Malou Verlomme, Reading, 2005

Technological shifts in type design and production

Dissertation submitted in partial fulfillment of the requirements of Reading University for the degree of Master of Arts in Typeface Design

Abstract

This dissertation is an attempt at analysing the development of type design and production technologies. The transitions from a technology to another are often agitated periods in which fundamental question arise. These underlying theoretical issues related to technologies are observed through different points of view. First, a simple semantic analysis of the mediums and the tools of type design and production is conducted. In a second time, technologies are seen through the shifts from one to another. The manner in which the invention is made possible, and the way in which designers appropriate a technology is where lies the interest of this study. It also tries to look at the effects of these changes on the way type is being designed and produced; particularly in the separation of the roles provoked by a shift to a new technology. A few cases of revived typefaces are described and the intention behind them are deducted. The goals of this dissertation are double: first, building a set a tools consisting in a vocabulary and abstract concepts useful in analysing history and current practice. And secondly, identifying directions in type design, attitudes of designers and their view over the role of technology.

Contents

I. Introduction

1. Scope

This dissertation is not an attempt at describing the successive technologies used in type design and production. Instead, it tries to look at the nature of these technologies and their effects on letterforms. It is more interested in the issues brought up by a technology, and a change to another, than by the way in which this technology happens. These periods of change brought up a lot of fundamental questions on typography. With time, type designers, type manufacturers and typographers have started to develop a critical view of the tools they until then regarded as neutral. A lot of essays, correspondences and books adopting contrasted points of view create a fertile ground for discussion.

Processes in type making vary considerably from one technology to another, consequently, stages and roles in production have to be devised in order to create tools for analysis. Richard Southall devoted most of his writings to creating those tools. He developed a system of thought made of vocabulary and abstract concepts that are recurrent in all of his writings. In a lecture at the University of Reading[1], he planted the seed that lead to this dissertation. He redefined with his vocabulary certain processes never questioned so far. This system has the advantage of being expandable and creating a tool that may evolve with typographical knowledge and culture. This dissertation tries to investigate related theoretical fields with the same intention. Its intention is not primarily to look for new evidence, but rather to try to integrate a large amount of available information within a system.

This study also comes from the difficulty of looking at the history of type design in a significant way. It comes from the will to define a system, a frame of elements to look at type design history. A theoretical structure, a way to look at things. It covers a lot of ground, tries to encompass the overall history of type design and the four main technologies in use. This overwhelming program can only be fulfilled in such a short text by focusing on a very thin transversal layer of facts. But if this layer is correctly defined and positioned, it can put into light a great amount of related matter, and provide an entry point in understanding them.

The information presented here can for the most part be found quite easily in available literature on the subject. Its goal is to classify the facts in an original perspective, or to define a vocabulary from the existing body of evidence. Developing a terminology being one of the principal goals of this dissertation, the choice of word for certain concepts is explained in related chapters and not in this introduction. Nevertheless, two of the most important concepts are described here.

[1] The lecture was given in November 2004.

2. The word *Technology* in this text

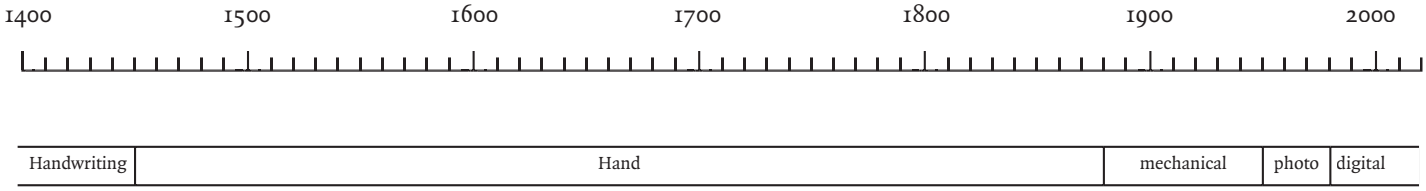
The word *technology* is used here in a very broad sense. It encompasses the four main processes of type design and production: hand punch cutting; mechanical punch cutting & composition, photocomposition and digital. Indeed, a file or a pencil is here as technological as a complex rasterization device or a pantograph. And to a certain extent, even handwriting is here considered as technology. This latitudinarian use of terminology although lacking precision, enables an easier comparison of methods throughout techniques used in type design and production. It enables a systematic

approach and eases the apparition of bridges, contrasts, and constants in the various processes described here. It is in fact for its large possibilities of meaning that is was chosen, leaving room for a development of its definition throughout this text.
Writing about these technologies put to light the difficulty in developing a terminology that works throughout the four developments. The words generally used are confusing: for *hand punchcutting*, one would like to fine a term that encompasses the whole process of the technology, and not only the design related part of it; for *typefoundry*, one would like to incorporated the design part. *Mechanical typesetting* is also referring to one specific part of the type production process; but not to the process as a whole. For these reasons, only the first meaningful part of these terms is kept, to which *typography* is associated. Thus *hand typography* include the processes of cutting a punch, making the matrix, justifying it, casting type, setting it, and printing it. To a certain extent, it even takes into account the way in which type was being used, important type design figures and historical events concomitant to the technology. Once again, the broad sense of the term is looked-for, leaving room for further research to enlighten the notion. *Mechanical typography*, *photo typography* and *digital typography* also follow the same pattern. Thereby, *hand punchcutting* refers *only* to the process of cutting a punch by hand and *photocomposition*, *only* to composing type photographically.

3. The word *type* in this text

(or, *The disappearance of type*)
Type is a word often used to define all kinds of different things. In this dissertation, it has a special meaning, or rather, connotation. The following is an attempt at describing the notion of type in this text.

"Type is something that you can pick up and hold in your hand"
(Harry Carter, *A view of early typography up to about 1600*, Oxford, 1969)



This diagram emphasises visually how little maturity all technologies attained compared to hand punch cutting. This also shows us how little time we have had to reflect over the current digital technology.

The word *type* is partly incorrect to refer to digital letters for the reasons described further. As type disappears and becomes potential, many prefer the word typeface. Type designers are a thing of the past and have been replaced by typeface designers, for no one creates objects anymore. But the following analysis requires a common vocabulary, a word that acts as a bridge over time and technologies. This account portrays the disappearance of type; its remains in late technologies are only conceptual.

This is an attempt to look at the physical properties of type in a way independent of their historical contexts. To look at things in a simple, semantic way, to look at a very basic nature of type. It tries to lay a vocabulary, a way of looking at things that will serve as a background for analysing historical cases.

First we had metal. Hard, timeless, earthly metal. A three dimensional object that has to be sculpted. Then type freed itself from this constrainting body, to adopt light as its medium. Type is then controlled two dimensionally. Light is trapped, directed by black and white surfaces. Finally, type in itself disappeared totally to become nothing more than a potentiality of type representation. Type became numbers. Invisible data. Type is there, but has left our material world. We then have to translate it into appearance.

Where does this standpoint leave us? What impact did this disappearance have on the ways type is conceived? How does one design with metal, light and numbers?

Metal (hand-mechanical)

The first sentence of Harry Carter's *View of early typography* defines in a very simple way what makes type differ from a typeface. Metal type has only one potential, itself. It is self-defined and limited to its materiality. It shows a reversed image of its future representation. It has a weight, and is sold as a merchandise. In this piece of metal is contained information about its printed size, its side bearings, its size on the body. It is the printing form and will be pressed onto paper.

Metal takes type back to something primitive. Something you can touch.

Light (photo)

By adopting light as its medium, type is disembodied. It starts to become a potentiality of type-faces. The medium itself being light, ways to direct it vary, and it already becomes difficult to grasp the object of the design.

Numbers (digital)

Type itself is now totally disconnected with the design procedure. Building a design relation with the medium of type becomes more and more an abstraction, and happens less and less through a simple physical contact. And yet, it is with numbers that the typeface designer deals.

If type as an object disappeared altogether, the concept of type, as the definitive and final form has drastically evolved. "We have had 550 years of moveable type, now we have mutable type"[2]. In this sense too, type has disappeared, or rather it is now disembodied to become an array of representation. Photo typography made type size independent, digital typography made it also device independent. It has become a main challenge for type designer to create a set of forms that can function under a whole range of sizes and environments.

[2] Carter, Matthew, 'Now we have mutable type', part of a talk given to the Royal Society of Arts, london, 1990, published in *Typographers on type*, by Ruari Mc Lean [editor], London Humphries, 1995.

II. The tools of design

It is difficult to associate tools of design to a technology, the two often evolving independently (*see* chap. V). Therefore, some of the tools here commented upon overlap more than one technology, and others are limited to one period.
Even though constantly evolving, these tools can be divided in two main procedures: sculpting and drawing.

1.To sculpt (hand)

Punches sculptors have never been many. From the end of the 19th century, when they stopped being necessary, their number has diminished, until, in the 20th century, when remained only a few such as Rädisch at Enschedé in Holland, Edward Prince in England, Charles Malin in Paris and Christian Paput at the *Imprimerie Nationale*[3] in France. Today, only a few individuals still know the craft, and no one practices it actively. Surprisingly little is known about the practice of early punchcutting[4]. The main texts on the subject suffer from being either from the period but relatively vague (Moxon[5], Fournier[6]) or precise but reconstructed from the little evidence available (H. Carter[7], Smeijers[8], Paput[9]). Nevertheless, the accumulated knowledge is large enough for this research.
Even though the final product will always be two dimensional, cutting a punch is really a three dimensional process. One has to see a hand punch to realise how much they are a sculpture more than a drawing.

[3] Until 2004, punches were still cut by hand by Christian Paput at the National Printing Office in France.

[4] Early punchcutting refers here to the period starting with the invention of printing, and extending up to about 1700.

[5] Joseph Moxon, *Mechanick exercises on the whole art of printing*, London, 1683.

A punch cut by Garamond (left) from the Plantin Moretus Museum; and punches cut by Fleishman (right) from the Enschedé collection.

[6] Pierre Simon Fournier, *Manuel typographique*, Paris, 1764.

[7] Harry Carter, *A view of early typography up to about 1600*, Oxford, 1969.

[8] Fred Smeijers, *Counterpunch*, London, 1996.

[9] Christian Paput, *La gravure du poinçon typographique*, Paris, 1998.

[10] Very basically, using a counterpunch to punch the counter of another punch. (see *counterpunch*)

In all later technologies, Drawing (either with pen on paper or with Bezier curves) became the standard tool. There is therefore a dichotomy in design procedures that leads to different approaches to design. A punch is closely linked to the printing form, and in hand punchcutting, the designer is first the maker. This simplicity in the process made the invention possible (the distance taken by the different forms of type in later developments is described in chap. V).
The part on which the punchcutter acts directly is what will later become the white space. Fred Smeijers investigated the process of counterpunching[10]. This early modular system provides with a regular rhythm of white space, which is very much what the eye perceives at small sizes. It could in fact be more effective in its principle than the one often used today which consists in copy and pasting parts of letters, regardless of counters. The tools of the punchcutter consist mainly in files and gravers of different shapes and sizes. Counterpunches are in a way custom made tools.

[11] 'the tools of punchcutting do not seem to influence the forms of character written with it. The process is completely flexible with regard to the kind of shapes it can produce'. Southall, typo papers.

[12]Fred Smeijers, *Counterpunch*.

