The Sorcerer's Brew

The Unexpected Results
of Typographic Innovation

Kamal Mansour

Abstract. The history of typography is lined with sundry brilliant inventors. Beginning with Gutenberg, pivotal protagonists altered the course of typography through innovative solutions to discrete problems. In numerous cases, their inventions prompted additional unanticipated changes, or even morphed into themes that eventually became integral to typography. We capture several pertinent cases and examine their manifestation in contemporary typography.

1. The Father of Type

In a simplistic way, Johannes Gutenberg (Fig. 1) is usually considered the founder of Western typography (Rees, 2006). To gain a better understanding of Gutenberg's role, it is crucial to view his work in light of his goals. In the 1400s, demand for books had risen sharply, but making copies by hand was slow, laborious, and expensive. The production of books was entirely in the hands of the scribes. Gutenberg wanted to produce books of comparable look and quality as the scribes, but faster and more economically. By inventing movable type, Gutenberg had created the instrument to effectively beat the scribes at their game.

To produce his printed edition of the Bible around 1450, Gutenberg had calculatedly created a typeface that replicated the scribes' handwriting as closely as possible. As we can see from the detailed image (Fig. 2), Gutenberg meticulously imitated the scribes' lettering style, including abbreviations, and other writing conventions. He even added decorations in color as they did in their manuscripts. Even so, Gutenberg never intended to create a new class of letter forms to be used exclusively for the printing press. He didn't foresee that in the future, people would strive to design families of letter forms that would never be written by hand. This stark separation between handwritten and typographic form was gradually introduced by other typographic innovators after Gutenberg, and in the long run, became expected.

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FIGURE 1

FIGURE 2

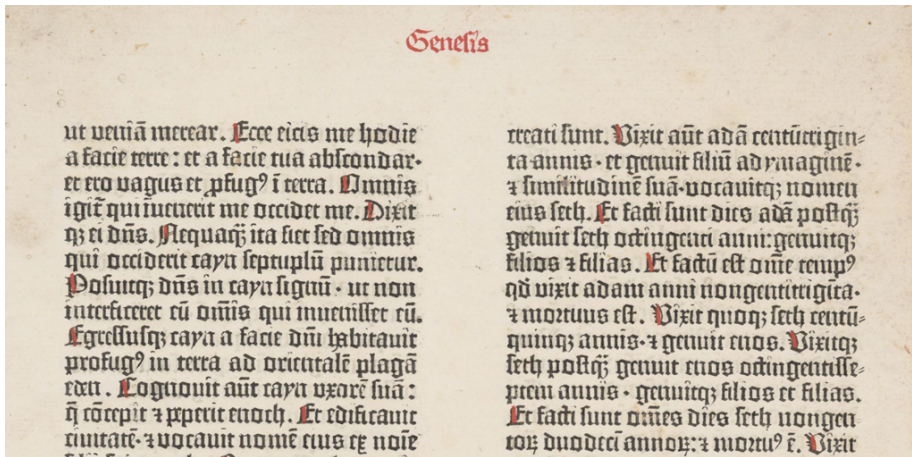About fifty years after the publication of the Gutenberg's Bible, the printed edition of Bembo's work, *de Aetna*, was produced. Although its typeface was also based on a handwritten form, it was further tooled into a distinctly typographic design. In fact, the typeface in this book would have looked alien to Gutenberg.

Thus, the craft of typography was born from the seed of Gutenberg's movable type.

