 1950. Jacques André, editorial direction. Atelier Perrousseaux, Gap, France, 2016, <http://tinyurl.com/ja-xxieme>. The book is in French. Volume 2 covers the years 1950 to 2000, to be reviewed later.



The 20th century saw the three most transformative innovations in typographic technology after Gutenberg's invention of alphabetic movable type five centuries earlier. Each innovation by turns increased speed, reduced cost, and increased efficiency of text composition. First came keyboard-driven hot-metal composing machines like Linotype and Monotype; invented in the late 19th century, these achieved commercial dominance in the early decades of the 20th century, supplanting most hand-set type. Next came phototype — electro-optical photographic composition; invented in the 1940s, phototype replaced most hot-metal typesetting by the 1970s. Lastly came digital typography; invented in the 1960s, it replaced most metal and photo typesetting by the year 2000. Typesetting occurs prior to print, so these technological changes went mostly unnoticed by readers. By the end of the millennium, however, digital typogra-

phy had begun to supplant print itself, because text display and reading increasingly shifted from paper to computer screen, a phenomenon now noticed by nearly all readers and publishers.

In the 20th century, typography was also transformed by cultural innovations that were strikingly visible to readers. In a profusion of new styles, movements, and polemics, a plethora of avowedly revolutionary “-isms” challenged traditional tenets of typography in zealous efforts to reformulate, abandon, or replace long-held principles of typographic organization and expression.

Some of these cultural movements hearkened back to an idealized typographic past, while others pointed to an idealized future. Our typography today is a mix of such memories versus desires: old and new, traditional and modern, potential and practical, obsolete and avant-garde.

There have been relatively few books on typography that provide deep analysis of its cultural transformations, knowledgeable explanations of its technological progression, and copious illustrations to accompany both aspects.

That is why this book is a milestone in the scholarship and appreciation of modern typography. Totalling 522 well-illustrated pages in two volumes of essays by a group of typographic experts under the editorial direction of Jacques André [1], the books provide an impressive perspective on the typographic art, culture and technology of the past century. [2]

Instead of an overview of the whole book, this review of the first volume gives partial summaries and comments on each of the chapters. This is done for two reasons. First, the book is in French, so the short, mini-summaries may help English-language readers get some idea of the contents and significance of those various chapters that may be of particular interest. Second, because each author writes with different expertise, perspective, and literary style, these mini-summaries may give some hint of the variety of styles and sensibilities in the essays. The book deserves an English edition, but it is hoped that these notes may at least point to what is contained therein.

Here are the chapters of Volume 1.

Alan Marshall: Preface (*Préface*)

The 20th century was one of the most eventful periods in the history of typography, influenced by two major changes, the mechanization of typesetting and the diversification of the use of print. The former advanced typography for *reading*, while the latter transformed typography for *seeing*. The selection and production of typefaces for mechanized composition concentrated mainly on traditional type forms that

are nearly subliminal in extended texts, but for promotion of goods and dissemination of publicity in the increasingly mass-market 20th century, super-liminal type styles were created to arrest, shock, intrigue, seduce, and persuade readers of short commercial messages. As technology and usage changed, traditional methods did not entirely disappear; hand-set display types, for example, were often used in conjunction with mechanized composition of longer texts.

1. Matthieu Cortat: The flowering of the Modern (*La floraison de la modernité*)

From beginnings in the late 19th century English Arts & Crafts movement and French lithographic poster lettering, new typographic styles emerged, especially the flowing, floral, and youthful styles gathered under the banner of Art Nouveau, which exercised international influence on lettering and typography, often in contrast to traditional typographies of France and Germany. The botanical style of Art Nouveau is a recurrent theme in this essay, which ends with an olfactory metaphor: that when the avant-garde moved on to other styles, Art Nouveau typography faded into obsolescence, leaving only occasional whiffs of a flowery perfume in its wake. (This reviewer recommends a whiff of Jacques Guerlain’s “Après l’Ondée” (After the Rain Shower), the quintessential Art Nouveau perfume, composed in 1906 but still in production and regarded as one of the greatest fragrances of all time.)

2. Roxane Jubert: Signs of the avant-garde: the alphabet between construction, system, art and utopia (*Signes des avant-garde: l’alphabet entre construction, système, art et utopie*)

This lucid yet congenial exposition, reminiscent of the essays of Roland Barthes, analyses the explosion of diverse avant-garde movements in Europe, including Futurism, De Stijl, Dadaism, Constructivism, Bauhaus, New Typography, and their effects on typographic forms and organizations. The structuralist approach of the essay effectively elucidates implicit (and sometimes explicit) aesthetic and semiological philosophies of the avant-gardists with their arrestingly visual modularization and segmentation of typographic images, their construction of experimental alphabets, and their integration of typography, geometry, and photography. Even the best English discussions of avant-garde typography are rarely this interesting.

3. Roxane Jubert: The Art Deco Letter: variety, stylization, play, and contrast (*La lettre Art Déco: variété, stylisation, jeu, contraste*)

Art Deco was (and still is) an aesthetic family that encompassed several different but somehow related visual styles. Understanding Art Deco visual relationships is a bit like grappling with Wittgenstein’s remarks on family resemblance — is there a single core element or a set of overlapping similarities? Whatever its visual core, Art Deco influenced poster art, architecture, signage, advertising, and typography and characterized the then-modern era of the 1920s and 1930s, between the two great wars. Despite diversity within the style, multiple connections can be traced among its apparently disparate forms. Of particular typographic note are Art Deco typefaces by designers who are better known today for more sober creations, including Morris Fuller Benton, Rudolf Koch, Imre Reiner, Robert Middleton, and Dick Dooijes. There are also notable designs by artists firmly within the Art Deco genre such as A. M. Cassandre. Unlike the Art Nouveau types, many forms of Art Deco continue to be used today.

Jacques André: First Interlude: The sociology and revival of a type style: stencil (*Pause: Sociologie et renouveau d’un caractère: les pochoirs*)

This absorbing, often amusing, and copiously illustrated exposition proceeds from a hand silhouette in palaeolithic cave painting to the analytic logic of form and counter-form in letter shapes; from spray-painted graffiti to labels on gunny sacks and letters on wine barrels; from slogans on walls to road markers; from signs cut in metal to stencil-like typefaces by Auriol, Jacno, and other 20th century type designers.

4. Nelly Gable and Christian Paput: Perennity of punches and matrices (*Pérennité des poinçons et matrices*)

A clear and beautifully illustrated treatise on type punch-cutting, emphasizing the tools and techniques still used today at the French Imprimerie Nationale. For five and a half centuries [3], punch-cutting has been at the core of every era of typography, practiced by a tiny group of skilled artists whose exquisitely precise work has rarely received public recognition, first because it was necessarily executed in miniature (like the 10 point type you are reading now) and was usually anonymous (apart from in-group knowledge of a few typographic cognoscenti) because type was made in service of the arts of literature and knowledge. Stanley Morison wrote that typography is only accidentally aesthetic, “for the enjoyment of patterns is rarely the reader’s chief aim.” This applies as well to the jewel-like intricacy of finished punches. In this chapter, the methods, tools, and techniques of cutting and proofing punches, and of striking and

justifying matrices, are precisely described and explained, coupled with clear photographs by Nelly Gable and Daniel Pype. Among its side-revelations are the names of the principal French punch-cutters who worked at the Imprimerie Nationale, Deberny & Peignot, and other organizations in the 20th century. Thus, artists who worked mostly in obscurity are rescued to some extent from anonymity. A photo of punches bearing the punch-cutters' own identifying stamps furthers the cause. Little has been published on punch-cutting, and even less is still in print, so this excellent chapter especially merits an English translation and republication, perhaps as an offprint. [4]

5. Christian Laucou: Technical innovations from 1900 to 1945 (*Les innovations techniques, de 1900 à 1945*)

In the Internet era, we may believe that electronic innovation travels at a faster speed than ever before, but this essay demonstrates the dizzying pace of mechanical innovation in typesetting at the start of the 20th century. Typography was, after all, the dominant information technology of that era. Even the lexicon of names of typesetting inventions is enough to write rhyming poetry to accompany the clatter of machines like Barotype, Diotype, Franco-type, Intertype, Linotype, Monotype, Nebitype, Rototype, Stringertype, Teletype, Typar, Typograph, Typomeca, Typostereotype and more. Engineering drawings, particularly of matrices and mechanisms, illustrate the ingenuity devoted to turning keystrokes into print, a process that continued to be reinvented throughout the century in other technologies, even as metal-based composition approached near-extinction.

Jacques André: Second Interlude: Louis Jou, an idiosyncratic brilliance

(*Louis Jou, un marginal génial*)

An appreciation of the typographic work of Louis Jou, an engraver, typographer, type designer and fine book printer-publisher whose work combined the richness, variety, and elegance of Renaissance typography with the exuberance of Art Nouveau, enhanced by his own inventiveness in ornamental lettering and layout. A friend of Apollinaire, Dufy, Cocteau, and other literary and artistic luminaries of his time, Jou, who was born in 1881 and died in 1968, “came too late to achieve the glory of his English equivalent, William Morris but too early to use digital type, which would have enabled him to play more with fonts and compose his books with the perfectionism of an aesthete.”