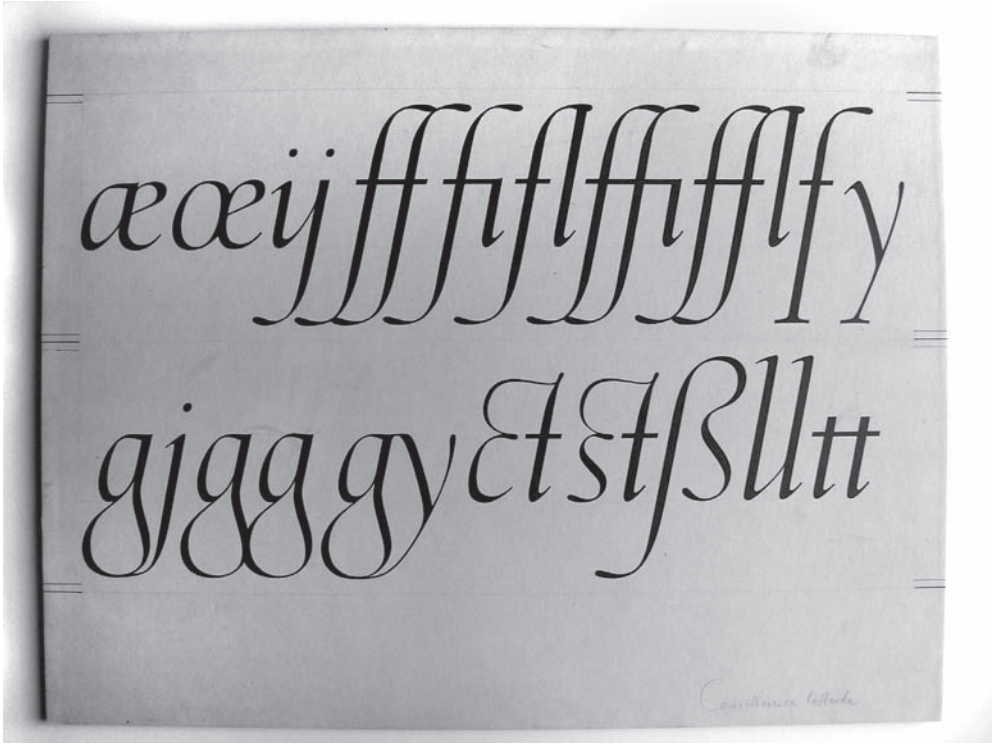
[13] Matthew Carter, 'From punches to pixels', *Letter Exchange* Forum no 8, 2004.

[14] This sentence has for aim to remind the reader that such designer's drawings are not type, but letters. In a second phase, these drawings are translated into type. (see chap. VI)

If files and gravers do not leave any trace of their own[11], counterpunches as tools do leave a trace and influence greatly the design process. Smeijers believes that some couterpunches were used for more than one design[12]. This would indeed make them a very determining part of the design. In fact what defines a designer in this context is also the tools that the he creates for himself. This also reminds us that modularity is not a recent theme in type design.
An other crucial aspect of designing on the face of the punch is its *unforgiveness*.
"If I'd been working on a punch all day and at knocking-off time I took a chip off a serif, I'd just throw away a whole day's work. And that teaches you to think long and hard before you commit to doing a letterform: you have to visualize what you're going to do very carefully. I believe that did influence my way of thinking. Nowadays of course the situation is totally different. If you're using a computer you have an "undo", and there is no penalty for making a mistake."[13]
When trial and error is not an option, one needs to be taught the craft. It leaves little room for experimentation and is far from the scalable, undoable, testable digital design tools.

2. To draw (hand, mechanical, photo, digit)

Comparing the process of cutting a punch and the one of drawing letters on paper is like comparing a goldsmith and a fine artist. The perspectives are different, and designers too.
Jan van Krimpen, embodies a lot of the ideology behind *designing type by drawing letters on paper*[14].



Sketches by Jan van Krimpen for Cancelleresca Bastarda.

The big difference with other means of designing type is that when drawn on paper, letters always have to be interpreted and thereby turned into type. Calling Jan van Krimpen a type designer leaves a lot of room for the term *designer* (or for the one of type). It implies that the design does not happens in

the making, but in the imagination of the designer. Drawings leave room for interpretation, and in that sense are a much more artistic representation of type than any other.

Jan van Krimpen, talking about his drawings[15], differentiates three stages, going from a vague drawing leaving room for interpretation, to a filled in black ink highly finished drawing.

Three stages for the sketches of Spectrum.

Astonishingly, it is the first stage of drawing that Jan van Krimpen prefers: "the first row is the most interesting one and therefore the best; it certainly is the best representation of my intentions vague though they may show. The next row is still tolerable; while the last, the filled in one, has, to my taste, lost most of its interest."[16] This illustrates the very quality of drawings as opposed to any other production related tool. It makes successful teams possible in leaving enough freedom, in being "vague" as Jan van Krimpen puts it, for another protagonist to bring his knowledge into the task of designing a typeface.

Richard Southall explains this semantic distinction with the word *model* (guide to be interpreted) and *pattern* (last drawing to be used for production). This is also the difference he establishes between *appearance* and *shape*. This vocabulary becomes necessary to describe design and production systems. There is a long tradition of drawing of about two inches high. It was the requirements from Monotype to designers, and seems to be a precise enough, yet comfortable size to draw in. The kinds of drawings mentioned here are those of the design and not of the production; the models not the patterns. Contrarily to the other forms of drawings mentioned underneath, since it has no link to the produced form of type it is technology independent. From the engravings made by the commission for the *Romain du Roy*, in 1692 to the immaculate drawings by Jan van Krimpen for Rädisch, until the highly finished drawings by Bram de Does for the Lexicon typeface, drawings as an object separate from production, carry with them a philosophy, an attitude towards typography.

• Drawing with Bézier curves

Unlike drawing on paper and like hand punchcutting as a design tool, drawing with Bézier curves[17] enables one to design directly in what will become type.

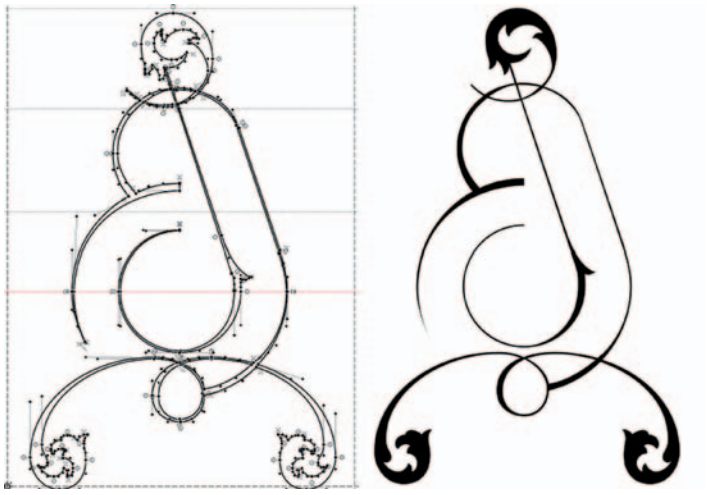
Even though starting with sketches is the common practice in digital type design, quite a few well-known type designers approach a new design directly onscreen[18]. Bezier curves are then the only tools they come in contact with. They are very precise and enlargeable to infinity, but do not allow the fluid and dynamic response of the pen and paper (for a brief account of their invention *see* chap. IV, part 4).

[15] Krimpen, Jan van, *A letter to Philip Hofer, on certain problems connected with the mechanical cutting of punches.* Boston, David R Godine, 1972.

[16] Krimpen, Jan van, *A letter to Philip Hofer, on certain problems connected with the mechanical cutting of punches.*

[17] The distinction is not made here between quadratic (TrueType) and cubic (Type 1) Bezier curves; but it can be assumed by the reader that the basic and most common type of curves (cubic) is the subject of the subsequent discussion.

[18] Zuzana Licko and Gerard Unger for instance have mentioned it publicly.



The outline such as it appears in type design softwares (left), and the filled-in version (right) of the typeface Missionary, distributed by Emigre.
"[...] a typeface designed to challenge the modular contructivist fonts and the cut & paste typography of the time, a result of designers getting to grips with the Apple Mac. The letterforms were developed into a typeface named Missionary, a testament to bezier virtuosity" (Émigré's website).

This approach requires from the designer a relatively precise in-head image of the letterforms before-hand. In other cases, some start a new design by opening a typeface previously designed, constantly modifying the same structure. Summer Stone, in an account of the design of the Stone family[19] describes the same process inside of a family of typefaces "It is possible to use a letterform as a raw material for creating another one". This approach can be related to the punchcutter who built a collection of counterpunches, as a set of recurrent shapes throughout designs, to the custom made set of French curves made by the drawing office[20], and to the stencils cut by Dwiggins for a new design[21]. This method conveys homogeneity, but can lead to design conservatism if used throughout different typefaces. Once theses shapes are defined, it leaves very little room for external elements to be influent.

• Drawing with pixels

Digital technology came along with the concept of *device independent* fonts. Now it is impossible for anyone to predict in which environment, with which output device, at what size (...) a typeface is going to be used[23]. This became an important field of investigation for type designers. But with type being more and more displayed on screen, hinting[24] became more and more imperative. With digital typography designers could attach bitmap images to a font that will display when the typeface is set at the appropriate size[25]. In this, for the first time since the advent of mechanical punchcutting, designers go back to designing type. The designed object is dependant of its size which take us back to optical scaling[26]. Richard Southall who devoted numerous texts[27] on type manufacturing systems and the distribution of the roles in different systems, is very attached to this philosophy of type design. The projects on which he has worked as a type designer all involve a specific environment. From television subtitles to a telephone directory[29], these projects manage to link contemporary design practice and an old tradition, the one of type, of optical scaling.
The way pixels are used today has changed from the early days of hinting. To hint a typeface does not involve "drawing" each pixel for every size[30], but giving instructions to the rasterizer on how to interpret outlines on the grid. On the other hand, bitmaps fonts have known a great popularity since the first experiments by Zuzana Licko.

[19] Stone Summer, 'the Stone Family of typefaces: new voices for the electronic age', Fine pint vol14, no 3, 1998

[20] According to R. Southall, "they were often specially made to fit the characteristic forms of a new design." Southall, Richard, *Printer's type in the twentieth century, manufacturing and design methods*, The British Library, Oak Knoll Press, 2005

[21] In Dwiggins, William Addison, *WAD to RR: a letter about designing type*. Cambridge, Mass., Harvard College Library, 1940 W. A. Dwiggins gives an account of his use of stencils as a recurrent set of shapes through the design. 'I cut stencils in celluloid — a long and short stem, the n arch, and a loop — twice the size of 12 points — pretty small! — and constructed letters from these elements by stencilling.'

[23] Apart obviously from typefaces designed for a specific project in which these factor are know in advance.

[24] Hinting is not defined here, for it is not the main subject of this study and would require a lengthy description. But *in very short*, it is the information added to a typeface that will tell rasterizing devices indications on how to display letterforms at specific sizes.

[25] The size mentioned here is expressed in point per em (ppem) and not in point size.

[26] The word optical scaling refers here to the relation of a design to a specific size, and not to the scaling of a design according to its size.

[27] Southall, Richard, *Printer's type in the twentieth century.*

[29] Colorado project in collaboration with Ladislas Mandel.

• Designing with numbers

What used to be the largest metal surface needed for the design (em square), has become a 1000 units grid (or a 2048 one for TrueType fonts). When early designers used tools to sculpt the face of a punch, contemporary ones move points on this imaginary grid. Instead of filing the sides of a matrix to define side bearings, we nowadays assign a number to each side of the letter. Even if everything is given to us visually, it still is with numbers that we design, store and set letterforms. If the rendering device of type is most often unpredictable, the precision in type configuration is absolute. But is this of any help? It is a very well known fact that type perception and reading, far from being an absolute science, is subject to numerous optical illusions, and subjective perception. This feeling of control can be misleading, if design decisions are less and less the result of perception.

