Fundamental Research Methods and Form Innovations in Type Design Compared to Technological Developments in Type Production

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If we ask different professionals in the area of type and typography what the expression *Letterform Research* means, we will be given very different answers. The historian generally interprets it in a different way from the technician, and the typeface designer differently from the manufacturer or the typographic designer.

In this paper, we would like to investigate a specific aspect of Letterform Research, namely the design of the typeforms of our typographical past, present and future, in comparison and in contrast with the technical development of type production.

Gutenberg's type-case for the printing of his 42-line Bible contained 299 signs. The hand compositor's technique of assembling lines, letter by letter from a store of cast type, into the composing stick, remained unchanged in principle for nearly 500 years.

It was the invention and development of hot-metal composing machines that first brought a substantial increase in setting speed, from about 4,000 characters per hour to start with, up to 30,000 with linecasters controlled by punched paper-tape in the nineteen-fifties.

The first phototypesetting machines were still related to the hot-metal machines in their principles of construction. The typecasting matrices were replaced by film matrices, that is to say, a film negative, and an exposure device took the place of the casting device. Phototypesetting machines of conventional design allow exposure speeds of 50,000 to 250,000 characters per hour.

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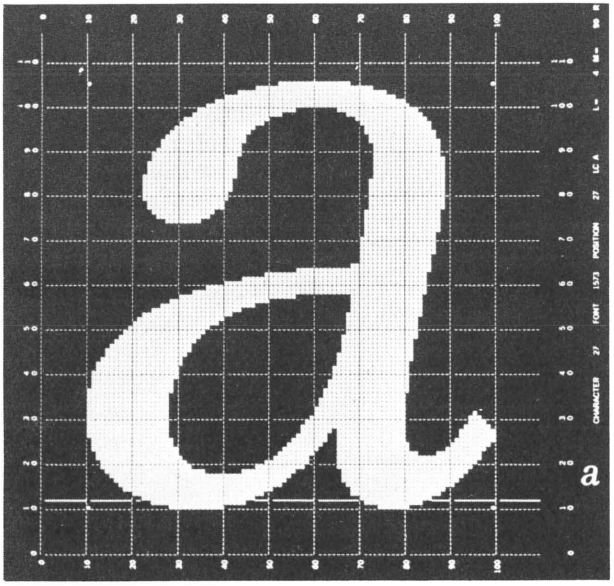

From Gutenberg's type case for his 42-line Bible to today's digital letterform reproduction for high-speed composition.

With the development of CRT and laser typesetting units, the technique of type image production has undergone such a rapid and revolutionary development within a few years that its effects on the whole situation of typography are still hard to grasp in their full implications. At the same time, the advent of digital-electronic typesetting computers has made exposure speeds from one million to several million characters per hour into a daily, but still astonishing, reality.

Parallel to this technical revolution, there has developed a design industry specific to the production of typefaces. The first manufacturers of phototypesetting machines mainly used their new technique to copy the *proven* typefaces of the past as faithfully as possible, to convert them for photosetting and to supplement the traditional basic styles with many variations of weight and width. Whether it is still meaningful today to interpret a distinguished old book-face of the sixteenth century by means of present-day technology is a question that we would like to discuss.

The fact that the *liberation* of typography from the restraints of metal opened up undreamed of new creative possibilities, is a statement from the pioneer days of phototype which is still often and gladly quoted today. If we now consider the typography of every day with a critical eye, more than 30 years after the introduction of phototypesetting, we must ask ourselves to what extent these possibilities have been used for a new creativity in typeface design as well.

A type specimen book of a photosetting firm in Switzerland shows how the revival of the most ridiculous typefaces of the nineteenth and early twentieth centuries has come into fashion today. Can the abundance of these revivals from the lumber-room of the nineteenth century count among the creative possibilities which have been opened up by the new technology?

Considering the entire production of typefaces during the past few decades, only a few genuine innovations in type design have been able to establish themselves in the phototype market. The job of researching and designing typefaces and typeface programs which not only take into account the system-oriented technical characteristics of new setting and printing processes such as so called *optical corrections*, but also place these technical conditions as the very basis of the whole design process – this job has comparatively seldom been undertaken.

In these critical remarks, we do not in any way wish to overlook the genuine achievements of individual typeface designers and individual companies – from Adrian Frutiger's Univers to Bram de Does' Trinité – to mention only one of the first and one of the latest typeface creations for photosetting. Our judgment applies only to the total amount of effort that has been made in our times in the design area of type and in the research and creative sense, as being relatively inadequate in comparison with the enormous technical development which has been based on correspondingly intensive research and major financial investments by the manufacturing business.

As typeface designers with teaching experience in this field, we must make a critical comparison of these developments. We are well aware of the social and commercial interdependencies of the highly-developed information industry, but we also know about the cultural values that are specific to our area of activity. Typefaces and typography, as an expression of the human spirit, are closely linked with the development of our society, and they comprise values whose preservation and further development seem all the more urgently important to us when the technical development of the means of production has practically no limits.

In this complex situation it must be our aim to make use of our professional abilities and knowledge, and our experience as designers and teachers, so as to return to a position in which we can further develop a sense of quality and creative research and design in the field of letterforms.