6. Manuel Sesma: Return to historical and neo-historical typefaces (*Retour aux caractères historiques et néo-historiques*)

Revival and practice of past letterforms is traditional in Asian calligraphy. In the Italian Renaissance, Humanist handwriting revived Carolingian court handwriting of six centuries earlier and became the model for the first roman and italic types. Arts and Crafts printers revived older types using photographic enlargements from books and hand punch-cutting. Augmented by pantographic punch-engraving, revivals achieved commercial success in the 20th century, especially with revivals of types cut by Claude Garamond in the 16th century (or derivatives cut by Jean Jannon in the 17th century but misidentified as those of Garamond). These revivals were marketed under the names “Garamond,” “Garamont,” “Granjon,” “Estienne,” “Sabon,” and others, causing this essay to call the phenomenon “garamonomanie” (perhaps “Garamonomania” in English). Questions about whose types were actually revived as Garamond’s resulted in intriguing typographic scholarship by Jean Paillard in 1914 and Beatrice Warde (writing as Paul Beaujon) in 1926. [5]

The Peignot foundry types “Cochin” and “Nicolas Cochin” were based on elegant lettering by 18th century engravers Charles-Nicolas Cochin and son. The Peignot Cochin types became fashionably popular in France and were imitated by foundries elsewhere.

In the U.S., American Type Founders (ATF) produced successful revivals by designer Morris Fuller Benton and printer-scholar Henry Lewis Bullen, including Bodoni, Jenson (called Cloister), (Fry’s) Baskerville, Caslon, and the Garamond that ignited Garamonomania. Frederic W. Goudy often took Renaissance models as inspiration but imbued them with his own artistic sensibility. Goudy Old Style from ATF, with additional versions by M. F. Benton, has remained popular through every major change in typesetting technology. Goudy also drew “Garamont” for American Monotype.

Revivals were also produced by the Bauer and Stempel foundries in Germany and Linotype in England, Germany, and the U.S. In mechanical composition, the best known series of revivals came from the English Monotype corporation. Under the direction of Frank Hinman Pierpont and with the advisement of Stanley Morison, Monotype revived types by Jenson, Aldus, Arrighi, Garamond, Van Dijk, Fournier, Baskerville, Bell, Bodoni, and others, and also produced original faces by designers with classical affinities: Perpetua by Eric Gill, Romulus by Jan van Krimpen, and Dante by Giovanni Mardersteig.

Though waxing and waning at times, type revivals continued through the rest of the 20th century.

7. Manuel Sesma: Lead again

(*Encore le plomb*)

As the European typographic industry strove to recover after World War II, an exuberant flowering of imaginative typefaces emerged from French designers and typefoundries with an inventive sense of graphic style termed “La Graphie Latine” (“Latin Typography”). These spirited French typefaces brimmed with inspiration: Paris, Flash, Île de France and Champs Élysées by Enric Crous-Vidal; Choc, Banco, Mistral, Calypso, and Antique Olive by Roger Excoffon; Jacno by Marcel Jacno; Ondine and Phoebus by Adrian Frutiger. Though revolutionary in style, these faces were produced as lead foundry types. [6] Mistral and Calypso were “tours de force,” challenging the constraints of metal type. In the 1950s and 1960s, expressive French designs differed markedly from the sober, grotesque-style sans-serifs at the core of Swiss typography and its allied international modernism that favored grid-based bureaucratic regulation over charismatic expression. But, as a philosophical complement to effervescence in letter design, French writing and thinking on type also featured acutely rational reflections on the logic of typography, as seen in the typeface classification system devised by Maximilien Vox and adopted as a standard by the Association Typographique Internationale as the Vox-ATypI system, and in the numeric naming system for typeface weight, width, and posture devised by Adrian Frutiger for his pioneering Univers neogrotesque produced by the Paris foundry Deberny & Peignot, for both phototype and foundry type.

8. Charles Bigelow: Legibility and typography: research in the first half of the 20th century

(*Lisibilité et typographie: les recherches durant la première moitié du xxe siècle*)

By the first decade of the 20th century, literacy rates in France, England, Germany, and America had soared to more than 90 percent due to national expansions of free, public education. The vast increases in literacy fueled the printing and marketing industries but raised concerns about typeface legibility in reading education, ocular health of children, and the physiology and psychology of reading. Émile Javal in France and Edmund Burke Huey in America pioneered reading research. Shortly afterwards in New York, Barbara Roethlein (with font assistance from Morris Fuller Benton) conducted one of the earliest psychological studies comparing type legibility. Elsewhere, Richard L. Pyke in England, Gerrit Willem Ovink in Holland, and Miles Tinker with

Donald G. Paterson in Minnesota conducted legibility studies, the last of these continuing through the first half of the century. Although most typeface development followed traditional faith in the trained eye of the designer, legibility research did influence the design of a few popular typefaces for specific purposes. The enduringly popular Century Schoolbook, originally designed by Morris Fuller Benton for a textbook publisher, drew upon Roethlein’s earlier research. Linotype’s “Legibility Group” was at one time used in more than half of all newspapers in the United States. It included several closely related designs (Ionic No. 3, Excelsior, Opticon, and Corona) that were influenced by Century Schoolbook and unpublished legibility research by Linotype. Not all legibility studies were reliable. R. L. Pyke skeptically remarked, “Four times as many writers have measured legibility as have defined it. Three out of every four writers have been attempting to measure something the exact nature of which they have not paused to examine.” [7]

Paul-Marie Grinevald: Third Interlude: Survey of historians of typography

(*Aperçu des historiens de la typographie*)

This is a rare essay in typographic historiography: a history of histories of typography. It includes social histories of printing such as Elizabeth Eisenstein’s *The Printing Press as an Agent of Change*, Lucien Febvre & Henri-Jean Martin’s *The Coming of the Book*, Marshall McLuhan’s *The Gutenberg Galaxy* and *The Medium is the Message*. Recognizing that typography is only the most recent form of writing, the chapter cites Jack Goody’s anthropological treatises on writing and society, ancient and modern, in *The Domestication of the Savage Mind* (the title an in-joke on a structuralist treatise by French ethnologist Claude Lévi-Strauss) and *The Logic of Writing and the Organization of Society*.

On the forms of letters and typefaces, this survey touches on Euclidean letter constructions by Luca Pacioli, Albrecht Dürer, Geoffrey Tory, and others in the 16th century, on the refined Cartesian geometry of type forms developed circa 1693–1702 by savants Jean-Paul Bignon, Jacques Jaugeon, and Sebastian Truchet, which led to the creation of the Roman du Roi, the French royal typefaces. Valuable essays on type and history, to mention a few of the many cited, include: in the 18th century, Pierre-Simon Fournier’s *Manuel Typographique* and the chapter “Caractère” in the Diderot *Encyclopédie*; in the 19th century, Talbot Baines Reed’s *A History of the Old English Letter Foundries*; in the 20th century, Daniel Berkeley Updike’s *Printing Types: Their History,*

Forms and Use—A study in survivals, Marius Audin’s *Histoire de l’Imprimerie par l’Image* and *La Somme Typographique*, Harry Carter’s *A View of Early Typography*, Fernand Baudin’s *L’Effet Gutenberg*, John Dreyfus’ *Into Print*, Alan Marshall’s *Du plomb à la lumière*, and other recent works. Preceding volumes from Perrousseau in the series on *Histoire de l’Écriture: Typographique* must also be mentioned: *De Gutenberg au XVIIIe siècle*, by Yves Perrousseau; *Le XVIIIe siècle* (two volumes), also by Yves Perrousseau; and *Le XIXe siècle français* by Jacques André and Christian Laucou.

The book ends with an extensive general bibliography as well as bibliographies specific to each chapter, totaling 412 references in all, to works in French, English and German. These are followed by indexes of typefaces, typographers, and typographic topics.

Notes

[1] The general editor, Jacques André is a French computer scientist with an intense interest in typography. He organized the first academic conference on the integration of computer science with typography, “La Manipulation des Documents”, in Rennes, France in May, 1983, and organized the later international “Raster Imaging and Digital Typography” (RIDT) conferences. He has published papers on \TeX , and readers of *TUGboat* may know his reviews and articles including “Father Truchet, the typographic point, the Romain de Roi, and tilings” (*TUGboat* issue 20:1, 1999) and “The Cassetin project — Towards an inventory of ancient types and the related standardised encoding” (24:3, 2003). Notable are his translations and re-interpretations of selected print works, such as “Petits jeux avec des ornements”, a translation into French with digital re-composition of ornamental patterns by Swiss typographer Max Calisch in *Kleines Spiel mit Ornamenten* (Berne, 1965), and an electronic revival of P.-S. Fournier’s *Manuel Typographique* (Barbou, 1764). <http://jacques-andre.fr/japublis/>

[2] These two volumes are the latest in a series on “Typographic Writing” from Atelier Perrousseau, a French publisher of typography books. The series, in several successive volumes, begins with Gutenberg and thence covers the next six centuries. The term “typographic writing” in the title affirms that typography is the latest form of writing in a long history of literacy. All of the books in the series are well worthwhile.