[30] Laurence Penny, during a lecture at the University of Reading, demonstrated the limits of this kind of hinting with a simple calculation: for a font composed of 300 glyphs, in four weights, and by controlling 16 different ppem sizes, the total amount of design to control would mount to 19200. If this has never been done since practically impossible, in some designs from the early days of hinting, actual bitmaps configuration was attached to the typeface.

• Designing with programs

Designing with programs refers here to the fact of using computer programs and languages to define the very appearance of type, and not as is the case for any digital font, to support it. Two of the most visible attempts are the Metafont project by Donald Knuth[31] or more recent experiments by Letterror, such as Beowolf [32]. These experiments are not central to this study, therefore are only referred to for their implications on designing processes. In the separation between the designed and the final output, digital typography introduced the concept of device independent. Designing with programs implies taking one more step in relying on exterior element for the final form of type. Metafont lets the user define a certain amount of parameters that result in the creation of letterforms. Beowolf relies on a structure, but when the font is sent to an output device, the outline is distorted in three degrees of randomisation. If Metafont is a system, a type generator, and Beowolf an actual typeface, both might instigate a future direction, a step further in the distance taken by the designer from type.

[31] See, Knuth, Donald E, 'The concept of a Meta-Font.' *Visible Language*, vol16, no 1, 1982, pp 3–27

[32] Beowolf was designed by Erik Van Blokland in 1990, distributed by FontShop

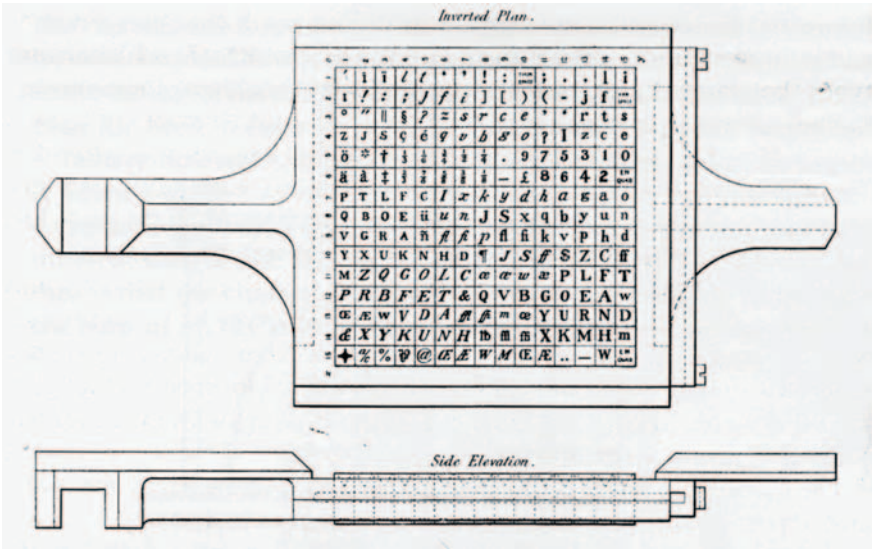
III. Design constraints and limitations

1. Hand punchcuttting

Punches cut by hand do not seem to suffer any major technical limitation. In his *Counterpunch*, Fred Smeijers creates an analogy between the size of a curl cut from a punch and the way in which we measure definition on a printer. He comes to the conclusion that a hand punchcutter can define the shape of a punch with a precision of 2540 dpi (!). In other words, a graver can be precise much beyond what our naked eye can perceive. In that respect, a limitation exists in the fact that the punchcutter cannot enlarge his design as it became possible in later technologies. Another minor limitation lies in the minimum width of strokes in order for the punch not to break when struck into copper.

2. Mechanical punchcutting

When going from hand punchcutting to mechanical punchcutting, typography went from a craft related activity with few constraints, to an industrial, full of technical requirements activity.
The main requirements associated to mechanical typography are those of the Monotype and Linotype machines.
When setting type with the Monotype machine, the operator types text with a keyboard that transfers information by punching holes in paper ribbon. At the end of each line, the correct width for the space character is specified in order to justify the line properly. For this reason, a procedure had to be devised that would systematize the width of each character. Monotype conceived a system based on their diecase (also called matrix-case).



The Monotype diecase.

This system often referred to as *the 18 units system*, deals with relative units, not connected to any actual point size. Thus all widest characters (often W, Œ, Æ) have to share exactly the same width. Their width is then divided into eighteen units, used to describe all the other characters of the typeface. These restrictions are particularly bothersome when the task of the drawing office is to translate a designer's drawing into a pattern (a distinction has to be made between the *drawings* supplied by the designer, and the *patterns* executed by the drawing office from the designer's drawing, which are to be used as a guide for the pantograph operator). But when, as was the case with Monotype

Plantin and Imprint, the design is executed by the works itself, this constraint can in fact become a help in the design process. It has been observed by Walter Tracy[33] that the two typefaces share common width. One can see how this given set of character width can become a strong basis for a new design, and how it must have enabled the drawing office staff to "concentrate on other aspects of the design"[34]. This is a case of a design being executed for a specific technology, by the very operators of this technology, making it a starting point to the design, and not an obstacle to an ideal form. Both these faces have now become classics, and are seen by some as the pinnacle of the hot metal era.
The amount of characters contained in the grid created by the Monotype diecase also determined the character sets of the typefaces designed in this period. For instance, the first Monotype diecases were constituted of 15 rows of 15 characters of the same width. The character set for the typefaces of this generation were therefore comprising 225 characters.
If the first Linotype systems did not require any fixed width characters, its main limitations lied in the impossibility of kerning[35] any of its characters, roman or italic alike. In cases where kerning was primordial though, Linotype would cast pairs of kerned characters[36]. In later systems, the Linotype adopted the 18 unit system grid, and even more constrainting, in certain cases, the roman letter had to share the same width as its italic counterpart. But, as Robert Bringhurst points out, "a number of typefaces designed for the Linotype were artistically successful in spite of these constraints".
An other requirement shared by both Monotype and Linotype is the size of the patterns to be followed by the pantograph. Both systems need patterns to a body size of 25 cm (10 inches) with an accuracy of around 0,2 mm (0,008 inches). In this, the pattern has clearly left the field of design to the one of highly technical drawing.

[33] Tracy, Walter, *Letters of credit: a view of type design*. London, Gordon Fraser, 1986

[34] Southall, Richard, *Printer's type in the twentieth century.*

[35] *kerning* refers here to the metal sense of the term — a piece of the type going over its width — and not to the present digital sense of the term — pairs to which are assigned positive or negative spacing values

[36] This was the case for instance with the Caslon Old Face cut by Linotype in 1921. This practice called duplexing required the two duplexed letters to be identical to their corresponding characters.

• A fruit of metal limitations: Sabon

In the early 1960s, a group of German printers were looking for a typeface that they could use in the three text setting systems of the time: Monotype, Linotype, and foundry type (represented by Stempel) while appearing to be the same. The commission to Jan Tshichold also required the typeface to be in the style of Garamond, but slightly narrower for the sake of economy.

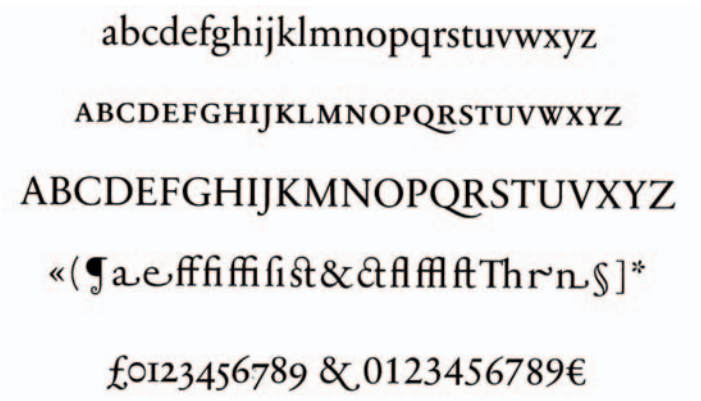
abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ

Digital version of Sabon, similar to the linotype-Monotype metal version.
Notice that roman and italic have the same width.
Distributed by Linotype.

A lot of discussions has happened over which exact source was used as a basis for the design, but this issue is not relevant for the present discussion. What is of interest though is the way in which Tshichold managed to overcome these limitations (*see* chapIV part 2). Indeed, he succeeded in creating what has become a classic, while being under the constraint of both Monotype and Linotype's technical limitations. The most visible effects of the Monotype width system can be observed in comparison to the foundry type version that wasn't affected by these requirements. Some letters such as the lowercase "a" seems surprisingly wide for a Garamond, and most of the italic is also very wide for a Baroque inspired typeface (they had to share the same width

as corresponding roman letters). But Sabon bears little enough resemblance from the start to a pure Garamond for these details to stand in the way. Once Sabon is seen as Sabon and not as a revival (the name itself is only remotely connected to Garamond), the charm of this typeface becomes unmistakable. The absence of kerning due to the Linotype system was also admirably *avoided* — or *used* — in most *problematic* — or *thought provoking* — cases. "[...] the impossibility of kerning in Linotype hot-metal typefaces resulted in elegant solutions to letters that would usually kern"[37]as Christopher Burke notices. The italic lowercase "f", for instance has no outstroke, but once set in text, it flows remarkably well. The roman lower case "f" is narrow while elegant, and the uppercase "Q" manages to retain grace without overleaping — and everyone who has seen Garamond's equivalent knows how much they do. If this is standardization, it is done by a very talented designer.

[37] Burke, Christopher, *Jan Tschichold & Sabon, Sabon Next specimen*, Linotype Library GmbH, 2003



Sabon Next, designed by Jean François Porchez. Distributed by Linotype.

The recent digital version (Sabon Next) designed by Jean François Porchez was presented by the distributor (Linotype) as a revival of a revival (One may ask in this context if not all typefaces are). Jean François Porchez's demarche consisted in doing a research to discover which exact sources were used by Tshichold in order to design Sabon as it would have been designed — or one should say *as Porchez thought Tshichold would have designed it* — if he had been free of any technical requirement — or rather if the only requirements were the ones of the current state of digital technology. But some have criticized this approach by saying that what defines Sabon is precisely the way in which it *uses* these technical requirements. "Sabon is the fruit, not the victim, of its constraints: to redraw the Sabon today without taking into account its original and specific context equals denying the very reason for its genesis. Let us attempt an analogy: who would dare producing a coloured version of *The Battleship Potemkin*, pretexing that only black and white filming existed in Eisenstein's time?"[38]. Once again, this asks the question of the way in which a revival is to be directed. When should one stop in the backward quest for an ideal model? Are technologies to be seen as an obstacle or a springboard?