ut audeat affirmare Aetnaea, incendia nõ
esse usquequaq; duratura. B.   F.   Ego
uero, quid sentiam; non sat scio : quanq̃
equidem mallem Pythagoram, q̃ Em-
pedoclem imitari : ille enim quae natu-
rae consentanea uidebantur, credebat asse
rens mutari quidem omnia, nihil tamen
omnino interire : hic ; dum curiosius na
turae causas perscrutatur; etiam se ipsum
imperscrutabilem facit.   B.   P.
Sed ualere nos illos sinamus filí: et quo
niam nos tibi, Aetnae incendia unde
fiant, diximus ; id uelim ego scire item
ex te, ipsa ista quomodo fluant.
  B.   F.   Iam istud quidem fie-
ri sine ullo negotio potest uel una Hesio
di comparatione ; qua ille in sua theo-
gonia fluxisse ait tellurem, ubi eam
post fulminatum Typhoeum igne cor
reptam describit, isto (ni fallor) modo :
ex quo sanè libet mihi suspicari etiam pa
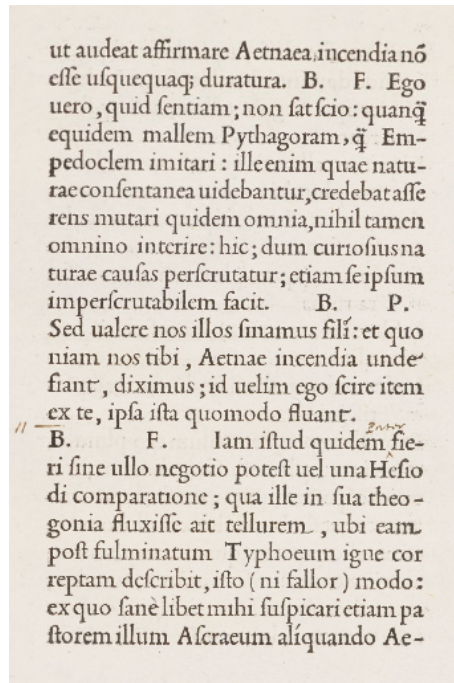storem illum Ascraeum aliquando Ae-

FIGURE 3

2.   The Extension of Invention

As commonly happens to a successful invention, people put it to use in ways that its inventor never foresaw. To explain this phenomenon, we can liken Gutenberg to an unwitting sorcerer who mixed a brew in his caldron, unaware what it would ultimately bring forth when taken over by his successors.

Into this brew, Gutenberg threw numerous elements, many of which later became indispensable to the typographic craft. Numbering among these elements are:

1. Letter forms based on a pattern.
2. Paper as a medium.
3. Ink as a pigment to render letter forms visible.
4. Lines composed of letters.
5. Galleys that hold all the composed lines in place, enabling the repeated printing of any given page.

As the craft of typography evolved over the centuries, Gutenberg's successors invented new techniques to enhance the typographic arts. They also, one after the other, flung new elements to the sorcerer's brew.

Together, all the elements churned in the brew, and brought forth what no one could have foretold at the time.

3.   Griffo and Italic Style

Since we cannot mention the contributions of all typographic innovators, let's pick out a few that, over the centuries, have made pivotal changes to the field.

We begin in the late fifteenth century, only 50 years after the publishing of the Gutenberg Bible. In that brief period, the printing arts spread quickly in Europe. Venice had become a hotbed of typographic work and innovation.

Francesco Griffo, also known then as Francesco da Bologna, had refined his skills at various print shops in Venice before joining Aldo Manuzio's workshop as a punchcutter. Himself a foremost innovator, Manuzio recognized Griffo's exceptional talent, and even lauded him publicly. By then, Manuzio had designed an elegant typeface style that had been used in several editions, as seen in Fig. 4 (Tinti, 2015).
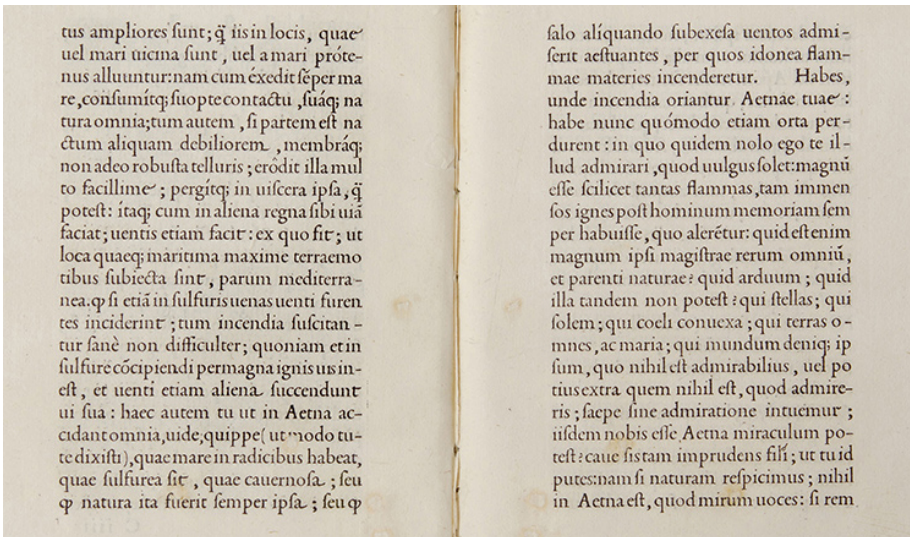