[3] Gutenberg’s method of making type in the 1450s remains shrouded in mystery, but the technique of punch and matrix was probably developed and prac-

ticed before 1470, when Nicolas Jenson, a master of the French mint who had studied the infant art of typography in Mainz, gave up minting for printing and opened his shop in Venice.

[4] The chapter’s bibliography includes *Counterpunch* by Fred Smeijers, now out of print but an entertaining and informative book that combines the author’s efforts to learn punch-cutting, including a history and explanation of the tools and techniques, comparisons of hand work to computer work, the creating of new type designs inspired by models from the golden age of typography, and comments on other topics arising during the author’s story. A good short essay, not in the bibliography, is Paul Koch’s “The Making of Printing Types”, translated from German by Otto W. Fuhrmann, in *The Dolphin: A Journal of the Making of Books*, No. 1, pp. 24–57. Illustrations by Fritz Kredel. The Limited Editions Club, New York, 1933.

[5] See: ‘Paul Beaujon’ (Beatrice Warde), ‘The Garamond types: 16th and 17th century sources considered’, *The Fleuron*, 5, 1926, pp. 131–79. A recent review of Garamond scholarship is James Mosley’s “Garamond or Garamont”, *Typefoundry Blog*, Apr. 1, 2011. <http://typefoundry.blogspot.com/2011/04/garamond-or-garamont.html>

[6] The title of this chapter and the bravado of the designers may remind fans of American western movies of a memorable line in the classic *The Magnificent Seven*, delivered by Steve McQueen: “We deal in lead, friend.”

[7] A short talk on this chapter was delivered at the \TeX Users Group meeting in Toronto, Ontario, on July 27, 2016. Legibility research lost academic popularity in the middle of the century, but scientific reading research was revived in the 1970s and 1980s, principally in three areas: eye movements in reading, researched by G.W. McConkie, Keith Rayner, and Andrew Pollatsek, among several others; psychophysics of reading, researched by Gordon E. Legge and others; various practical studies comparing typefaces, by Cyril Burt, Bror Zachrisson, E.C. Poulton, Dirk Wendt, Herbert Spencer, Linda Reynolds, and others.

Disclosure: As seen above, the reviewer contributed a chapter to this book (but receives no monetary compensation). He has known the general editor over more than three decades of friendly mutual interest in digital typography.

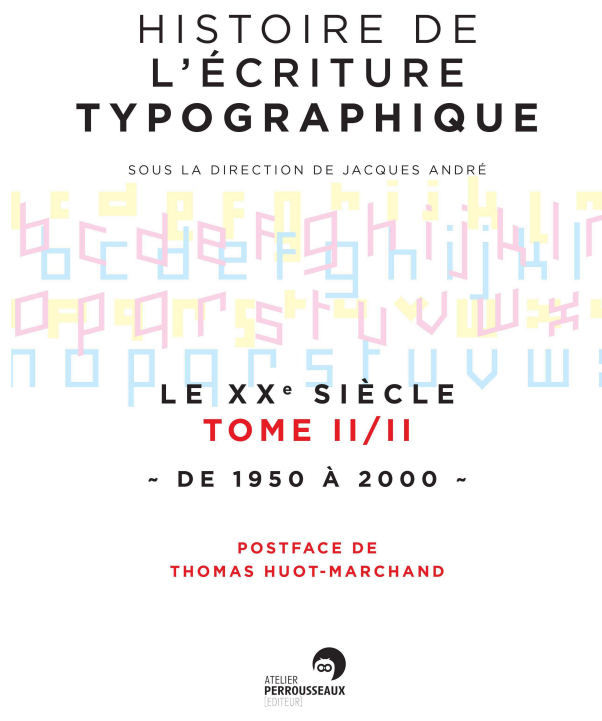
◇ Charles Bigelow
<http://lucidafonts.com>

Review and summaries: *The History of Typographic Writing — The 20th century Volume 2* (ch. 1–5), from 1950 to 2000

Charles Bigelow

Histoire de l'Écriture Typographique — le XXI^{ème} siècle; tome II/II, de 1950 à 2000. Jacques André, editorial direction. Atelier Perrousseau, Gap, France, 2016, ISBN 978-2-36765-006-7, <http://tinyurl.com/ja-xxieme-ii>. 364 pp., 391 figures (illustrations, photos, diagrams, etc.), illustrated end papers. Also available as an ebook. The book is in French. Volume 1 (reviewed in *TUGboat* 38:1) covers the years 1900 to 1950.

Occasional commentary below by the reviewer is placed in square brackets; the main text summarizes the original writing.



End paper (fragment): Apple Chancery typeface and typography both by Kris Holmes.

Charles Bigelow

Jacques André: Introduction

This is the last volume in the series created by Yves Perrousseau, on the “History of Typographic Writing” from its beginning to the end of the 20th century.

In the 20th century, the powers of social and informational functions of writing, previously distinguished in part by their modes of production — for example, public inscriptions and signage, book and news publishing, and personal handwriting — were expanded by technological advances. Commercial, governmental, political, and educational institutions used typographic media to ever-greater extent and effect, although individual expression remained, for a time, limited to handwriting and typewriting. By the end of the century, however, new technologies of typography vastly enhanced the power, extent, and graphical range of personal written expression.

This second volume of the history of 20th century typography is intended for general readers interested in the history, art, and technology of the century, as well for specialists and students in the field. It has been written by ten different authors and thus reflects as many different perspectives and styles. In addition to text and copious illustrations, it includes an extensive bibliography.

1. Alice Savoie: Typography transformed: the era of photocomposition (*La typographie en pleine mutation: l'ère de la photocompositions*)

“Photocomposition before 1945: false starts and early experiments.”

In the early decades of the 20th century, several inventions applied photography to type setting. Despite clever mechanisms and novel names, the Bawtree, Photoline, Rotofoto, Thothomic, and Uher-type proto-phototypesetters proved less efficient, less economical, and lower in quality than established hot-metal composing machines and hence failed to become commercially successful. This first phase of photocomposition was followed by the so-called “first generation” photocomposers — the Intertype Fotosetter and the Monophoto, which adapted hot-metal machines by replacing the casting unit with a photo unit. These machines produced commercially adequate output, but were not widely used.

“Second generation” photo-electronic systems, especially the pioneering Lumitype invented in France in the 1940s by Moyroud and Higonnet but developed in the U.S. as the Photon (sold in France as the Lumitype), revolutionized text composition in the 1960s and 1970s. Third generation phototypesetters were based on cathode ray tube (CRT) imaging and computer control, and fourth-generation machines were based on laser imaging.

The phototypesetting revolution was not merely technical but also social. Fast typing abilities on QWERTY keyboards (AZERTY in France) coupled with quick learning of computer mark-up codes and commands replaced the mechanical skills learned from long apprenticeship in hot-metal type technology. “Photocomposition enabled the type-compositor to trade the blue collar laborer’s shirt and noisy, heavy machines, for the white collar office shirt and precision knives and photochemical processes.”

[CB: Thus began a trend toward higher education and social mobility for typographers, women and men, reflected academically, first in the awarding of Bachelor’s, then Master’s, and most recently, Ph.D. degrees in typography, supplanting the exclusively masculine apprenticeships of older generations of typographers.]

2. Alice Savoie: The creation of new typefaces for photocomposition (*Concevoir de nouveaux caractères pour la photocomposition*)

The designs of Adrian Frutiger and Ladislav Mandel.

Phototypesetting machines transformed not only the process of composing texts but also the process of making type. Type fonts ceased to be miniature metal sculptures and instead became abstract photographic images, requiring new techniques and often, new designers.

In 1953, Charles Peignot, director of the Deberny & Peignot foundry in Paris, hired a young Swiss designer, Adrian Frutiger, and assembled a team that included Ladislav Mandel and Lucette Girard, to produce high-quality photo fonts for the Lumitype photo-typesetter. The team first adapted popular metal faces like Garamond, Baskerville, and Times Roman to the strictures and distortions of high-speed optical imaging, but then Frutiger persuaded Peignot to support development of a totally new family of sans-serif types based on Frutiger’s student studies at the Zurich School of Arts and Crafts [where he was taught by Walter Käch and Alfred Willima].

The result in 1957 was the astonishing Univers family. In the metal type era, extensive font families like those of P.-S. Fournier and M.F. Benton had been cut incrementally in various sizes and styles over years or decades, but Univers burst forth from Deberny & Peignot all at once in 21 variations of weight, width, roman and italic, and all photographically scalable to many sizes. Typography would never be the same again.

[Univers was enthusiastically embraced by modernist graphic designers and over ensuing decades, its basic concepts were adopted by later generations

of type designers. There is hardly a new family of sans-serif types today that does not owe a debt to Univers, whether overt or unacknowledged.]