[38] "Le Sabon est le fruit, et non la victime, de ces contraintes : redessiner le Sabon aujourd'hui sans tenir compte de ce contexte originel spécifique revient à nier les raisons mêmes de sa genèse. Osons une comparaison : qui aurait l'audace de produire une version colorisée du Cuirassé Potemkine sous prétexte que seul le cinéma en noir et blanc existait à l'époque d'Eisenstein ?" Darricau Stéphane Etapes no 117, fev. 2005, p. 36-41

3. Phototypesetting

If metal-typography is defined by its limitations, photo-typography could be defined by the disappearance of metal limitations.
Phototypesetting freed type from most of its constraints because not only did the technology change, but the actual medium of type changed dramatically (*see* chap.I, part 1). It only barely staid part of our physical world. Type becomes an image that can be freely distorted, scaled, overlapped...
The most visible aspect of these new possibilities was seen in the kerning, or tracking of text. It is natural that being offered such new possibilities, some typographers and graphic designers took it as far as they could — too

far. “Children play with a new game until they brake it; in the late 1960, photocomposition was treated equally.”[39]. This play on conventions was indeed done with more or less talent. The result was stimulating, but broke away drastically from tradition and typographical “golden rules”. Some theories were even submitted sustaining the argument that creating a compact block of letters made word recognitions easier. This was also joined by modernist movements, and a debate over the use of sans serif typefaces.
In one hand, most traditionalist typographers and type designers saw in photo typography the possibility for unscrupulous typographers to fulfil their “type crimes”, so far limited by the constraints of metal. On the other hand it enabled unleashed creativity in display typography, represented notably by Herb Lubalin and Ed Benguiat. This generation of type designer, graphic

[39] “Les enfants jouent avec un nouveau jouet jusqu’à le casser ; à la fin des années 1960, la photocomposition connut le meme sort”. Blackwell Lewis Typo du vingtième

Deformations of the thext in this advertisement are the result of manipulations with the typositor machine launched in 1961

designers and typographers saw the full potential of Photo typography as an image related technology.
Ligatures for example reflect this logic. Some text ligatures partly disappeared from the production of typefaces from the period, because they where not needed so much now that letters could come as close to each other as wanted. And at the same time, display ligatures started to appear, best known with the Avant Garde typeface by Herb Lubalin.

“Logo” for the Avant Garde magazine, which eventualy became a typeface of its own.

In short, it could be said that the Photo typography era was observed by many as a time of decrease of quality in text typography, while display, expressive typography blossomed. But is it that Photo typography corresponds more to display than text typography, or is it just a result of new possibilities that had to be fully explored, before going back to tradition?

4. Digital

What are the limitations of digital typography? The history of constraints was in a way a history of liberation from the original metal medium. At the time of OpenType and programming in type, it is hard to see what are the current constraints for type designers. Now that a technology separates us from this first demanding metal medium, it becomes more a question of new possibilities than of limitations. It is only with time than one can reflect on one's tools, and become critical. In Photo typography there was a search for the limits of the tools, of the new possibilities. These currants in type design are very much influenced by exterior factors such as sociological and historical ones. Indeed, just as the industrial revolution "created" mechanical typography (its tools, its role distribution...) in the 1960s, the atmosphere lent itself to new experimental approaches. It is hard to be critical over such evolutions for present digital technologies, but it can easily be compared with artistic and cultural currents. Relations between a certain globalization of knowledge and culture, and the changes in production processes, lead to the much debated 1990s experiments. Once again, designers felt the need to see how far they could go with the new toy that technology became. But interestingly, some of these very designers (Zuzana Licko from Émigré for example) have in more recent works gone back to more tradition-aware designs. Besides, it is now possible to identify certain elements of these experiments that have been incorporated in common practice and reading habits. Modularity for instance was always intrinsic to type design (from the first counterpunches) but has now come to a peak with font development software.

When this formal vocabulary forged in first periods of experiments become cliché and is taken on by the mainstream of advertisement and public, the very sense of these experiments is lost. Furthermore, the very nature of an experiment implies that it might fail. Experiences in legibility for example are central to type design, yet, it is the most difficult ground on which to be experimental, being constantly slowed down by very conservative reading processes. If letterforms were the subject of experimentation in early digital technology, it seems the focus now might have shifted more to the possibilities offered by programming incorporated in a font. If the experiment first happened on the face of type, it might now involve the font as a system, and "smart" options added to a font. OpenType can be seen as a new technology by itself, and just like any preceding ones, it is going through phases of appropriation. The first goals of the format to surpass both True-Type and type 1, and to make certain existing typographical features easier to use[40] has already been attained, and new possibilities never though of before start to arise. But the technology is too young for anyone to try to predict the degree in which its potential will be used.

From a constraint point of view, typography became more and more standardised and suffered more and more constraints until the advent of mechanical typography. From that point on, it progressively freed itself from these constraints, leaving designers with two possible directions: using the new tools to return to older, more refined letterforms, or going forward in the standardisation of type.

[40] Ligature and small capitals for example are now very easy to use with OpenType compared to type 1 or true type formats.

IV. Technological Shifts

• Shifts

When pottery was first invented, it was used to reproduce wicker baskets. It is only in a second stage that all the possibilities it offered were explored. In fact this pattern can be observed in almost any technical invention. With the invention of printing, punchcutters first tried to reproduce handwriting as faithfully as possible, before conceiving type as an independent means of communication. With each development in type production, the same pattern can be observed.
These shifts are in fact more transitions, adaptations; and this is the only possible pattern for evolution. The reasons for this are of industrial and human natures. The inventions of new type production technologies have had tremendous effects on the printing industry. When phototypesetting was implemented, all the existing types became obsolete, and this had for effect the bankruptcy of many foundries and printers. Therefore, subtle improvements of technology are more manageable for the industry. Another factor, maybe even more influent for this necessary smooth transition is the human factor. Traditionalist typographers have often seen technological development as a threat for their beloved classical typeface. Therefore, type manufacturers have tried to temper the transition, being afraid of loosing clientele. In cases of a shift stirring radical modification in letterforms, reading habits are also an obvious factor in slowing down the apparition of type embracing fully the new possibilities offered by the newly developed technology.
This is a very short history of typography seen through its four main technological shifts. It is very selective and does not attempt to offer any definitive view on the subject, but tries to lays relevant elements for the object of this study.
As we will see, technological shifts are in themselves a construction of the mind. History consists of transitions, and adaptations. We later rationalise this evolution by isolating dates and milestones. A more faithful wording might be technological *change*. But identifying key periods in these developments is a necessary step to build a finer frame of investigation.

1. From manuscripts to Hand punchcutting

(or, *from handwriting to typography*)

Necessity being the mother of invention, it was to reproduce the gothic handwritten letters of medieval scribes that Gutenberg invented printing[41]. The need for speed is a major factor in the invention of all type design and typesetting technologies. Gutenberg did not only transfer written letters onto type, he also made use of the abbreviation and other signs (points, underlined letters...) in use by scribes at the period. This first aspect of type as a "fake" written letter was in fact criticized by some of Guttenberg's contemporary. Jenson is the one generally credited for combining in an harmonous way the humanistic minuscule (a late version of the Carolingian minuscule) in use in Italy around the mid fifteenth century, and the Roman inscriptional capital. This early roman provided a model that kept on moving away from its calligraphic origin to become more and more rationalized.

[41] Many other inventors were suggested, of which the most important is the Dutch Laurens Janszoon Coster. But present day historians seem to agree that Gutenberg's invention came prior to Coster's. Some even believe that Coster never existed, but was a made up legend (see, Middendorp, Jan, *Dutch types*).

2. From hand punch cutting to mechanical

• The role of the punchcutter

The transition to mechanical typography can be observed through the role of the punchcutter in type production processes. The thorough transformation it witnessed is representative of the changes in the way typography has been regarded. Gutenberg's invention was based on the knowledge accumulated by goldsmiths, and was therefore a very craft related process. Throughout the 16th and 17th century, the punchcutter grew into a more cultural figure. Publisher, printer and punchcutter were often the same person. This evolution maps the democratization of printed book, as a way to spread knowledge, as opposed to the manuscript, reserved to a chosen few. The punchcutter attained its golden age in the end of the 17th and the 18th century. The role of the punchcutter and the number of them in activity, started then to decrease until the 19th century when it became solely represented by a few figures such as Edward Prince and P. H. Rädisch. From an important cultural figure embracing all the design, production, printing processes, the punchcutter became an executor of someone else's design. If it lost practically all its cultural and design related activity, it also became the keeper of a long acquired typographical optical knowledge. The punchcutter went from transferring handwriting into type to transferring drawn designs into type. This isolation of the process opened the way for the invention of the pantograph.

• A beam of inventions

In the 19th century, increase in literacy and the newspaper industry were two major factors in creating a need for speed in composition. At the same time, inventions in other sectors of industry fed the printing and type production techniques. The printing presses had already greatly improved their speed[44], but type still had to be composed manually. This painstaking process implied the use of a constantly increasing number of hand composers; and acted as a brake to speed. The allocation of a fixed character width was a first step towards mechanization of the process. This meant that composing justified pages became systematized. The first mechanical composing machines were simply trying to reproduce the job of the hand composer — even inside inventions, smaller inventions still follow the same path... If the result wasn't as revolutionary as expected (they were still very slow and needed continual assistance), they enabled the discovery of "another important nineteenth-century invention, the keyboard"[45]. Mechanical composition only really became successful when it departed from its previous form: by mechanically assembling matrices and not already cast type. It also meant that the type was always fresh. This system then split into two different machines that carry the name of their companies as well as their basic principles: the Monotype machine, assembling separate type, and the Linotype, assembling lines of types (the latter was more often used to compose newspapers, because faster, but difficult to correct; and the first was more used for books because slower, but easier to correct). But this also required a huge amount of matrices. The existing stock of hand cut punches was soon to wear out and break. The last necessary element for mechanical typography was then invented: the pantograph.

[44] Lord Stanhope's iron hand press around 1800, followed by George Clymer and R. W. Cope, increased the power of impression by printing in one movement. Later on, presses worked around a cylinder and were powered by steam, with notably Frederick Koenig and Andreas Bauer's press for *The Times* in London.

[45] Carter, Sebastian, *Twentieth century type designers*, Trefoil, 1987

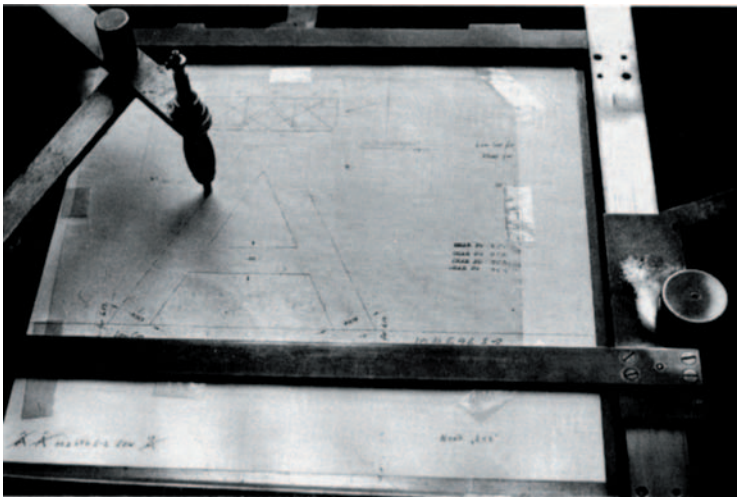
• The pantograph

In 1884, Linn Boyd Benton (1844-1932), an American type founder, invented the pantograph. Most type technology inventions happen by transferring the knowledge from an other field into the one of typography. In this case the invention consisted in adapting the pantograph from display to text typography. Thus, in its principles, the pantograph was already in use for the production of wood type as early as 1834.

Not only did his invention permit to produce mass quantities of matrices for mechanical composing machines, but it also enables to cut a punch from a drawing, therefore changing once and for all the way type was being designed and manufactured. As Sebastian Carter puts it: "Now it was possible for anyone who could draw letters, and even people who could not, to design typefaces which could be linked into practical shape by the foundry drawing office". The separation that had began to operate between designer and producer of type with the *Romain du Roy* was completed by the invention of the pantograph. (*See* chap. V For a more detailed account of the distribution of roles in type design and production.)