Figure 4

Wanting to fit more text than usual on a page, Griffo came to realize that existing typefaces could not satisfy such a requirement. Because of its relative compactness, Griffo decided to create a typeface based

on chancery handwriting (*cancelleresca corsiva* in Italian). This writing style had been perfected by renowned scribe, Bartolomeo Sanvito, from whom Griffo likely took his inspiration (Fig. 5).
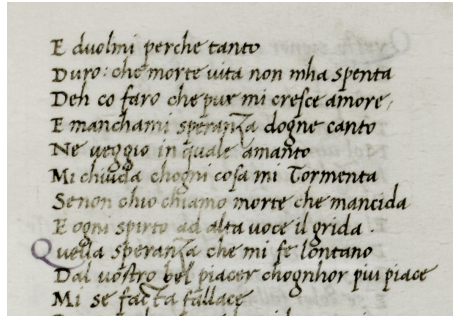

FIGURE 5

Below we see the second chancery typeface (Fig. 6) engraved by Griffo for Soncino's *Opere volgari di Messer Francesco Petrarca*, published in 1503.
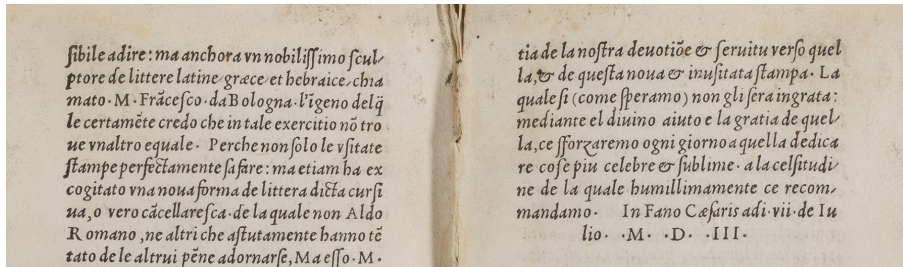

FIGURE 6

In the early sixteenth century, no one would have called such a typeface "italic" because this term referred to anything from the Italian Peninsula, and was not yet associated with the concept of a leaning style. In fact, the angle of his *cancellersca corsiva* was most moderate, while its capital letters were fully upright, as in Sanvito's model.

Griffo had flung this new style into the bubbling brew, oblivious to its subsequent reverberations in typography. Little did he know that with the passing of time, his typeface would come to be called "the first italic". As far as Griffo was concerned, all his work was *italic*. Even more unthinkable to Griffo would have been the eventual pairing of an italic

style as a complement to an upright one within a typeface family—a concept that we have by now espoused as a natural part of typography.

By the mid eighteenth century—about 200 years after Griffo's original italic design—the pairing of an upright and a leaning style was becoming conventional, as evidenced by this specimen of Caslon's work. It is worth noting that *Roman* had come to mean upright, while *Italic* meant leaning.

4.   Bodoni and the Inevitable Stroke

Let us return to Ancient Rome to contemplate this famous inscription (Fig. 7).

Figure 7

The flaring at the ends of the stems was a characteristic typical of Roman letter forms, evidence of the chisel that engraved them into stone. At the time, this flaring, or serif, was minimal and unassuming. It was simply an inevitable artifact of the tool. Calligraphic letter forms also manifested a similar feature as evidence of pen and ink. When classical letter forms were later conscripted into typographic service, the serif was kept. There, it remained a quiet guest.

Along came Giambattista Bodoni in the late eighteenth century, stretched the serif, and made it thin as a slice of Parma prosciutto (Lester, 2015). By doing so, he succeeded in changing what was once a secondary feature into a primary one (Fig. 8). Bodoni had made the serif a *thing*.

With these changes, the serif plunged into the simmering brew, and started drawing attention from other type designers.
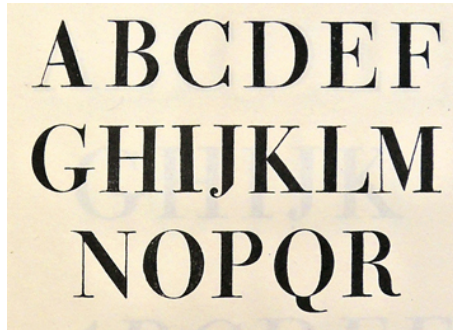
FIGURE 8

As various typographers altered the shape of the serif to suit their tastes, the differences became conspicuous, and were associated with specific styles.