As phototype achieved commercial success in the 1960s and 1970s, more firms commissioned and developed original typefaces for photocomposition. At Monotype, John Dreyfus commissioned new photo text faces by Frutiger, Jose Mendoza, and Chris Brand. At Linotype, Mike Parker commissioned new script faces by Matthew Carter and Hermann Zapf, as well as new types for Arabic, Hindi, Hebrew, Greek, and other non-Latin alphabets.

Foreseeing typeface piracy in the photo era, Charles Peignot, with Stanley Morison, Jan van Krimpen, Hermann Zapf, and others, formed the International Typographic Association (l’Association Typographique Internationale, ATypI) to promote intellectual and artistic property protection for typeface designs. Several American photocomposing machine manufacturers prospered by developing cheaper and faster machines but plagiarizing typefaces, relying on lack of American copyright for type designs [still the case] as well as weak or absent protections in other countries.

Beginning in the 1970s, the International Typeface Corporation commissioned new types and modernized versions of traditional types for photocomposition. New ITC types by designers Ed Benguiat, Hermann Zapf, and others were licensed by many photo and digital composing machine manufacturers and found wide popularity, especially in advertising and display typography.

Christian Laucou: First interlude: Classification of typefaces and cataloging of fonts (*Première pause: classification des caractères et catalogage des fontes*)

As typeface variations multiplied, type classification became a perennially fascinating intellectual exercise. Classification systems were proposed by, among others: Thibaudeau in 1921; Audin in 1929; Duvillé in 1931; Tschichold in 1951; Vox in 1952; Turner, Berry & Johnson in 1953; and the German DIN standard in 1962. Most of these shared, to varying degrees, a small set of core classes denoting text typefaces of historical eras, supplemented by stylistic variations mainly produced in the 19th century. Differences between classification systems were partly due to lumping or splitting of a few classes, like the gothic scripts, the numerous sans-serifs, and multitudinous “fantasy” display faces.

The Vox classification was adopted by ATypI in 1962 and remains widely used and useful, but new classifications continued to be proposed, in part

because increasing multiplicity of type forms rendered older classifications incomplete, and partly because perceived flaws in the logic or concepts of previous systems spurred new efforts. Bringhurst, in 1992 and later, utilized art historical nomenclature as well as biological taxonomy to articulate aesthetic-conceptual relationships of type forms. In commercial type sales, marketing and advertising, categories based on usage, context, and emotion have appeared in type catalogs, specimens, and web sites. Classification of non-Latin typefaces, such as Chinese or Arabic, posed additional difficulties because of cultural and historical distinctions not always shared with Latin typography.

[In the classification systems cited above, the number of different classes ranges between 5 and 22, with average and median both around 10. Because of the vast proliferation of type forms in the digital era and type usage by billions of computer and smart phone users, type classification has become a nexus of modern Internet culture, inviting further analyses of font features and classes, whether logical, semantic, or pragmatic.]

3: Jacques André: Office typography: typewriters, printers, and “strike-on” fonts (*Vers la typographie de bureau: machine à écrire, imprimantes et caractères à impact*)

Following their invention in the 19th century, typewriters proliferated in the 20th century. Keyboard layouts varied by manufacturer until standardization of a few layouts according to country or language, like QWERTY in the U.S. and AZERTY in France. For ease of use and mechanical simplicity, typewriter typography was graphically simplified. Most typewriters had monospaced fonts and a single type size. Only a few sizes were available.¹

When a key was struck, a character image on a moving type bar impacted an ink-impregnated ribbon and squashed the character image onto paper.

Because of wear on type from the very high number of repeated impacts and coarsening of letter images from ribbon squash, typewriter typefaces were usually monoline and based on sturdy designs, particularly slab-serif faces. Typewriters became so

¹ [CB: Also called “fixed-pitch” or “fixed-width” fonts, as used in this footnote. All characters have identical widths, for example, the letter ‘i’ in its space has the same set width as the letter ‘m’ in its space. In the U.S., the most popular standard size was traditional English “pica”, with a height of six lines per inch when single spaced vertically, and 10 characters per inch horizontally. The smaller “elite” size set at 12 characters per inch but usually at the vertical “pica” line spacing.]

popular that traditional type foundries created printing typefaces to imitate the typewritten look. The popular Courier, designed for IBM electric typewriters at IBM in 1956 by Howard Kettler, was based on geometric slab-serif printing types. Sans-serif, italic, and all-capital typewriter faces were also produced.

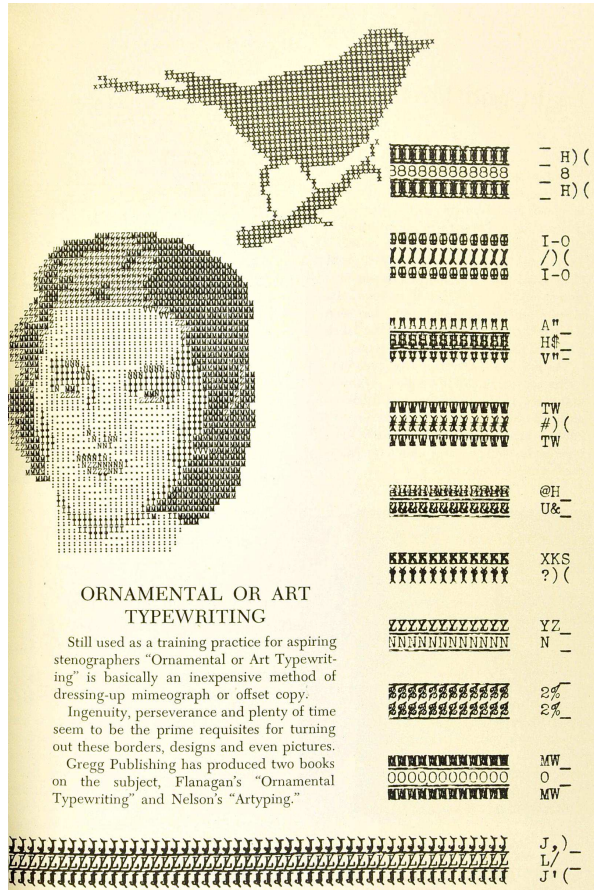
A deficiency of the typewriter was that it produced “one-off” documents that were not easily reproducible. A few carbon paper copies of lesser quality than the original could be made while typing, but mimeography, offset lithography, and photocopying were used to reproduce typewritten documents in greater quantities.

The ubiquity of the typewriter, its conceptual simplicity, its standardized keyboard, and its vast number of users led to adoption of typewriter-like input for other systems including Telex, Teletype, Varityper, and Justewriter, as well as computer input using paper tape perforated by keyboard typing. Computer output also predictably produced typewriter-like printing. When CRT monitors and keyboards began to be used for computer input, the dot-matrix characters displayed on screens resembled, more or less, monospaced and monoline typewriter fonts. Thus, the typewriter became one of the earliest, longest enduring, and most important paradigms in human-computer interaction.

Adoption of typewriter-like computer input also spurred standardizations of the numerical computer codes corresponding to letters and characters, resulting in ASCII (American Standard Code for Information Interchange), European ISO Latin, and IBM EBCDIC character encodings. Stringent technical limitations and typographic simplicity did not, however, totally suppress artistic ingenuity. Typewriter and “ASCII art”, made with monospaced typewriter or computerized typewriter-like characters, included a plethora of often playful and ingenious images and patterns.

Christian Laucou: Second interlude: Games with letters (*Deuxième pause: Jouons avec les lettres*)

In the Latin, Hebrew, and Arabic writing traditions [Chinese and Japanese could be included], scribes often played with the arrangement and shaping of letters to make pictorial, ornamental, or scholarly arrangements of text. This tendency continued into European typography with the Hypnerotomachia Poliphili printed by Aldus (1499), an edition of Calimachus by Henri II Estienne (1577), and the polyglot Bible by Christophe Plantin (1572). Renditions of pictorial typography include the mouse’s tail



in Alice in Wonderland, poetry by Stéphane Mallarmé, Calligrammes by Guillaume Apollinaire, and avant-garde compositions in several “isms”, including Dadaism, Futurism (both Italian and Russian variations), and De Stijl.

These experiments in the early part of the 20th century were later followed by typo-pictorial compositions of poetry and prose under the banners of Lettrisme, “poésie sonore”, “poésie expérimental”.

[Similar manifestations appeared in works from OULIPO (Ouvroir de littérature potentielle), in international “concrete poetry”, in the playful “Typoésie” by Jérôme Peignot, in many typographic works by Robert Massin, and in compositions by Bruno Pfäffli and other students of Emil Ruder.]

Following the avant-gardists, playful renderings and distortions of letters for semantic as well as phonetic signification often appeared in commercial advertising. As mentioned in chapter 3, when computer typography was limited to single sizes of monospaced fonts in limited character sets, “ASCII art” (as above) was spontaneously generated in a kind of ad hoc computer pointillism and was often widely distributed because of the ease of text transmission.