Another way in which Benton changed the course of type is by adding an element that would stay ever after: scalability. When a hand punchcutter was to cut a punch, he would cut one punch by required point size and thereby operate optical corrections for each specific size. Small sizes would then bear low contrast between thick and thins, large counters, and loose spacing; when large sizes would tend to have much more contrast, narrower counters, and tighter spacing[46]. These adjustments, if invisible by the lay person are crucial factors in legibility and good behaving of type at small sizes. This knowledge that had been acquired by a long tradition of punchcutters and apprentices was threatened at once by the pantograph. Now, one set of drawings (not always executed by someone who knew much about type) could serve a whole range of point sizes. Not only was it possible to avoid the painstaking process of optical scaling, but the person who knew this "science" was no longer needed. Even though in many cases, type manufacturers still produced more than one master per typeface, the practice started to vanish, to become almost obsolete in photocomposition. The replacement of the punchcutter by a machine was achieved. The pantograph itself is often blamed as the trigger of the industrialization of type design; but it is its use by the drawing office that can be criticized.

[46] For a more detailed account on adjustments operated by hand punchcutters, see Harry Carter, *A view of early typography up to about 1600.*



Pattern drawing from a pantograph.

3. From mechanical to photo

In the end of the 18th century, the Bavarian Alois Senefelder, invented the basic process of lithography. A drawing made with a greasy pencil on a limestone was damped then inked. Water is driven away by grease, and ink by water. This is the first time printing happens entirely two-dimensionally (planographically), and defines the underlying principles of lithographic offset printing. In the middle of the 20th century, offset printing is already well established, but printing types with this technique is still very time consuming and illogical: pages of metal types are composed as they used to, and printed proofs are then photographed onto the offset plate. This awkward process led to the invention of a typesetting system that would make the best of available photographic and lithographic technologies. The first instances of photocomposing systems work in the exact same way as the existing hot metal machines, only replacing the matrices inside the diecase by negative images then projected onto light sensitive surfaces. Once again, this first necessary phase of reproducing existing technology was soon to be replaced by a new form, embracing more fully the potential of photographically reproduced letters. There seems to be a general tendency, as technologies evolve, to diversify and multiply the tools, or machines of production. If hot metal composition relied mainly on the Monotype and Linotype machines, phototypesetting technology witnessed a profusion of machines each trying to surpass the last one. These can be classified into two main groups: a first one still very much linked to mechanical typesetting technology, storing type images on film; and a second one storing type information by electronic means, linked to the soon to come early digital technology.

In its basic principle, phototypesetting happens half way between lithography and photography, both technologies of the image. This influence of image in the transition to the phototypesetting technology had a deep effect on the design of new type during this period. Once the first goal of providing a faster technology than mechanical typesetting was achieved, its full potential as a two dimensional, image related medium, began to be exploited by type designers.

In a way, it is with the advent of Photo typography that graphic designers as we know them today appeared. It is that ability to play with type, mix faces, styles, size, and images that differentiates the graphic designer from the composer, typesetter or even book designer.

4. From photo to digital

A type technology can be divided into four phases: the type design technology, the type production technology, the typesetting technology, and the type rendering technology. In many cases, one of them comes first, creating a need for its corollary technologies. In the case of digital technology, letterforms were already stored numerically, and most technological inventions happened *inside* the computer. The successive machines of mechanical and photo typography are replaced by inventions of computer languages, font formats, font development software, typesetting programs. The storing of letterforms in early digital techniques, even though varied, generally involved a grid. This way of representing letters changes completely with the invention of Bézier curves, but has remained in almost all type rendering devices[47].

Pierre Bézier (1910–1999) was a French engineer and draftsman for the car manufacturer Renault. He worked there for 42 years, and was involved in many tasks related to design and construction of cars. It is in this context that he conceived the basic principle of Bezier curves, and fought for their developments in the industry. In an account of his invention[48], Pierre Bézier describes how when he explained his idea to his superior in 1970, he was

[47] Wether a screen or a printer, both function with a rasterizing grid.

[48] Bézier, Pierre, 'Petit histoire d'une idée bizarre', originally written in 1982, http://www.le-boite.com/bezier.html, sept. 2005

told “if your thing really worked, Americans would have been using it for long...”[49].They basically consist of mathematically representing a line in a simple cubic equation. Ever since, they have become the standard for a whole range of drawings, and made possible digital typography. Indeed, PostScript language is based on this way of mathematically representing letter outlines. This computer language bridged type design to what was soon to become a more complete form of digital typography, that includes output devices, typesetting programs, font formats etc.

[49] ‘Si votre truc marchait vraiment, les ricain l’utiliseraient dejà depuis longtemps’

5. Four phases in appropriating a new technology

This attempt at analysing the sequence in which type designers and manufacturers appropriate a new technology will not apply entirely to each of them. As any generalisation, it fails to discern the idiosyncratic and meaningful peculiarities of each technology, something which is dealt with elsewhere in this text. Again, these phases did not happen overnight, and between the peaks described here, a whole range of transitions occured.
The first phase consists as we have already seen many times in trying to match (and surpass in time) the existing technology. Once this is done, designers start to see a potential so far undiscovered with the new technology, and start to exploit it. This exploration, as it becomes experimentation often goes too far (from a functional point of view), but it is a necessary step in understanding the frontiers of offered possibilities. In a fourth phase, one can observe a return to a more history-aware design, but that has incorporated some of the experiments of the third phase. It is a more pragmatic and sensible period in which robust designs are conceived.
This categorisation is not the main subject of this study, but does provide a background to analyse historical cases. Following is a very concise survey of these four phases in hand typography, with for only goal to make this theoretical division clearer.
Until Francesco Griffo and Aldus Manutius, it could be said that type still imitates handwriting. Metal is still used in a relatively crude way, the potential of the tools is not exploited. The second phase extends through the Renaissance, with Garamond until the baroque period, and represent for some the golden age of hand punchcutting. Modern typefaces go very far (too far for legibility) in rationalising letterforms, and are representative of the third phase. The exaggeration of the contrasts between thick and thins come from a determination to push the technological limitation further than ever before. From there and until mechanical typography, hand punchcutting is in its fourth phase and an awareness of past letterforms starts to become more visible. In this backward movement, two periods collapse into one, self-aware representation. A knowledge of the past becomes visible, in that sense, one could call this period *post modern*. This pattern could be applied to each technological appropriation, but also in a much larger scale, to typographic appropriation, as opposed to handwriting. Each technology now becomes a separate phase: hand typography, if observed with the distance acquired with a gap of three technology, appears still connected to handwriting. Mechanical typography defines a strong base for typography as opposed to handwriting. Photo typography tries to take type as far as possible from its origins, turns text into image. Digital technology, once passed its experimental phase, is more mature, very referential, history-aware. Whether applied to the overall evolution of technologies, to one specific technology or to smaller developments, a repetitive pattern seems to appear.
This cycle in human progress has been observed in arts currents, with pictorial discoveries, avant-gardes, and draw backs. This schizophrenic attitude toward progress seems to have somewhat disappeared in present

times where "everything happens at once everywhere". If it is possible to identify directions and specific currents in art until the late 20th century, everything seems to nowadays be thrown in to the big "contemporary art" bag. Or rather, currants are so many that no one tries referencing them. Every artist becomes his own currant. Rather than a disappearance of artistic currants, we would witness a dissemination of them. The same can be said about intellectual currants of thought, which could still until relatively recently be identified. Now, they have branched into so many individual ones that a classification would be useless. This development of human movements could apparent itself to a tree like structure, where big branches split up indefinitely.

6. Reactions

The underlying ideology behind a technology is evidently linked to sociological, historical and industrial context, and can be observed through the reactions it provoked. Amongst the most well known examples of strong reactions provoked by a technology and the ideology surrounding it, is the private press movement, represented by William Morris. In a time of industrialisation of crafts, Morris and some of hid friends set up in 1861 a company[50] that specialised in making furniture according to vanishing traditional techniques. This early approach coupled with political engagement lead him later in his life to set up with Emery Walker, the first recognisable private press[51], known as the Kelmscott Press. The approach developed there came as a reaction to the standardisation of printed books and the decrease of quality that resulted. An often criticised paradox in Morris' personality was being both strongly politically involved in socialism, and at the same time producing high quality books that were only affordable by rich people. Morris was responsible for a few revivals, and most famously the Golden type, based on Jenson's model. Curiously, by going back to previous models, Morris is often credited as the roots of later modernist movements. As Robin Kinross explains: "The types that were cut for the press did look back towards early models, but they created something new. So too the Kelmscott book had the qualities of a dream: an imagined typography of the past, but one that, in its physical richness, was very much there in the present as an active statement. The books were thus of a piece with Morris's utopianism: back-looking and forward looking in one moment"[52]. This attitude was conceptually post-modern, and historically pre-modern.

In the 1970s, and until the 1990s, reaction movements shift from a reaction against industrialism to a reaction against capitalism and globalisation. Contrarily to Morris who went back to old and forgotten techniques, this new reaction movement happened through the liberalisation of the tools and the freedom of expression that resulted from it. When mechanical typography becomes a standard, only industry possesses the tools to create new types; but partly with photo typography, and especially with digital typography, type design practice frees itself from this industrial process, and any individual "armed" with a computer can create his own foundry. In the 1980s, the Macintosh gains the image of a liberating tool: "Apple allied itself with the idea that technology was a potentially liberating force, a force that properly employed, could promote rather than repress individuality. To a certain extent, Apple computers became associated with counter-cultural forces, but they were acceptably rebellious, not dangerously revolutionary." (Emily King, New faces) This "shared ethic" of apple users has had a very visible influence on experiments of the 1980s and 1990s.

[50] later known as *Morris & Co*.

[51] The model provided by the Kelmscott Press — comprising hand cut type from 15th century models, a hand press, and traditionally made paper — was then followed by other figures such as C.H. StJohn Hornby with the Ashendene Press, as well as T. J. Cobden Sanderson and Emery Walker with the Doves Press.

[52] Kinross, Robin, *Modern typography*. London, Hyphen Press, 1992

V. Separation of the roles

1. The roles

The five main protagonists involved in the process of making type are: the client, the *designer*, the *producer*[53], the *typesetter*[54] and the type *renderer*[55]. To each of these roles, corresponds a form of type: commissioned, designed, produced, typeset and rendered. The way in which information is communicated before the type is produced, is critical in its development, and often relies on written form. Very often, some of these roles (even all of them in some cases) are embodied by one person. In other cases, one of these role has disappeared, or is replaced by a machine. But this classification needs to be broad enough to support any possible type manufacturing system. Being more interested here by the design related processes than the ones of commissioning, printing or rendering on screen, the focus will be directed on the roles of designer and producer.
Certainly, these roles did not remain the same over the development of type technologies. Whatever the technology, there has been cases where the designer did not operate the production process, and cases where he did. Nevertheless, some practices are more recurrent in one technology than in others. Also, the examples studied here are representative of design attitudes associated with different technologies.