It is doubtful whether the present mass-production of all kinds of typefaces and the continued over-saturation of the market for type can continue to be meaningful, either from an artistic or a commercial point of view, even if such production may appear to be more practical with the use of computers and computer-controlled drawing.

On the other hand, the technical development of type and print production and the new electronic media present us with a whole range of tasks to which we have certainly not yet found answers, and which have to a large extent scarcely been formulated. These many-sided and complex undertakings within the comprehensive area of typeface design cannot be approached or resolved except in close and intensive collaboration between scientist and designer, technician

and businessman. The following are only a few examples of the kinds of tasks concerned:

- Typefaces for typewriters and word-processors, which in combination with the development of new copying and duplicating techniques will certainly not be limited to the revolutionizing of office information.
- Typefaces on the video screen. Beyond the use of screen typefaces in typesetting and computer stations, everyone will very soon be confronted with the type-forms of these new media through Teletext and Videotext.
- Digitised printing type and its electronic processing, in association with the development of new printing techniques, necessitates a coordinated re-thinking of the entire typographic situation of the present and the future.

It is our considered opinion that increased and intensive efforts are necessary today, especially within industry, in order to reorganize the technical development of type production equipment, not only in accordance with the criteria of technical rationalization and commercial profitability, but in association with wide-ranging basic research and development of the qualities of the product, of the artistic form and the readability function of type.

As a stimulus, and as only one example of the present urgent need for a program of basic research, we would like to consider, in the next part of this paper, an area of printing type which is today influenced to an exceptional degree by technical change in the production of type and print: The Typeface for Newspapers.

In the present contribution we cannot and should not be concerned with presenting a suggested design for a new newspaper typeface, but only with a catalogue of the criteria and factors which, in our opinion, must be borne in mind in the search for the qualities of design and readability of a present-day newspaper typeface.

It is only on the basis of the evaluation and judgment of all these factors and criteria, in collaboration with scientific research, with technicians, designers and industry, that the contours of a project, for example a new newspaper face, may be sketched out.

The oldest way of conveying news, still in use today in remote parts of Mexico and Africa, is by word of mouth. Regular written communication of news by correspondence is first known to us from the early Middle Ages. Witness to such a correspondence

service is provided by the famous letter-journals of the commercial House of the Fuggers which not only gave commercial news but also reported on major political, ecclesiastical and military events.

Letter-journals were duplicated in manuscript by the hundred. This relatively laborious and time-consuming work was later replaced by letterpress printing, a technique with much greater speed and scope. The single-sheet print or fly-sheet, for the rapid dissemination of news and information digests of all kinds, is known from the very earliest days of printing: an article printed in 1492 reports in verse on the fall of a meteor, and another sheet records an unusual appearance of the moon.

The fly-sheet and the pamphlet had exceptional importance and distribution as weapons in the religious and political struggles of Europe during the early sixteenth century. The Reformation pamphlet, *On the Freedom of a Christian*, by Martin Luther was printed in thousands of copies as soon as it had been written and subsequently went through eighteen editions.

Even if the fly-sheet has little to do with our theme, this medium shows how conditions were created in the sixteenth century to inform people on a large scale and enable them to participate in public events. These are the conditions which made newspapers really necessary.

From a kind of amalgamation of the single-sheet print with the handwritten letter-journal, there arose at the beginning of the sixteenth century the first examples of the printed newspaper, known in German as *Neue Zeitung* and giving news about contemporary events. The original meaning of the German word *Zeitung* is derived from the word *Zeit*, which in English is *Time*. Like the letter-journals, the *Neue Zeitungen* gave information on two to four pages about the political, religious, and also more trivial events of a period whose spirit is marked by uncertainty, anxiety and superstition. However, these publications lacked regular appearance, being published only sporadically in accordance with the arrival of oral or written news.

Printed news was published in regular sequence from 1588, with the six-monthly *Trade Fair Journals* (*Messrelationen* in German), which from then on were sold in conjunction with the Spring and Autumn Fairs. These journals were very popular and had wide circulation; one of them, published in Frankfurt, survived into the nineteenth century. The first monthly newspaper, the *Annus Christi*, appeared in Switzerland

July issue of the first and only monthly newspaper of the year 1597, edited in Switzerland. In comparison to traditional book typography in newspaper design of those days, a typographic image of the present day paper by 'Herald Tribune.'

IVLIVS Anni 1597. Jahrs.

Kurtze anzeigung der

eelicher fürnembsten Geschichten / so in dem Monat Julio / des 1597. Jahrs / zu Constantinopel / in Siebenbürgen / Ober vnd Vnder Hungern / Oesterreich / rc. Behaimb in den Niderlanden / Franckreich / Engelland / Italia / Spania / vnd Aphrica / sich zugetragen.

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Herald INTERNATIONAL Tribune

Published With The New York Times and The Washington Post

ZURICH, WEDNESDAY, MAY 25, 1983

U.S.-Soviet Relations at One of Lowest Points in a Generation, Specialists Say

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towards the end of the sixteenth century. As was usual up to that time, it lacked both issue numbering and folio numbering. Planned as a year's project, it remained the only newspaper with monthly publication. After one year, the enterprise was given up, for reasons which we do not know.