4. Thierry Gouttenègre: Transfer lettering (*La lettre transfer*)

Beginning in the 1960s and continuing for three more decades, transfer or “rub-off” lettering provided a handy and affordable means of typographic composition for graphic designers, architects, fashion designers, engineers, and others needing easy access to limited amounts of typography.

Transfer letters were based on the method of decalomania (“decal” for short, an image-transfer method invented in France and exploited in 19th century England for decorating pottery). The 20th century innovative rub-off letters of Letraset, Alfac, Mecanorma, and other firms were screen printed with an adhesive onto a substrate from which the letters could be hand-transferred onto paper or other surface by careful rubbing. Although rub-off letters began with selected traditional typefaces, the “fonts” quickly expanded into realms of bold faces, fantasy forms, shape distortions, radical expressions, and graphical explorations barely imaginable and commercially impractical in the previous, traditional metal type era.

The wild florescence of rub-off display faces began to fade at the end of the 1980s as digital typography increasingly provided more accessible, economical, and powerful means of typographic composition. It is unclear how many of the rub-off designs transitioned into the digital era.

5. Jacques André: History of digital font technology (*Histoire technique des fontes numériques*)

In the 1950s, typography moved from metal type and photo-type to the abstractions of digital computing. Newly vectorized forms of letters, numbers, and diagrams began to be traced with computer-controlled electron beams on phosphorescent CRT screens.

Similar information was also used to draw images with electro-mechanical plotters on paper or other substrates. A noteworthy compilation of vector-defined fonts for early computer screens and plotters was published as “Calligraphy for Computers” by Allen Hershey. The Hershey fonts, which were polygonal because of the technology, had many forms and variations—linear, cursive, and gothic styles as well as mathematical, chemical, and other symbols.

In the late 1960s, typesetting machine manufacturers began to use rasterized letters—aggregations of pixel elements or run-length codes—to display text on CRT screens from which photographic film or paper could be exposed. The results were equivalent to analog phototypesetting but the digital typesetters ran much faster. Also in the 1960s and 1970s,

CRT monitors, which displayed simple dot-matrix characters, began to be widely used for computer data input and programming. When this screen technology was adopted for broad public usage in the French Minitel system in conjunction with the telephone service, tens of millions of customers began to read dot-matrix characters on screens.

The limitations of low resolution digital letter imaging prompted some designers, such as Wim Crowel, to devise rectilinear and polygonal letterforms adapted to the restrictions of then-current computer technology, but these novel experiments were soon supplanted by more traditional-looking letter forms as digital resolutions increased.

In the 1960s, in the fields of computer-aided design and manufacturing, there was pioneering research and development of mathematical descriptions and renderings of curves for computer graphics. In France, Pierre Bézier at Renault and Paul de Castel-jau at Citroën adopted cubic splines for the description and rendering of curved lines and surfaces.

The decade of the 1970s was rich in exploration of digital letter forms. Peter Karow at the URW firm in Hamburg developed the Ikarus digital type system, which encoded contours of letters with cubic splines that could be output to computer plotters to cut photo-masks for photo-optical typesetters, and could be software scan-converted to rasters, run-lengths, and bitmaps for different kinds of digital typesetting equipment. Also in the 1970s, Philippe Coueignoux at MIT and Patrick Baudelaire at Xerox PARC independently used mathematical curves and splines to define letter contours for typography. At Stanford University, Donald Knuth developed his Metafont system for font creation and digitization, using cubic splines. Also in the 1970s and early 1980s, a few digital typesetting machines, especially for newspapers, used outline formats — some based on straight-line vectors and others on circular arcs — optimized for fast output.

Karow's Ikarus system gained commercial success among digital typesetting manufacturers and font developers. Moreover, URW itself digitized hundreds of very high resolution fonts in the Ikarus spline format, and those, along with fonts from manufacturers using Ikarus, became the basis for a substantial subset of the PostScript and TrueType fonts produced in the 1980s and 1990s by Adobe, Apple, and Microsoft for personal computers and laser printers.

The Xerox corporation played a major role in the development of digital typography in the 1970s. At the Xerox Palo Alto Research Center (PARC), bitmap fonts were developed for the screens of personal computers — the “Altos” — to display approx-

imations of some traditional typefaces, and spline-defined letterforms were developed by Patrick Baudelaire. The xerographic laser printer was invented at Xerox by Gary Starkweather in 1969 and was commercially developed for high-speed xerographic printing systems by 1977.

In the mid-1980s, Xerox's innovations were imitated and popularized in products like the Apple Macintosh computer and LaserWriter printer. Xerox had also developed software for computer interchange and output of type and pages on laser printers. Adobe Systems, founded by alumni of Xerox PARC, developed the PostScript page description language, which used outline fonts of cubic Bézier curves as part of a general imaging model, to solve the problem of device-independent page interchange and rendering. The first commercial PostScript printer was the Apple LaserWriter launched in 1985.

The spline-defined font outlines of Ikarus, PostScript, and similar systems had several advantages, including: economy in computer file size and memory utilization, scalability to arbitrary sizes, ease of rotation and modification. The raster scan-conversion of abstract mathematical outlines to arrays of discrete pixels on monitor screens or page bitmaps of laser printers raised difficult technical and aesthetic issues at low resolutions. Technical issues involved tracing pixels along the edges of characters and filling the edge-defined shapes, with the goals of increasing computational speed and efficiency. [These were mainly solved by improved rendering algorithms as well as by the increases in computing speed and memory described by Moore's Law.]

The aesthetic problems, however, proved more difficult because they involved aspects of human vision, mechanisms of reading, and expectations of the appearance of text, all less amenable to algorithmic analysis and hardware advances. At the laser printer resolutions of the 1980s, all below 600 dots per inch, simple scan conversion produced letterforms in which irregularities of stem weights, horizontal alignments, letter spacings, and traditional detailing produced texts that failed to conform to reader expectations. The outputs were accordingly judged inferior, and there was a scramble to ameliorate perceived type quality. Karow was the first to address this problem; in the late 1970s and early 1980s, the Ikarus system used software distortion of master outlines to conform to digital grids before scan-conversion. This was done off-line to produce bitmap fonts.

To its PostScript Type 1 fonts, Adobe added data to mark stems, curved bowls, vertical alignments, and other features, and those data were used to locally distort the outlines of characters prior to

rasterization in order to impose greater regularity when the characters were rasterized for the digital grids of printers. Adobe termed these declarative data “hints” but kept their implementations as trade secrets. Adobe’s advance over Ikarus was that PostScript hints were applied on-the-fly during rasterization in the printer, instead of off-line to produce fonts in bitmap and raster formats.

The success of PostScript and its fonts engendered competitors, of which the most successful was TrueType, invented at Apple and later licensed to Microsoft. TrueType used quadratic B-splines instead of cubic Bézier splines, and procedural instructions for fitting outline shapes to raster grids.

[The concept of procedural hinting had previously been developed in the late 1980s by the Folio corporation for its F3 font technology and disclosed to Apple early in the design of TrueType. Sun Microsystems acquired the Folio F3 technology but did not strive to promote it as a standard in competition to PostScript or, later, TrueType.]

In 1989, Microsoft licensed TrueType technology for its Windows operating system, igniting a years-long commercial battle popularly known as the “Font Wars”, in which the combatants made rival claims of technical and artistic superiority for their font technologies. A partial cease-fire in the Font Wars came in the 1990s when former combatants Microsoft and Adobe agreed on an expanded format named OpenType, in which character outlines could be implemented in either PostScript or TrueType form, and which included data to support alternative and context-sensitive forms and glyphs required in certain non-Latin writing systems like Arabic and the Indic scripts. OpenType, however, was promoted by the Adobe-Microsoft pair against a similar, earlier font technology, TrueType GX that had been previously released by Apple, so the font wars were not entirely over with the announcement of OpenType.

Between 1985 to 2000, some of the aesthetic problems of digital type were ameliorated in two ways. First, for computer screens, the algorithmic adjustment of pixel intensities along character edges, called “gray-scaling” or “anti-aliasing” reduced the perceptibility of jagged pixels along curves and diagonals. [This depended on the pixel resolutions of screens. At resolutions below (approximately) 120 pixels per inch, gray scaled edges looked smoother but blurrier and were not as acceptable as manufacturers hoped. Screen resolutions above 220 and 300 pixels per inch after the year 2000 effectively resolved the problem of jaggedness and irregularity of text on screen, obviating the need for hints.]

Second, for printers, doubling of resolutions from 300 to 600 dots per inch reduced the more egregious irregularities in text rendering, while techniques for decreasing intensity of laser beams along character edges to reduce apparent jaggedness of curves and diagonals, similar to anti-aliasing in which spot size was analogous to screen gray-scaling) made hinting less necessary or unnecessary. [Limitations on electrostatic printing limit the effective resolutions that can be achieved for mass-market devices.]