2. Separation of the roles

The earliest type making process is also the simplest. All the role are held by the punchcutter.
In 1692, a Commission from the French King Louis XIV gathered a team from the *Académie des sciences*[56], who produced a series of engraved plates, rationalising letter construction. The plates were divided into "64 parts, each subdivided into 36 others, making a total of 2304 little squares for roman capitals"[57], as reports Fournier[58]. He then contrasted this number with the surface available when cutting a punch, "it will be appreciated how useless is such a multiplicity of lines for shaping a punch whose face in the case of letters most often used in printing, measures no more than the twenty-fourth part of an inch across"[59]. Granjeans indeed followed these patterns very loosely in cutting the punches. Independently of the quality of the final product and the effectiveness of such a system, this is one of the first documented case of a clear distinction[60] between designer and producer.
This separation of the roles became intrinsic to mechanical typography with the requirement of large drawing[61] as an intermediary stage in production of punches. Some designers were close from producing these patterns but the requirements were the ones of an industry, not a craft. The very large scale of these drawings and the difficulty in testing the effect of reduction made it very difficult for designers to anticipate those effects. As Dwiggins points out, "Curves do all kinds of queer things when reduced; and the way line running together make spots will surprise you — but one or two tries on these points give you the information you need. I am beginning to get the drift of it and to foresee from the large drawings what will happen in type. I can *modify*[62] in the large outline drawings, but so far I can't *originate* in that medium"[63]. Therefore, the drawing office was a necessary bridge between the designer, and the pantograph. The communication between these parties became crucial, and could become the reason behind the failing of some typefaces[64]. It was on the whole marked by the personalities involved as well as the difficulty to express verbally some abstract and subjective typographical notions. With

[53] *Type manufacturer* might also used when mentioning this protagonist; with an emphasis on industrial production.

[54] Typesetter means here anyone who sets type, by any means. Therefore, it is the hand composer in hand typography, the mechanical typesetting system in mechanical typography, the phototypesetting system in phototypography, and the typesetting program in digital typography.

[55] Awkward — and inexistent — word, but that has to include such diverse things as a printer and a screen at once…

[56] According to Bringhurst, the team from this science academy was composed of two priests, an accountant, and an engineer (Bringhurst, Robert, *The elements of typographic style*. (2nd ed), Point Roberts: WA, Hartley & Marks, 1996)

[57] This way of defining letterforms is not without remembering today's digital em square of either 1000 or 2048 units.

[58] Carter, Harry, *Fournier on typefounding*.

[59] Translation Harry Carter.

[60] In fact, it could be argued that this distinction was not so clear, since as seen with Fournier's arguments above, the punchcutter's task was once again subject to interpretation. How much the result differed from the designed plates, is where the accuracy of this distinction lies.

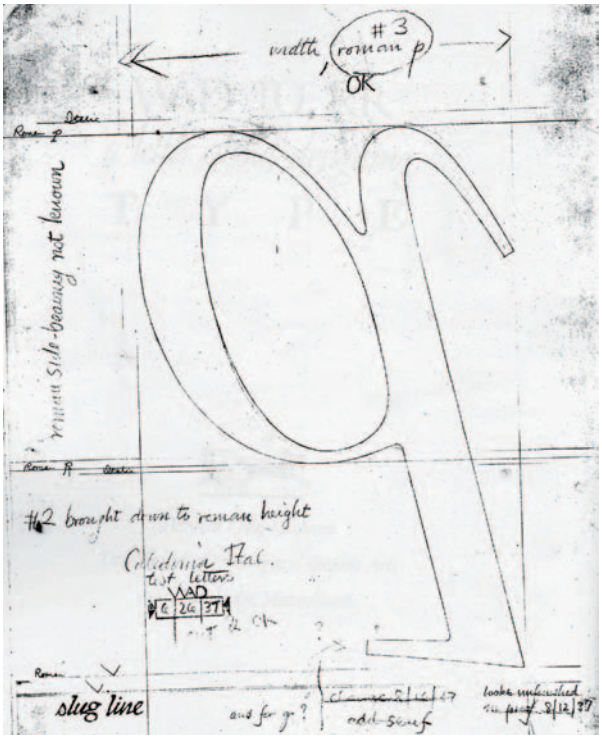
[61] (c.f. chap. III part 2) Both Monotype and Linotype systems needed patterns to a body size of 25 cm (10 inches) with an accuracy of around 0,2 mm (0,008 inches)

[62] The italic in the quotation stand for the romain occasionally used by Dwiggins in his italic handwriting manuscript *from WAD to RR*.

[63] Dwiggins, William Addison, *WAD to RR: a letter about designing type*. Cambridge, Mass., Harvard College Library, 1940

[64] Middendorp sustains in his book Dutch types that the reason for Romulus Sans never being completed lied in "Morison's growing dislike of sanserifs in general."

the advent of photo typography, the drawing staff remained as a translator between the designer and the different requirements of the many machines photocomposition gave birth to.



Example of large drawings submitted by Dwiggins for the production of Caledonia italic. Reduced by 60%.

Digital typography however, changed the repartition of these roles drastically. As it had first been in the early days of hand punchcutting, the designer worked directly on the final product[65], and therefore was able to handle the production of their own typefaces.
Type become device independent; a PostScript font can be used on a variety of typesetting programs, and output devices; and is not linked anymore to any specific piece of technology or even machines. This had an inestimable effect on the way type was being manufacture, marketed and eventually on the way it was designed. One should not forget that what Monotype sold were machines. And type was a very efficient way to create a need for new machines. In late photo typography, this situation had already started to change. As Emily King reports in *New Faces*, Lubalin and Burns with the International Typeface Corporation (ITC) pioneered new ways of distributing their typefaces, by licensing them for more than one photo typesetting system. Their structure too was independent from the industry manufacturing those systems, which hadn't happened since free-lance hand punchcutters. Photo typography operated as a transition from an industrial discipline, with heavy constraint and costs, to a discipline that could be performed by any individual equipped with a personal computer, with very limited costs, independently of the industry and of output devices. After the separation between designed and produced, digital typography operated a separation between the typeset and the rendered.

[65] Only, as we have seen, this product was not type anymore, but a potentiality of type representation.

3. Same role, different technologies

Jan van Krimpen witnessed the mechanisation of type production, and has been the centre of abundant discussions on the subject. His manuscript *A letter to Philip Hofer on certain problems connected with the mechanical cutting of punches* is an interesting case of a designer expressing his — strong — views over

a birthing technology. As he worked both with one of the last active hand punchcutters (P. H. Rädisch at Enschedé), and the newly developed Monotype drawing office as integral partners in the design process, his case is of great interest for the subject of this study.
It has to be mentioned though, that these processes were marked by the outspoken personality of Jan van Krimpen. Therefore his strong view on the subject directed the discussions while raising fundamental questions.

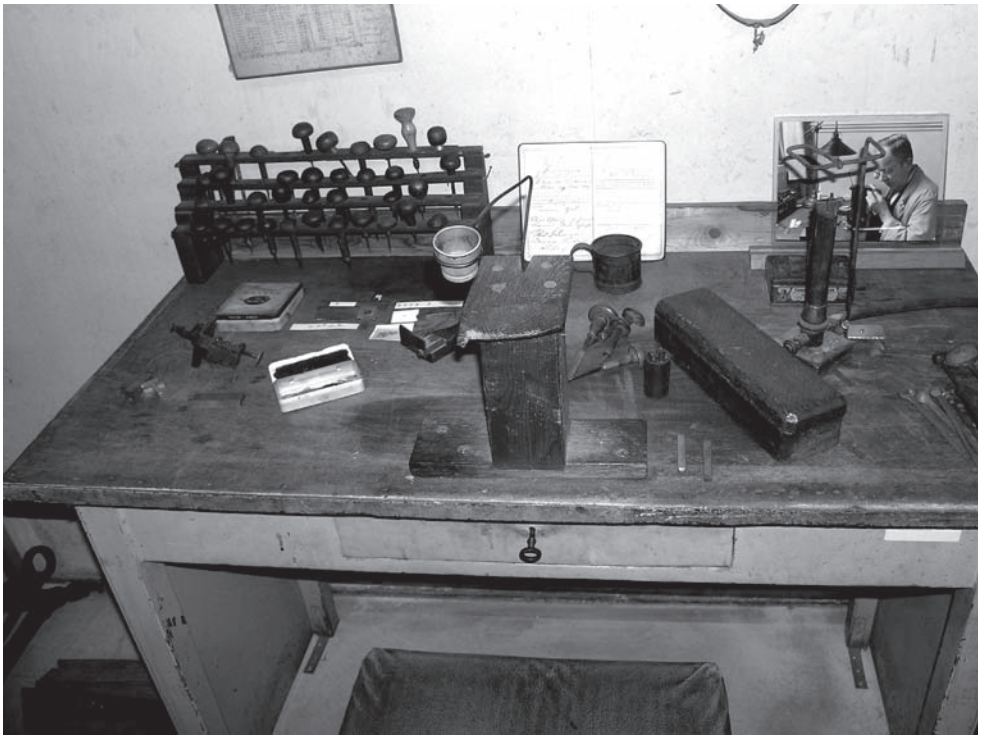
•Jan van Krimpen & Rädisch

The collaboration between Jan van Krimpen and Rädisch was again tainted by Jan van Krimpen strong personality. Indeed, he almost never mentioned his punchcutter's name when talking about his designs (and one should in fact say "their designs"), rather calling him "the punchcutter of the house Enschedé"[66]. This team was responsible for successful designs such as Lutetia, Romanée, Romulus, Haarlemer, Spectrum and Sheldon. Three of them were adapted for the Monotype machines (Lutetia, Romulus, Sheldon). For Jan van Krimpen, the punchcutter "may be replaced without any noticeable difference in the result". In this team, Jan van Krimpen operated as the artist, the intellectual, in fact his long past as a book designer at Enschedé tells a lot about his personality. His strong affection for traditional typography did not stop him from being a fierce opponent to the revival program operated by the Monotype corporation, or even from being probably the first to attempt the design of a large family including Greek companion and sans serif counterpart of the roman in a large range of weights[67]. He prefigured the post war character of the educated, refined typographer with an artistic sense and a deep knowledge of history. For Enschedé, he was a consultant, a typographer and a type designer. Rädisch on the other hand was the humble craftsman, one of the last still practicing by hand the craft that what was soon to be totally replaced by a machine. Walter Tracy in his book *Letters of credit*[68], says about Jan van Krimpen that he "thought like an artist, not like a designer".

[66] Krimpen, Jan van, *On designing and devising type*. New York, the Typophiles, & London, Sylvan Press, 1957

[67] Romulus was cut by Monotype, and the family was never completed. Dutch Type Library are working on a digital revival, incorporating the sans serif that never made it to metal.

[68] Tracy, Walter, *Letters of credit: a view of type design*.



Rädisch's desk at Enschedé.

The insistence with which Jan van Krimpen states that drawings highly unfinished are the one that best represent his intentions (*see* chap. II, part 2) implies that he relied on his punchcutter to *interpret* his designs rather than to *execute* them. This interpretative skill of the punchcutter to transfer intentions conveyed by a drawing into type that works at small size was threatened by mechanical punchcutting. And nevertheless it is where lies the essence of typography; in appreciating details at text sizes, anticipating the effects of scaling, of ink spread. If Jan van Krimpen provided artistic inspiration and aesthetic judgement, it was Rädisch who supplied typographic skills and knowledge. What this partnership does not allows for though, is the interaction between aesthetics and tools as it can happen when the designer is also the producer. According to G. W. Ovink, in his review of the *letter*[69], Jan van Krimpen could have learnt these typographic skills, "had he taken the trouble to sit down, and do at least the fundamental part of the dirty work himself". Indeed, is it not precisely the combining knowledge of aesthetics with the technical and functional that makes a designer a designer?