FIGURE 9

Little did Bodoni know that one day in the twentieth century, a common typographic classification (Fig. 9) would use the shape of the serif as a prominent attribute.

Could Bodoni have ever imagined that his own typeface would be classified as *Modern*?

5.   Benton and the Pantograph

Moving forward to the end of the nineteenth century, demand for printed material was rising to new, unprecedented levels. Noting this unmet demand, Linn Boyd Benton astutely detected an important bottleneck in the publishing cycle: the process of creating new type was slowed down by the need to manually engrave metal punches in different sizes. As no predecessor had, Benton envisaged that by scaling a fixed pattern to various amounts, different sizes could be created (Cost, 2011). By inventing the pantograph, punches for various sizes of type

could be engraved based on a single drawing (Fig. 10). In fact, Benton's pantograph not only could enlarge or reduce a pattern, but it can condense, extend, and slant it also.
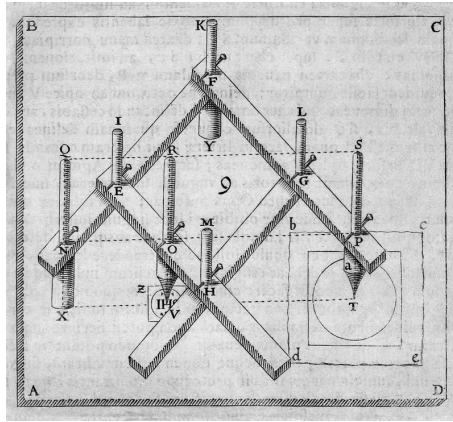

FIGURE 10

Did Benton imagine that letter forms would eventually be scaled using light and lenses? Or that later on, letter forms would be defined as polynomial curves? Today, we take it for granted that the pantographic principle can apply to all letter forms, even non-physical models such as Bézier curves. Did Benton even surmise he might be hurling the element of *scale* into the roiling brew?

6.   Composing Lines

Although Benton recognized a significant inefficiency in the preparation of printed matter, two other astute observers detected another critical bottleneck: the process of composing lines manually out of individual letters was extremely time-consuming. The first of these observers was Ottmar Mergenthaler—who later founded the Linotype Company, while the other was Tolbert Lanston, inventor of the Monotype machine. Using divergent approaches, the Linotype and Monotype machines upstaged manual composition by mechanizing the process, thereby accelerating significantly the typesetting process (Romano, 1986).

The composing stick (Fig. 11) went by the wayside and was replaced by a keyboard. For each line of text, lead type was freshly cast from molten metal (Fig. 12) during composition, and did not need to be

FIGURE 11

fetched out of type drawers anymore. As a result, the quantity of newspapers and other printed matter boomed in the early twentieth century. Linotype and Monotype machines improved efficiency of print production unlike any other innovation at that time.

Through their respective inventions, Mergenthaler and Lanston lobbed the worm of automation into the sorcerer's brew. Over the following decades, it continued to morph, but it never died.
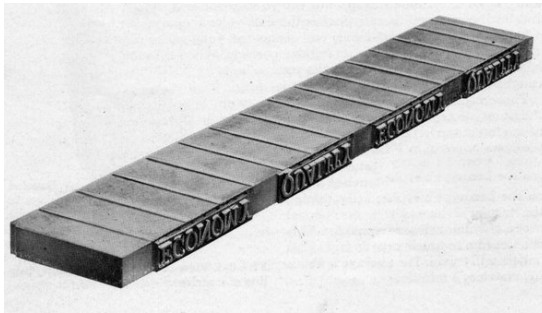

FIGURE 12

7.   From Metal to Photons

Metal type continued to reign as sole sovereign until the middle of the twentieth century. To imprint the image of the letter form on the line or the page, metal was composed and impressed with ink on paper. That remained so until two French engineers, René Higonnet and Louis Moy-

roud, came along with a new idea. Why resort to metal when light could imprint letter forms on film? After all, photography was well established by then and was utilized in numerous fields.