As computerized typography and document layout advanced, leaders in the computer document industry faced the problem of exchanging electronic documents across networks, computers, and devices, which required standardization of computer character encodings beyond the American ASCII and European ISO Latin standards. Begun by Xerox in the 1980s and supported by Apple, Microsoft, and other firms later in that decade or in the 1990s, a 16-bit character encoding standard called “Unicode” was developed with the goal of eventually encompassing all the world’s written languages. A similar encoding project was begun in Europe as the ISO-10646 standard. These parallel projects were merged in the early 1990s as the Unicode standard. Among many other benefits, Unicode brought computer character standardization to many of the non-Latin and non-European orthographies and writing systems that had encountered obstacles to efficient computerization, thus spurring development of computer-aided document production and distribution.

[CB: Because of the length needed for the above review of the information-packed Chapter 5 on digital fonts, the remaining chapters of the book will be covered in the third and final part of this review. For reference, the remaining titles and authors are:

- “The first commercial digital fonts”, by Frank Adebaiye;
- “Interlude: On the revival of typefaces”, by Franck Jalleau;
- “Everyday working fonts from 1985 to 2000”, by Olivier Jean;
- “Hybridization, (de-)construction, and quotation in typography from 1985 to 2000”, by Hervé Aracil;
- “Interlude: On the preservation of typographic heritage”, by Alan Marshall; and
- “Postface — the metamorphosis of typography”, by Thomas Huot-Marchand.

Ending with an extensive bibliography and index.]

◇ Charles Bigelow
<http://lucidafonts.com>

Review and summaries: *The History of Typographic Writing — The 20th century Volume 2* (ch. 6–8+), from 1950 to 2000

Charles Bigelow

Histoire de l'Écriture Typographique — le XXIème siècle; tome II/II, de 1950 à 2000. Jacques André, editorial direction. Atelier Perrousseau, Gap, France, 2016, ISBN 978-2-36765-006-7, tinyurl.com/ja-xxieme-ii. 364 pp., 391 figures (illustrations, photos, diagrams, etc.), illustrated end papers. Also available as an ebook. The book is in French. Volume 1 (reviewed in *TUGboat* 38:1) covers the years 1900 to 1950; chapters 1–5 of volume 2 were reviewed in *TUGboat* 38:2.

Interpolated comments by the reviewer are in square brackets; the plain text summarizes and condenses the original writing, to the best of the reviewer's abilities.

6. Frank Adebaiye: The first commercial digital fonts (*Les premières fontes numériques commerciales*)

The first digital typesetting fonts were developed in the late 1960s for the Hell Digiset, the first digital typesetting machine. Digi Grotesk (1968), was a rasterized version of sans-serif Neuzeit Grotesk (c. 1930). In the 1970s, Hell produced original digital typeface families by Hermann Zapf, including Marconi (1976) and Edison (1978) for news display and text, respectively. [In the 1980s, Hell produced other original designs, including Aurelia (1982) by Hermann Zapf, and Isadora (1983) by Kris Holmes.]

American Linotype produced Bell Centennial (1976), a digital type family designed by Matthew Carter for telephone directories. Also for directories, Ladislav Mandel digitized his Galfrá type in 1978.

In the 1980s, several manufacturers of digital typesetters plagiarized popular typefaces and marketed them under pseudonyms. [CB: The problem of typeface design protection is a recurrent thread in this chapter 6. For some history, see “Notes on typeface protection”, *TUGboat* 7:3, 1986, tug.org/TUGboat/tb07-3/tb16bigelow.pdf.]

In the mid-1980s, Xerox, Adobe, and Apple licensed and produced digital versions of Times and Helvetica for laser printers and personal computers.

Several other firms developed original digital designs in the 1980s. Among them were

- Bigelow & Holmes, with Lucida (1984) and Lucida Sans (1985);
- URW, with URW Grotesk (1985) and URW Antiqua (1985), both by Hermann Zapf;

Charles Bigelow

HERMANN ZAPF DESIGNS DIGISET

Marconi & Edison: Digital Types for Electric Communication

Marconi ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdehijklmnopqrstuvwxyz1234567890?

Marconi Italic ABCDEFGHIJKLMNOPQRS
abcdehijklmnopqrstuvwxyz1234567890?!

Marconi Bold ABCDEFGHIJKLMNOPQR
abcdehijklmnopqrstuvwxyz1234567890

Marconi Bold Italic ABCDEFGHIJKLM
abcdehijklmnopqrstuvwxyz12345678

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In Digiset Marconi, Hermann Zapf captures the elegance, symmetry and brilliance of the classical Modern sans of Bodoni, Didot, & Walbaum. Perfectly suited to contemporary trends in text and display, Marconi has the large x-height, open counters, and strong detailing necessary for most main clarity in today's graphic technology.

In designing Marconi for Digiset, Zapf drew directly for the digital grid, to achieve complete mastery over every aspect of the letterforms.

Point by point, letter by letter, line by line, Marconi has been exhaustively tested and corrected by the world's most renowned typographers. In Digiset, the world's most experienced manufacturer of digital types.

Named in honor of Guglielmo Marconi, Nobel prize-winning pioneer of radio telegraphy, Digiset Marconi in Roman, Italic, Bold, & Bold Italic is today's pioneer in electric communication.



Since childhood, I have had a special liking for electrical engineering. Everything connected with this caught my eye. For years I have studied and analyzed in a laborious but successful manner logical concepts completely under digital control.

Hermann Zapf, Above Alphabet.

Digiset Edison is the culmination of Zapf's intensive study of digital typography and his experience in designing contemporary types.

To outstanding legibility and stylization for the toughest typographic tasks, Edison adds calligraphic warmth and verve for exciting display. Edison in the newspapers Edition on the screen! Edison on the signs of the Times! From Hermann Zapf and Digiset.

Named in honor of electrical inventor, Thomas Alva Edison, Digiset Edison in Roman, Italic, Bold, & Bold Italic is as versatile and electrifying as its brilliant namesake.

Edison ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdehijklmnopqrstuvwxyz12345678

Edison Italic ABCDEFGHIJKLMNOPQRST
abcdehijklmnopqrstuvwxyz1234567890

Edison Bold ABCDEFGHIJKLMNOPQR
abcdehijklmnopqrstuvwxyz1234567

Edison Bold Italic ABCDEFGHIJKLMNO
abcdehijklmnopqrstuvwxyz12345678

a

- Donald Knuth, with Computer Modern (1980–1992);
- Bitstream, with Carmina (1987) by Gudrun Zapf von Hesse, Charter (1987) by Matthew Carter, and Amerigo (1987) by Gerard Unger;
- Adobe, with ITC Stone (1988) by Sumner Stone, Adobe Garamond (1989) and Utopia (1989), both by Rob Slimbach, Trajan (1989), Lithos (1989), and Charlemagne (1989), all by Carol Twombly;
- Agfa [formerly Compugraphic] produced the Rotis (1988) super-family of serif and sans-serif faces by Otl Aicher.
- “Punk” fonts issued from several firms, including: Emigré, with Matrix (1986) by Zuzana Licko, and FontFont, with Beowulf (1989) by Just van Rossum and Erik van Blokland.
- In France in the same decade, the independent type designers of typoGabor developed original fonts for Alphatype digital typesetters.

In the early 1990s, publication of Adobe's PostScript Type 1 font format and Apple–Microsoft's TrueType format resulted in a rush of new and original typefaces for the expanding digital typography market.

From FontShop and FontFont came FF Scala (1990) by Martin Majoor, FF Meta (1991) by Erik Spiekermann, and FF DIN (1995) by Albert-Jan Pool, among many others. From Apple came TrueType fonts for New York, Chicago, Monaco, and Geneva

(1991) by Bigelow & Holmes, first created as Macintosh bitmap fonts by Susan Kare (1984).

In 1992, Microsoft released TrueType fonts of Times New Roman, Arial, and Courier New, as well as a set of fonts equivalent to the Apple LaserWriter Plus set. Also in 1992, Microsoft released a large expansion of the Lucida family with new and original designs of Lucida Bright, Sans, Calligraphy, Blackletter, Handwriting, Fax, Typewriter, and mathematical symbol fonts, all from Bigelow & Holmes.

Windows users accepted Arial as a substitute for Helvetica, evidently being similar enough in appearance (and metrically identical), but Microsoft's distribution of "Book Antiqua" by Monotype (1992) sparked criticism from typographers that the face was a plagiarism of Zapf's Palatino. [The different reactions to Arial and Book Antiqua suggest that the grotesque sans-serif genre had become a "swarm" of vaguely similar and quasi-substitutable typefaces, whereas a distinctively artistic creation like Palatino could not be copied without being called either a travesty, or a rip-off, or both.]

Digital technology not only encouraged the creation of more typefaces but also enabled more complex designs, especially in the creation of alternate characters. In some cases, the design was ahead of the technology. In France, François Boltana created Champion, a joining script in English roundhand style, incorporating thousands of alternative glyphs, but a decade before OpenType made such fonts practical. Begun in 1989, the "Champion Pro" version was released in 2007. [In the late 1990s, other scripts with extensive alternate character sets included Apple Chancery (1993) by Kris Holmes (shown in the endpapers of this volume), Kolibri (1993) by Holmes for URW, and Zapfino (1999–2001) by Hermann Zapf.]