[69]Ovink, G, W, *Quaerendo*, vol 10 no2, 1980

•Jan van Krimpen & the drawing office

When Jan van Krimpen was first approached by the Monotype corporation about the recutting of Lutetia for the Monotype machine, he first refused: "my first impulse was to decline: I told my friends that I was afraid that they would not be able to make a rendering that satisfies me". Only when he was guaranteed full power of veto over trials, did he accept the recutting. This shows the predispositions of Jan van Krimpen over the mechanical cutting of punches. John Dreyfus reports how hard he was to satisfy on another type cut by Monotype: Spectrum. "On the shelves in Morison's office was a thick box file, with a spine label SPECTRUM TRIALS: the second word had a double significance — tribulations, and specimens."
An interesting point in the cutting of Monotype Lutetia, that persisted through the two other collaborations with the firm, is that the drawing office almost exclusively worked from existing punches cut by Rädisch.
For the first collaboration with Monotype, then, Jan van Krimpen insisted in having a different allocation of width for each size. If Jan van Krimpen probably enjoyed playing the figure of a hard man to satisfy, he might have taken it too far this time. Richard Southall reports "Every size requires a different set of keybars and a different stopbar case for the keyboard, so that as with Caslon 128, the capital cost of setting up for composition over a whole range of sizes is much higher than usual. In addition, and unlike Caslon, the selection of characters that overhang their body width and have to be cast with a supporting space is different for each size, so that keyboarding becomes very difficult". Later, Jan van Krimpen himself realised he had made a mistake, "this makes the type unfit for practical use"[70] and "if I had then understood and known the Monotype system better I should never have assented to this strange experiment and Monotype Lutetia would have become a different face altogether"[71]. And yet, in 1956, Jan van Krimpen compiled a memorandum with the lengthy title: "On preparing designs for Monotype faces so as to prevent arbitrary encroachments from the drawing office on the designer's work and intentions and otherwise inevitable disappointment at the designer's end". This formulation is by itself enough to illustrate Jan van Krimpen's opinion of the drawing office. One cannot help thinking though that what was at the base of Jan van Krimpen's discontent over the way the drawing office handled his designs might have come the fact that without his discreet partner at Enschedé, he simply wasn't competent to take typographical decisions anymore. In the early days of mechanical

[70] Even though JVK seemed to have a high esteem of himself, he devaluated his own work more than once.

[71] Krimpen, Jan Van, *On designing and devising type*.

punchcutting, the members of the drawing office surely weren't as skilled as a hand punchcutter in foreseeing the effects reduction, optical illusions, ink spread, etc. In fact they pretty soon acquired a bad reputation amongst type designers. Eric Gill after collaborating with Monotype on several projects, in *An essay on typography*, is quite unsympathetic of the drawing office staff: "It is difficult enough for the designer to draw a letter ten or twenty times as large as the actual type will be and at the same time in right proportions; it requires very great experience and understanding. It is quite impossible for a set of more or less tame employees, even if the local art school has done its poor best for them, to know what a letter enlarged a hundred times will look like when reduced to the size of the intended type." This lack of culture would apparently have lead the drawing office, when collecting sources at the Plantin Moretus Museum to pick the wrong (historically speaking) "a" for Monotype Plantin.

The other common criticism of the drawing office was that it had a tendency to oversimplify, dehumanise the designer's drawing with its sets of straight edges and French curves. "[...] that trace of life which lingers on in things made entirely by the human hand"[74]. Also, in any industrialism process, standardisation is unavoidable. The necessity for the drawing office to work as a group lead for instance to the simplification of certain formal elements, in order to assure consistency. These recurrent criticism might partly come from the fact that it is the drawing office that crystallised the effect of mechanical typography. From their role as a translator between the designer (a man) and the pantograph (a machine), they were in the centre of a debate that wasn't about typography anymore, but about moral. They were the ones to blame for the dehumanisation of type design, and the victory of industrialism over handcraft. Hermann Zapf comments in his dramatic tone: "It is now a dogged tussle over form, the designer on the one side armed only with pencil and pen, and on the other his numerically superior opponents, fully mechanized and equipped with machines of utmost refinement. Woe, if the machine wins out and the characters are shaped after its judgement! Who will need to wonder if the emergent letter is cold and soulless?"[75]. If it seems that no designer sees in the drawing office the descendant of the hand punchcutter, the fierce criticism expressed towards its staff seemed to have been tempered in the later periods of mechanical typography. Jan van Krimpen: "Cutting punches by machine is still young, younger men will find where it is wrong and will direct it in the right way due in time". And Updike: "In point of fact, the first types produced by punch cutting machines did seem to show a certain rigidity from the design point of view. That there has been an improvement of late in type cut by machine is undeniable. And yet there has been practically no change in its mechanism. This improvement, I learnt, has come to pass through the more sympathetic and subtle manipulation of the machine itself, and by modification of the rules by the eye who operates it."[76]

[74] Victor Hammer, Quoted by Jan van Krimpen, in *A letter to Philip Hofer*.

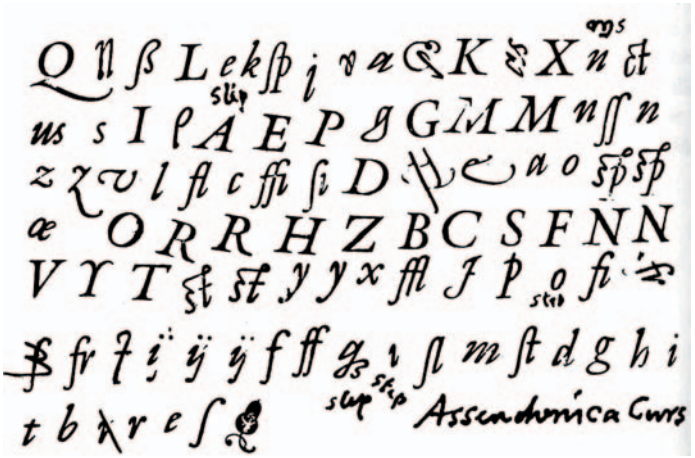
[75] Zapf, Hermann, *About alphabets: some marginal notes on type design*, New York, Typophile Chap Book no 37, 1960.

[76] Updike, Daniel, *Printing types II*, Cambridge Harverd University press, 1937.

4. Testing procedures

Testing procedures are a major element in the design phase. Its earliest form are the smoke proofs of hand punchcutting. They are very simple in principle and also very efficient. The punch is blackened on a flame, then pressed onto paper.

This enables a dynamic testing of the forms cut by hand. In the case of the punchcutter being also the designer[77], testing is in a way less crucial. With mechanical punchcutting, the distance taken by the different protagonists of the making of type, and the large size pattern required for the cutting of punches had a sheer effect on design procedures. The testing of a design becomes much more important than when it happens at the final size, and



Smoke Proofs from punches cut by Robert Granjon for Plantin in 1570.

yet, it becomes immensely more difficult to perform.
This difficulty built-in the Monotype and Linotype system even lead to such experiments as hiring Charles Malin, a French hand punchcutter, during the design of Monotype Perpetua, to provide types that would be used as a guide for the drawing office staff[78]. This process orchestrated by Stanley Morison emphasised communication difficulties between the designer (Gill), the manufacturer (Morison) and the punchcutter (Malin). Smoke proofs were the medium of interaction in the testing phase of Eric Gill's drawings, and trials were cut. This episode resulted in a clear animosity from Gill to the drawing office[79]. Independently from the quality of the result, this demonstrates the difficulty encountered in the testing of a drawn design for mechanical punchcutting.
In photo typography, the testing procedures varied considerably from one generation of machine to the other. If it was less constrainting than in mechanical typography, it still wasn't very reactive. In digital type design tools, the testing happens in a dynamic way and interacts very much with the design. "I say to students that the computer's all very well, but it's only there to drive the laser printer. It is the laser printer that has revolutionised type design, because for the first time in history, type designers can see what they're doing. You can put two letters into Fontographer and play them out, h-o-h-o, from a laser printer, whereas when I started I had to make laborious smoke proofs from punches or, in the days of photocomposition, wait days or weeks before getting trial fonts back from the factory."[80] Testing during the design process is really to "see what they're doing". This is the irony of the type designer's task: "the central paradox of type design is that in an immediate sense we design letterforms, but letterforms are not our products"[81]. Nevertheless, with digital typography, the designer gets closer than ever to the final form. "For the first time since the punchcutter used smoke proofs it is possible to get an almost immediate proof of your letterforms. In fact, these proofs are in some ways better than smoke proofs since they are the actual finished product created by the same machine(s) that will generate the types when the design is finished"[82]. Indeed, if the smoke proofs were quite accurate, they were proofs of the punch, and not of the final product, the type. At the same time, it becomes more and more difficult to predict the environment for a future digital typeface, and therefore, to know under what conditions the design should be tested. Typefaces tuned for any kind of environments have been designed but as Matthew Carter notices: "The difficulty for the design in making a type that is all things to all devices is to give it some personality rather than a bland, committee-built, health-warning, Diet-Coke, nondescriptness."[83]

[77] There are as we have seen, examples since the 17th century of punchcutters executing someone else's designs, but we are here interested in early forms of punchcutting, where the designer is also the punchcutter.

[78] For a much more detailed account of this apparently illogical procedure, *see* Southall, *Printer's Type in the twentieth century*.

[79] In a letter to Morison in 1926, he even drew two uppercase "I", one of them caricaturing the drawing office work by using parallel lines and purely circular bracketed serifs; the other showed slight imperfections conveying life to the drawing. As Sebastian Carter (*Type designers of the 20th century*) points out, "Perpetua exhibits in an extreme form the tendency of the Monotype works to draw letters with ruler and compass [...] as in many Monotype faces, the point where the compass take over from the ruler is quite perceptible".

[80] Matthew Carter, 'From punches to pixels', *Letter Exchange* Forum no 8, 2004

[81] Carter, Matthew, "Now we have mutable type"

[82] Stone Summer, "the Stone Family of typefaces: new voices for the electronic age"

[83] Carter, Matthew, "Now we have mutable type"

VI. Revivals

1. Defining a revival

Revivals are often the subject of heated debates, and yet, their definition is still unclear. Indeed, in many cases it is very difficult — if not impossible — to draw a clear line between an "invented"[84] design, a historically inspired one, and a "pure" revival (if such thing ever can exist). As Matthew Carter puts it: "I hear arguments about whether it is right to revive old types from the past in a day and age when originality is *a la mode*. For me, that is a boring debate — it has been going on since the 1550s for one thing, and, for another, I find it damn difficult to draw the line between renovation and innovation in many typefaces, including my own. I can more easily draw a line between tradition being used as a fertiliser, on the one hand, and nostalgia, on the other." This distinction between *nostalgia* and *tradition as a fertiliser* is primordial because it is not a factual one, but a semantic one. Indeed, what matters more than the difference between the original and the result (purely subjective judgement) is the intentions of the designer.

Another unclear distinction is the difference between the transfer of a typeface from a technology to another, and a "pure" revival.

From the designer's point of view, when embarking in such a task, one of the first question that comes to mind is which source to use. Someone wanting to revive a typeface from mechanical typography, for instance, could be confronted to a very important sum of evidence: the designer's drawings, the drawing office's patterns, mechanical punches, matrices, types, and printed evidence[85]. If the mechanical type was itself a revival from a hand cut type, the problem gets even more intricate. As we have seen with the case of Sabon, the original might have been the result of technical limitations no longer existing in present-day technologies. This asks the designer yet another question.

[84] Can there be any invented design or is "invented letterform" an oxymoron; reading being by nature a process based on convention?

[85] Another difficulty is that depending on the printing conditions, the appearance of the type may vary considerably.