Higonnet and Moyroud invented a process that flashed light through letter-shaped patterns to compose lines of text on film (Fig. 13). From there, film could be seamlessly converted to lithographic plates for printing, a process much simpler than the previous one based on metal type. The era of photocomposition was thus launched (Romano, 2014).

Light not only eliminated the need for metal letter forms, but also made page galleys nearly weightless, all while chasing away the lead fumes from the composing room.

FIGURE 13

If churning a sorcerer's brew could turn metal into light, what else might it be able to do? Were Higonnet and Moyroud aware that photons would continue to grow dominant and take the place of metal as the new sovereign in the typographic world?

8.   The New Medium

Since its inception, typeset text has appeared printed on paper. Metal, ink, and paper were the triumvirate of the typographic arts. As metal began to lose its dominance as the bearer of letter form, the role of

photons began to expand. In photocomposition, photons impressed images of letters on film. By the 1970s, photons began to display letter forms also on cathode-ray-tube (CRT) screens. Paper was no longer the sole medium. Afterall, why not see a fleeting image on a screen first before committing it to paper? Light became the *softcopy*, while paper was renamed *hardcopy*. As screen-quality improved in the 1980s, the early wyziwyg screens rendered a lower-resolution proof of typeset lines (Fig. 14), while a laser printer or film typesetter produced the final, higher-resolution hardcopy. The screen began to compete for its new role as a medium, chipping away at the centuries-long dominance of paper. The screen took on the duty of defacto proofing medium.
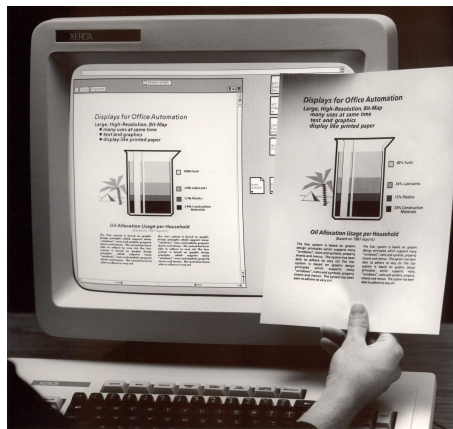

FIGURE 14

At the time, two discerning type designers, Kris Holmes & Charles Bigelow, realized that a significant technological shift was under way. They perceived that the role of the screen was in flux. Bigelow and Holmes surmised that the screen was not destined to remain in a secondary role as a proofing tool for images rendered on paper, but that it was turning into a new medium in its own right. With this coming transformation in mind, they set out to design Lucida, a new family of typefaces, to look good even on the low-resolution screens of that time (Carter, 1987).

The brew roiled and bubbled as it gave birth to a new medium.

Today, we live in a visual world where we are increasingly dependent on the medium of the screen for all sorts of information. Many of us now read published material of all types more often on-screen than we do on paper (Fig. 15). Screen resolution is high and rising. Type is sharper than ever.
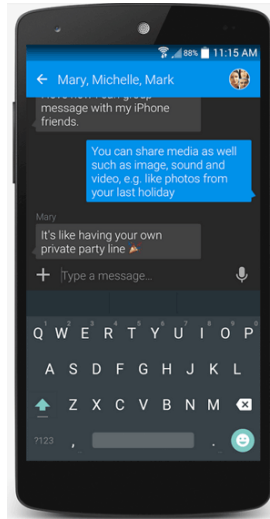
The photons are replacing metal & ink.

9. Beyond the Goal

Once a ball is propelled in a particular direction, it rolls towards its intended destination. Sometimes, after reaching its goal, it continues to roll on its own. At times, it can be picked up by someone else who sends it in a new direction. Without fail, all the innovators we have cited reached their goals; their inventions achieved the desired results—and a little bit more...

10. To the Unwitting Father of Type

Dear Johannes Gutenberg,

Just a short note to bring you the latest news from the world of typography.

Letter forms are now made of polynomial curves that we can scale, stretch, and compress as we please. They have replaced the metal punches and molds.

Ink is still around, but letter forms can also be rendered through light alone. Has news of LED screens reached you?

Lines are composed of phantom letter forms lined up next to each other.

We still make galleys to produce faithful replicas of typeset pages, but they don't weigh a ton anymore. We call them PDFs. Recently, someone invented a new, flexible galley that goes by the name HTML.

And, by the way, thanks for the good brew. It's still bubbling after six centuries.

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