The growing free software movement also encouraged distribution of authorized free fonts (not piracies). The earliest (except for the CRT Hershey fonts) and most extensive free font family was Computer Modern by Donald Knuth, who also published the fonts' source code in his Metafont computer language. From Knuth's typography research lab and the American Mathematical Society came Hermann Zapf's AMS Euler (1985) family, freely distributed for mathematical composition. Adobe released Utopia for free distribution in 1993, and Bitstream followed suit with Charter. The 21st century would witness many more fonts released for free distribution.

[CB: In the article "Digital Typography" in *Scientific American*, August, 1983, this reviewer predicted that when digital font technology matured, there would "surely be a flowering of new letterforms

in the digital era." He is immensely grateful to the many industrious and imaginative type designers who subsequently created thousands of original typefaces to prove him correct. :-)]

Franck Jalleau: Third interlude: On the revival of typefaces (*Troisième pause : re-cr  er des caract  res*)

"The revival of typefaces is an integral part of typographic evolution. It is a kind of art of heredity, of genetics, transmitted over generations, while introducing infinite variations and successive mutations."

Rehabilitation, revival, adaptation, interpretation, copy — there are many words to describe the translation of typefaces from one era to another, usually involving technological change. This includes the profound shift from handwriting to type. The process can be said to have begun with the earliest typography, when Gutenberg modeled his types on the formal handwriting of his era, and when capital letter forms based on surviving Roman inscriptions such as the Trajan column, were integrated with humanist minuscules, our lowercase. In the late 19th century, typeface revivals arose in an era of change in typesetting technology, and accelerated in the 20th century during further technological changes: a looking back to the past while questing toward the future. Each change in typographic technology imposed a need to adapt typefaces to new processes while preserving their inherent and inherited qualities created by designers of the past.

The revival of a typeface requires detailed analysis of the source materials, which may include different sizes of punches, matrices, and cast type, all preliminaries of the printed image, or, if the metal materials have been lost, the printed impression itself must be the sole guide. The shapes, their spacings, their "color" (gray tone in text) must be considered.

A revival is not a mere copy, but a new creation, an interpretation of the past. A revival in the digital era may need at least 256 characters to meet the de facto standard character repertoire, but the surviving materials of most historical typefaces have many fewer characters, so the modern designer must create new characters in the spirit of the originals. Moreover, modern typeface families often require a range of weights, but these do not exist for most classic typefaces, so again, they must be newly created in the spirit of the original. Different designers interpret classic typefaces differently. Revivals of the typefaces of Garamond, for example, differ greatly. Some are based on types of Jean Jannon, others on true specimens of Garamond, and may differ in weights, details, and proportions.

This chapter 6 concludes with illustrations of two examples of revivals with quite different approaches: Galliard (1978) by Matthew Carter, based on types cut by Robert Granjon circa 1570, and Francesco (2010) by Franck Jalleau, based on type cut by Francesco Griffo for Aldus (1499).

7. Olivier Jean: Working and office fonts from 1985 to 2000, between maturity and renewal (*Fontes de labour et de bureautique de 1985 à 2000 : entre maturité et renouveau*)

In the 540 years of printing from Gutenberg to 1985, the craft of typography was practiced by a small number of people and the art of type design by even fewer. After 1985, however, mass marketing of personal computers and laser printers introduced typography to millions of ordinary users who became conversant with “fonts”, “points”, and other terms of typography. In this new era (termed “desktop publishing” in English), authors, editors, and publishers gained new freedoms as industrial obstacles fell away. As technical barriers to entry lowered, more people became authors, editors, and publishers. As the power of computer technology increased, the quality of fonts on screens and from printers improved. The path from personal computer to print media became more like a highway. [This trend did not stop with print. The vast expansion of the Internet and world wide web, along with improvements in screen resolutions and font rendering made text more readable, and more widely read, on computer screens, furthering the democratization of information compilation, organization, transmission, and reception.]

The influence of “system fonts”: by 1992, Apple and Microsoft bundled families of “default” system fonts: Times Roman (or Times New Roman), Helvetica (or Arial), Courier (or Courier New). These fostered a “meme” among computer users that there were three categories of fonts: seriffed, sans-serif, and monospaced, each in a family of four variants: regular, italic, bold, bold italic.

Those basic families were initially sufficient for a majority of office workers and personal computer users, but as personal computing, printing, and publishing expanded and encompassed more applications and niches, the operating systems vendors added more and more fonts and developed fonts for other purposes, for example Lucida Console (1993) for terminal emulator windows, and Microsoft Verdana and Georgia by Matthew Carter (1996) for web usage. It is impossible to ignore Microsoft Comic Sans (1995) by Vincent Connare, which became highly popular yet widely reviled, like a beloved comic book villain, a font people love to hate.

A consequence of the lower cost of digital typography was its spread beyond the highly industrialized countries of North America and Western Europe to countries throughout the world, encouraging the development of the multilingual and multi-scriptal Unicode standard for encoding all the writing systems of the world.

When standardized font formats made typography cross-compatible, several proprietary font libraries were spun off as independent firms or were acquired by other firms. The proliferation of independent font designers and font vendors in the early days of desktop publishing began to coalesce by the end of the century, as smaller digital font firms were absorbed by larger ones. [This trend continued into the 21st century.]

In reaction to the loss of physical materials of traditional typographic heritage, some firms began programs of revival of classic typefaces. After Adobe Garamond, Adobe produced Adobe Caslon by Carol Twombly (1990). Matthew Carter revived large sizes of Caslon in Big Caslon (1994), and Adrian Frutiger reinterpreted Didot for Linotype (1991). There were also revivals of hand-written alphabets, including Adobe Trajan, Virgile (Roman rustics) by Franck Jalleau (1995), and Apple Chancery (Arrighi’s chancery cursive as taught by Lloyd Reynolds).

Digital technology enabled, and the burgeoning market encouraged, development of typeface “super-families” more extensive than in earlier eras. Examples include Lucida, ITC Stone, Rotis, Computer Modern, Thesis (1994) by Lucas de Groot, Le Monde (1994) by Jean François Porchez [the text fonts in these books]. Adobe released a new technology called “Multiple Master”, which enabled type users to modify and calibrate typefaces through a wide range of variations. This technology and its fonts were not commercially successful, however, and were cancelled before the year 2000.

Digital technology also enabled type designers to create typefaces for specific corporate clients and applications. Among many such, there were Colorado (1997) by Ladislav Mandel with Richard Southall, Telefont (1993) by Martin Majoor, and Le Monde and Parisine (1996) by Jean François Porchez.

As styles and variations expanded widely for Latin typography, digital tools in conjunction with the Unicode standard spurred expansion of non-Latin typography. Greek, Cyrillic, Arabic, Devanagari, Thai, Kanji, Chinese, Korean, and many other scripts were digitized. Lucida Sans Unicode (1994) was an early demonstration of Latin harmonized with non-Latin alphabets in a single TrueType font. The concept of integrating Latin and non-Latin scripts

in a single font was widely adopted and extended by the end of the century.

8. Hervé Aracil: Hybridization, (de)-construction and quotation — a view of typography from 1985 to 2000 (*Hybridation, (dé)-montage et citation – Un regard sur la typographie des années 1985–2000*)

Between the advent of the LaserWriter printer with Macintosh typographic fonts, and the end of the 20th century, typeface design enjoyed a period of richness and complexity that can be characterized by the words “transposition” and “reprise”. Translation from one medium to another is a form of transposition, and renewal of historical themes is a form of reprise. These interweaving tendencies in end-of-century typography, in opposition to prior movements like modernism, produced typographic phenomena equivalent to post-modernism and deconstruction in architecture, design, and music of the same period.

Digital technology, which made it easy to copy, cut, paste, and manipulate letterforms, aided these tendencies. One result was “hybridization”, the combination of characteristics from two or more different and distinct typeface categories. A forerunner was a hybrid letter ‘n’ combining sans-serif, slab-serif, and Elzevir serifs (think Times Roman serifs) in Thibaudeau’s *Manuel français de typographie moderne* (1915) [*French Manual of Modern Typography*; see accompanying figure].

Hybrid designs from the end of the century included, among many others:

- Prototype (1990) [capital + lowercase] by Jonathan Barnbrook,
- Dead History (1990) [mixed bold rounded + modern] by P. Scott Makela,
- Fudoni (1991) [Futura + Bodoni] by Max Kinsman,
- Disturbance (1993) [capitals + lowercase] by Jeremy Tankard,
- Walker (1993) (serif + ligature variations) by Matthew Carter,
- Amplifier (1995) [slab + rounded + Clarendon] by Frank Heine;
- variations of type design in coordination with literature included Quantage (1988) and Syntétik (1992) by Pierre di Sciullo.

In summary, such hybridizations, variations, and idiosyncrasies are not simply quaint experiments in typographic forms, but also constitute critical discourse on the philosophical bases of typography itself, for scholars, authors, readers, and designers to ponder and explore.



A spread from Thibaudeau’s *Manuel*.