2. After Griffo

The types of Garamond and the ones of Griffo are probably the ones that have most been revived[86]. But the successive attempts at revisiting Griffo's type are particularly representative of different approaches to reviving old type.

The story of the renaissance printer Aldus Manutius and his punchcutter Francesco Griffo are not related here, its relevance is only minor to this study.

[86] The irony is, that is appears — according to Philip B. Meggs and Roy McKelvey (*Revival of the fittest*) — that some of Garamond's type were in fact based on the Aldine model.

3. Poliphilus

In 1923, the Medici Society of London approached Monotype to cut a type for the facsimile of the *Hypnerotomachia Poliphili*, printed in Venice in 1499 by Aldus and with types cut by Griffo. The type was to be used for a facsimile, and in fact one can say that the type itself is a facsimile of the original, and not an interpretation.

asode

abcdefghijklmnopqrstuvwxyz

ABCDEFGHIJKLMNOPQRSTUVWXYZ

Digital version of Poliphilus, similar to the Monotype metal version.

Indeed, Monotype's production team lead by Frank Hinman Pierpont, followed exactly the outlines of the printed type, so far as to reproduce the jagged contours caused by early printing ink spreads. As Robert Bringhurst defines it, "the result is a rough, somewhat rumpled, yet charming face, like a renaissance aristocrat, unshaven and in stockinged feet, caught between the bedroom and the bath"[87].

[87] Bobert Bringhurst, *Elements of typographic style*.

This approach also reflected the desire to show that mechanical typography had nothing to envy to hand typography. As John Dreyfus reports, "it should be remembered that in the early nineteen-twenties, there was a widespread desire to show that even the trained eye could not tell the difference between hand composition and mechanical typesetting". In *A tally of types*, Morison mentions "it was possible, in fact, to compose, according to the correct dimensions of the original, a page of the Monotype version, place it side by side with the original, and find no difference except in paper. This test was in fact made, and, naturally, it gave the greatest satisfaction to the works". For the first time with the pantograph, exact reproduction was possible. When a hand cut punch broke, a new one was cut as close as possible, but it was impossible to be exact. This notion of *reproducibility* starts to become present in type design practices in mechanical typography. In Photo typography, reproductions could be even more exact — photographic — and the process did not have to go through so many stages of productions. But in digital, this notion of reproducibility was replaced by the one of *duplicability*. A digital font can be copied, multiplied as many times as wanted without any loss of any kind. This had for effect the birth of piracy issues; but fundamental design practice was also affected, most visibly with the apparition of a copy paste aesthetic[88].

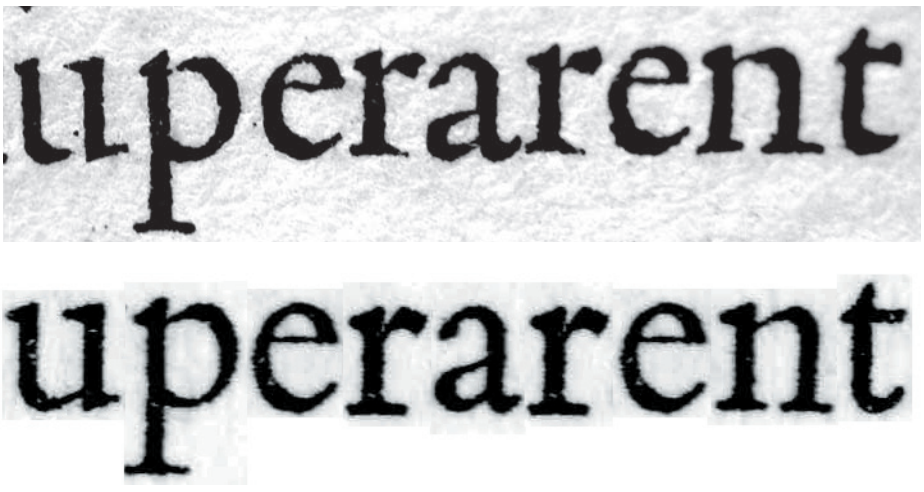
[88] A famous example is Fudoni, hybrid typeface made from parts of Futura and Bodoni (hence the name), designed by Max Kisman.

Poliphilus was then severely criticised by many contemporary, and above all, Jan van Krimpen. This event crystallised his philosophy developed in *A letter to Philip Hofer* about honesty in type design. Type should be designed, in accordance to the tools that produce it, and in that way, Poliphilus is *dishonest*. Even John Dreyfus agrees with this point of view: "there was an element of the mock antique about this type". By exaggerating the act of copying hand typography, Poliphilus asked: what to do with mechanical typography?

4. Monotype Bembo

Six years later, in 1929, Monotype started the design of another face based on the types of Griffo, but this time, from the book *De Aetna*[89] (1495).
It came from Morison's discontent with Poliphilus as well as his affection for the Aldine model.

[89] The types are different from the ones used in *Hypnerotomachia Poliphili*, they have the same lowercase, but a different set of uppercase.



Photographs from De Aetna, and Monotype Bembo metal.

This time, Monotype had learnt the lesson and went through a methodical cleaning of the outlines. The typeface, called Bembo after the author of the book used as a source, Cardinal Pietro Bembo, became a long-lasting classic and is often considered the best of Monotype's revival program. It succeeded both in maintaining the "spirit" of the original, and in being different enough, drastic in its sharp details, tailored to mechanical punchcutting. This balance is what Poliphilus lacked. Poliphilus is a case of nostalgia when Bembo is a case of tradition fertilising the present.

5. Digital Bembo

uperarent

Digital Bembo regular, very similar to the types of Bembo metal.

"I remember very clearly when I first used a digital version of the bembo typeface [...] On their arrival, I immediately opened Bembo Roman with the type design software. The Font layout appeared, and I double-clicked the lowercase 'g' just to check if the software was working correctly. After seeing the letter 'g' about ten-inches high, I immediately thought I had made a mistake, because it did not look like a Bembo 'g'. After seeing the 'a', and another letter, I got into a slight panic - none of the letters looked like Bembo! After checking Bembo Italic, I slowly began to realise that the fonts were indeed Bembo. I recalled that the typeface was originally designed for metal type, and most of the specimens and texts I saw were set in metal type in text size. I knew that a metal typeface was cut or designed separately for each size, but that a film composition or digital typeface is a kind of compromise since it has proportions designed for reduction and enlargement. I was overwhelmed to see such a huge gap"[90]. This reaction of the typeface designer Akira Kobayashi is representative of the acceptation of the digital version of Monotype Bembo by the typographic community. Typographers who cherished what they knew as "Bembo" had indeed a surprise when setting text in bembo digital. The strong colour and warmth of the metal version appeared weak and frail in the digital one.

Types from Bembo metal (left); and Bembo digital (right).

"[...] the types that were originally designed for hot-metal often looked too light and feeble" adds Kobayashi[91]. Even the phototypesetting version lacks

[90] Earls, David, *Designing typefaces*, Rotovision, 2002

[91] After searching unsuccessfully a digital typeface that satisfied him, Kobayashi decided to design a text typeface, FF Clifford, tuned for digital technologies.

vigour and weight. In the run of technology transfer[92], manufacturer forgot that they were going from a three dimensional technology that pressed type against paper, to one that happened entirely two dimensionally, reporting type's image on paper. Not only the types had different mediums, but importantly, the means of reproduction associated to these technologies were different and acted in opposite manners on the printed page. The hundreds of years during which punchcutters developed a fine sense of anticipation of these processes had to be shrank tremendously under industry's pressure. It is unclear whether Monotype used the 8 points or 10 points type for the revival, but what is certain is that they followed too faithfully the proportions of the metal type for the *new* Bembo. It seems even the manufacturer realised they had made a mistake since in 2005, Monotype released another version of Bembo digital named "Bembo Book". 10/18 points hot-metal drawings were used for the digitisation, and "extensive editing was carried out on the resultant outlines to ensure that design features and overall color from the digital output remained close to that of the letterpress product"[93].

Bembo book (top); and Bembo "regular" (bottom).

Apart from the overall density of the new type, which is closer to the metal version, details have been added (or rather corrected) such as the ascender height, and other minor features that had been removed from the metal version.

[92] In these periods of transition, manufacturers were afraid of loosing clientele. The types had to be transferred as rapidly as possible.

[93] Bembo book's online specimen, http://monotype.co.uk/bemboAMT/BemboBookUK.pdf, August 2005

VII. Conclusion

(or, *two attitudes toward technology*)

Technological changes question designers about the way they think typography should go forward. "It is only the development of photocomposition in our days [1968] which is in a position to bring back, once more, the whole scale of handwritten variations of earlier calligraphs."[94] In the view of Hermann Zapf, calligrapher and type designer, technology has a very clear potential to make type go back to its original, "pure" handwritten form. This view is double sided. Technology can here be a positive thing when *reverting the process* but is seen as negative when creating possibilities for evolution of letterforms. In another text entitled "is creativity in alphabet still wanted?"[95], Zapf argues that "digital technology allows the unscrupulous to plunder the work of others and gives those ignorant of basic laws of type design the tools to create travestites" This strong reaction is representative of a widespread opinion adopted by traditionalist typographers with the apparition of digital technology and its accompanying wave of microfoundries, and is analogous to many reaction observed in early mechanical typography and photo typography days. But interestingly, Hermann Zapf has clearly defined his position as a fierce opponent to revivals: "what a poor society this must be if it is unable to express itself and is only able to copy the past"[95]. This logic is very close to the philosophy of Jan van Krimpen, also strongly against revivals; and also very critical of the industrialisation of type design. This shows us that contrarily to what one might think, traditional typographers are not necessarily advocates of revivals. On the other hand, designers exist whose main field of experimentation is technology. They greet a new technology by a series of experimentations, pushing the new possibilities offered to them. Zuzana Licko, for example, developed an unprecedented relation with the aesthetics of the Macintosh. "[about the computer] I've never designed type any other way, so my style of type design developed out of using the digital medium. But I suspect if it wasn't for the digital medium, I wouldn't have designed typefaces for a living. [...] As it is, I do virtually all of my design and production directly in the computer. [...] To a great extent, the gradual sophistication of my type design have been matched by advances in the Mac's capabilities. [...] In addition, new technologies and environments arise to present new problems for the designer to address. The most successful experimental typeface design are often the ones that address the new needs of a new, yet uncharted technology"[96].

To sum, one could say that two opposite movements exist in type design. A forward movement, using technologies to influence letterforms, and transform our reading habits; and a backward movement, using technologies to revert to a lost ideal, whether calligraphic, or based on historical model. Theses are of course directions, and most type designer situates themselves somewhere between these poles. But this spectrum provides a frame for individual expressions and new answers to same problems. Evolving technologies create a constant need for a redefinition of the role of the designer, new designs better adapted; even more importantly, they ask new fundamental questions.

[94] Zapf, Hermann, 'The changes in letterforms due to technical developments'. *Journal of Typographic Research*, vol 11, no 4, 1968, pp 351-368.

[95] Zapf, Hermann, 'Is creativity in alphabets still wanted'. *Journal of Typographic Research*, vol 23, no 4, 1990.

[96] Herman Zapf, 'futur tendencies in type design: the scientific approach to letterforms', visible language, vol 19, no 1, 1985, p. 31

[97] Earls, David, *Designing typefaces*

VIII. Sources of images

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Photographs taken in the Plantin-Moretus museum in Antwerp.

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Original drawings from Jan van Krimpen photographed in the University Library of Amsterdam.

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Rädish's desk, photograph taken in the Enshcedé Museum.

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