Alan Marshall: Fourth Interlude: On the preservation of typographic heritage (*Quatrième pause : La préservation du patrimoine typographique*)

The word “typography” has two meanings. Originally, it meant the composing and printing of texts with movable metal type, which stayed much the same from its invention by Gutenberg in mid-15th century to the 1970s. At the end of the 19th century, typography also came to mean publication layout or typographic design. Typography now means not only printing on paper but also text on signs, packages, media, and computer screens. Type is a fundamental element of visual communication affecting everyone in literate society, whether through ephemeral or enduring artifacts: cinema tickets, utility bills, restaurant menus, train schedules, posters, magazines, and books, printed or electronic.

The three pillars of typography are technology, aesthetics, and cognition. The technology of typography changed only incrementally from the 15th to the 19th century. but has since undergone a series of technological revolutions [described in earlier chapters of these volumes] which transformed typography into the basis of our information society.

Typographic aesthetics have also changed. The stiff typography of posters in the early 19th century became the exuberant letterforms on posters in the Belle Époque at the end of the 19th century. The graphical appearance of typographic documents comes from the co-evolution of type technology with the needs of society.

Cognition connects typographic technology to aesthetics. From the cuneiform tablet to the computer screen, text has always been interpreted by the same tools: our eyes and brain. The tools and media of visual communication are in constant evolution but perceived through our human instruments.

What is our typographic heritage, and why should we preserve it? Typographic heritage began with Gutenberg and continued in metal for centuries. Today, type is no longer metal, nor photographic, but computer data. Although type has thus been

dematerialized, it is essential to preserve as much as possible of the metal punches and matrices, as well as the negatives of the phototype era, as well as drawings, proofs, and specimens of characters, so that we can understand the ancestral processes, thoughts, aesthetics, and graphical forms that shaped our modern fonts and layouts. Type comprises not only letters, but also ornaments, fleurons, dingbats, and other graphical elements that have evolved over the centuries, tracing a rich history of abstractions and patterns, from Jean de Tournes to Giambattista Bodoni.

In addition to type itself, there are typographic manuals, catalogues, advertising, and lessons showing how type was classified, organized, understood, and intended to be used, as well as manifestos proclaiming how type should be used. These materials, publications, and documents of typographic history constitute a rich source of inspiration, information, and education for the future of typography, affected by constant reinvention not only of technology but of changes in taste, fashion, and social applications.

Typographic preservation is divided among diverse institutions, including libraries, archives, museums of paper, of printing, of computer history. Although it is impossible to preserve every sort of typographic and printing material in one establishment, such institutions prevent the total disappearance of the materials that allow us to analyze the evolution of the techniques and forms of graphic communication.

Typographic material from the pre-industrial era of typography, from Gutenberg to the 19th century, is now so rare and valuable that it is preserved without question, but more plentiful typographic materials from the 19th and early 20th century pose the question of what should be preserved with the regrettably limited funds available to museums and libraries. For the recent eras of phototype and early digital type, the question becomes evaluative— which of the now obsolete materials are more valuable and worth saving, and which can be lost?

[CB: The preservation of typographic materials illustrates a fundamental problem of “disruptive” versus “sustaining” technology. “Disruptive” technology is admired because it replaces older technology and institutions based on it, with newer, more efficient and effective methods. But, in typography, the disruptive shifts from metal type to phototype, and from photo to digital type caused the collapse of traditional metal font foundries and consequent loss of priceless collections of unique punches and matrices, hand-crafted by generations of uniquely skilled type artisans. The tangible, physical results of thousands of person-years spent carving and casting the

most intricate metalwork made by mankind— equivalent to centuries of fine jewelry making— were sold off for scrap. The fonts displayed on our personal computers, tablets, and smart phone, the fuel for worldwide social media, are in large part mere shadows of a deeper cultural heritage lost in a disruptive scramble.]

Thomas Huot Marchand:

Postface: The metamorphosis of typography
(*Postface : Les métamorphoses de la typographie*)

Despite several radical changes in technology, which accelerated in the 20th century, typography has shown an amazing permanence of forms. Many of the fonts in use today are modeled on typefaces of previous centuries. Technological changes have, however, altered several principles underlying the forms. These include flattening, abstraction, fluidity, and instantiation.

“Flattening” is a dematerialization of the formerly solid typographic object. Type was three-dimensional metal for 500 years, but phototype was two-dimensional film image for 50 years. Digital type describes two-dimensional forms but is not “material” per se, but is instead computer code. Flattened 2D type enables distortions and superimpositions not feasible in metal type.

Abstraction is a reduction of a form to a set of parameters and instructions instead of a graphic object engraved, drawn, or written. In particular, in the Metafont computer language devised by Donald Knuth in the late 1970s, the description of a character is based on variable parameters of a virtual path in a plane. Changing parameters alters the form. The concept of type as a prefabricated instance of writing is therefore opposed by the variability of programmatic typefaces like Knuth’s Computer Modern.

Fluidity: [CB: The French term here is “liquéfaction”, evoking odd connotations in English.] Digital fonts and characters can “flow” from one computerized medium to another, e.g., pixel arrays on display screens, toner and ink arrays from laser and ink-jet printers. Digital text can be re-flowed on the screen when text block dimensions, kernings, line spacings, and other parameters are altered. Fonts and text are not bound to specific devices.

Instantiation: [CB: The French term here is “congélation”, meaning freezing. Although it makes a nice contrast to “liquefaction”, it doesn’t have a direct English translation.] In some digital font technology, pairs or sets of structurally similar characters along some dimension can be interpolated or extrapolated to generate new characters. For example, between a light weight letter ‘a’ and a bold

weight ‘a’, many other ‘a’s of intermediate weights can be interpolated. Interpolation was used in Ikarus software for type production, and was marketed to users by Adobe as Multiple Master fonts, and briefly supported by Apple in GX font technology. [The concepts have recently been reinvigorated as “Variable Fonts” (OpenType Font Variations).]

Emancipation: In the 20th century, designers were emancipated from the heavy machinery of typographic production [see previous chapters in this volume on phototype, transfer type, and digital type]. Type could be designed and produced more rapidly and less expensively, and digital type could be distributed through the Internet, enabling small independent digital type “foundries” to enter the font market.

Proliferation and concentration: Although emancipation enabled small type firms to proliferate, business circumstances within the font industry led to acquisitions of smaller firms by larger ones, resulting, for example, in the Monotype firm today, which, after its acquisitions of [ITC, Linotype, Bitstream, FontShop] now offers tens of thousands of digital fonts.

Streaming: [CB: The French term here is “évaporation”, which joins “congélation” and “liquéfaction” to make an analogy, whether intentional or not, between the physical states of water and fonts: solid, liquid, and vapor. My ad hoc translations do not capture this surprising analogy.] The widespread adoption of “web fonts” by most web browsers enables the streaming of fonts over the web. Adobe Typekit, Google Fonts, Monotype web fonts, and other firms provide on-the-fly downloading of fonts to documents, some for a fee, some free.

Is there a need for new fonts? Yes, more than ever. The great masterpieces of past type design should not lead us to believe there is no longer any place for invention. As Stanley Morison observed, “type design moves at the pace of the most conservative reader.” Over time, new designs appear and are added to our stock of earlier faces without rendering the latter obsolete. This series of books on the *History of Typographic Writing* reveals, in addition to major typographic trends, pathways seldom followed, type styles little known, designs rarely adopted. There should be a dialogue between typographic historians, theoreticians, and practitioners to integrate research in all these areas.

Extension to other writing systems: It may seem that there are more than enough fonts for Latin typography, with its history of typeface design and variation since Gutenberg, but non-Latin writing systems and scripts, including Arabic [as well as Indic scripts, Southeast Asian scripts, and East Asian scripts, which are often more complex and comprise more characters than Latin-based alphabets, open up new horizons for typographic creativity around the world. There are today more than 120,000 characters in 129 writing systems.

Bibliography and end materials

The bibliography for volume II contains 405 entries, subdivided into: (a) earlier volumes in the series; (b) encyclopedias, dictionaries, and inventories on typography; (c) specimens; (d) printing, typography, book arts: general history, theory, technology; (e) history of typography and graphics arts 1900–2000; plus sections with bibliographic references for each chapter and interlude. This supplements, with some overlap, the 412 entries in the bibliography of Volume I.

Illustrations. As with the first volume, this second volume is profusely illustrated, containing some 391 figures and 7 miscellaneous images and endpapers.

Indexes. There is a three page index to typefaces cited in the texts, and a six page general and typographic index.

Awards. At the 2017 Perpignan International festival of books on art, architecture, photography, cinema, and graphics, the two volumes of *Histoire de l’Écriture Typographique* won the prize for best book on graphics — a well-deserved honor.

In conclusion. The reviewer has provided extensive summaries of the chapters because these two volumes are unique in their extensive survey of 20th century typography and therefore merit the attention of English language readers. Depending on subject matter and potential readership, certain chapters would be worthwhile in stand-alone English translations, and a translation of the whole would greatly benefit typographic scholarship.

Explicit Liber.

◇ Charles Bigelow
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