In the first decade of the seventeenth century, frequency of publication was taken further. From January 1609, the first two weekly newspapers appeared: the Strasbourg *Relation* and Wolfenbuttel's *Aviso.*

Regularity now becomes apparent not only in publication but also in external appearance: the consecutive issues are numbered and the title-piece remains constant.

It was now only a question of time before the appearance of the first daily newspaper, which was published in Leipzig by the printer and bookseller Timotheus Ritzsch on the first of January, 1660. This seems to have been his fourth newspaper enterprise, for which he had received a twelve year Privilege in December of the previous year. It is uncertain whether he fully used this twelve year permission to publish, but we know that he was still issuing the newspaper in 1668.

In comparison with the countless weekly sheets which appeared throughout Europe up to the end of the eighteenth century, the number of daily newspapers remained very small. In England, the *Daily Current* first appeared in 1702, and France received its first daily newspaper considerably later, in 1777, with the *Journal de Paris.*

With the *Publick Occurences*, published in Boston, newspapers were introduced to America understandably late. Development of the newspaper press in America was very efficient, however, as there were already thirty-five weekly news-sheets by 1775, and the first daily newpaper appeared in 1784.

Up to the middle of the eighteenth century, newspaper typography conformed with the current design conventions of the book. The only difference worth mentioning consisted in the full utilization of the page area with a large type area. At first the title pages were very simply designed, with a bare mention of the contents, and often with a decorative surround for the title-text. Sometimes the title-page was embellished with a woodcut illustration. With time, the title-pages became more detailed, with mixtures of typefaces and type

sizes to differentiate the image. Sensational and other news was boosted with striking headlines. This verbal exuberance also found a natural expression in the title-piece designs of the late sixteenth and seventeenth centuries.

As a German invention, and therefore at first produced only in the German language, the early newspapers were set in typefaces of the Gothic style, with Fraktur types predominating on both title and inside pages. Other typefaces used were the Round-Gothic and Schwabacher.

As in books, so in newspapers, initial letters were an important element in design. Gothic capitals, in particular, lent themselves admirably to the job of typographical emphasis.

In non-German speaking countries, too, book typography was taken as the model for the newspaper. Towards the end of the eighteenth century, with the growth of the industrial revolution in England and the political revolution in France, there are clear changes in the appearance of the newspaper. New techniques and methods of production, political and social restructuring, brought changes all over Europe, and these naturally found expression in newspapers as well. A rapid succession of events and achievements led to the publication of many hundreds of newspapers and pamphlets; this was the beginning of the new century, which made the newspaper into a mass medium.

The first major innovation based on these events was an enlargement of the type area, since larger and heavier printing presses had made possible the use of larger sheets. This led to multi-column layout, which was already adopted by many newspapers before the middle of the eighteenth century.

If we now go briefly into the technical development of letterpress printing, composition and type design in the nineteenth century, the subject is all the more interesting in view of the close, reciprocal relationship between the further development of the newspaper and that of printing and composition. The growing mass medium of the newspaper became, in fact, the initiator of newer, faster and better methods of production. *The Times* newspaper of London played an important role in this development.

Beween 1785 and the end of 1787, *The Universal Daily Register* became established as the leading London daily paper. After three years of publication the title was changed and *The Times* began its history with the

first issue on the first of January, 1788. A pioneering spirit and the quest for quality by its founder and his successors made the newspaper into a by-word for high quality, and its progress, with the associated link between newspaper and printing developments, forms a remarkable story.

Before the turn of the century, when the young *Times* already had the largest circulation of any London morning paper, the Englishman Charles Stanhope brought the often-tried further development of the medieval wooden press to a successful conclusion (1800), and the first examples of his metal press were installed at Printing House Square, the Times printing office. A larger page size soon allowed *The Times* to go from four to five columns per page.

In the early years *The Times* continued to use the same Caslon Old Face as its predecessor *The Daily Register.* Following a trend of the time, a new text face was adopted in November, 1799. This was a Modern face, which, printed on relatively coarse paper and set in a slightly larger point size than the old Caslon, together with broken hairlines, brought no advantage to the reader. The probable intention at Printing House Square was to show readers that the paper was moving with the times.

With the first *double cylinder press*, the German inventors Koenig and Bauer brought the development of the letterpress machine to an entirely new stage. *The Times* supported the development and construction of this fully mechanized, steam-driven machine and was the first printing establishment to put it into use, with the issue of the twenty-ninth of November, 1814. The new printing technique was revolutionary, since it brought a five-fold increase in speed of output. A comparison between the new type reproduction quality and the quality of the image used before 1814 shows that the new technique produces a typeface which is bolder in design and the ink load is heavier.

At the same time, and at short intervals, at least three new types for body text and commercial announcements for *The Times* were tried, followed by a further change two decades later. All the typefaces concerned are of the Modern style. Their designs, in some cases, are quite similar. They differ most in the variety of weights, and sizes.

A further look at nineteenth century newspapers, outside German-speaking areas, shows the almost exclusive use of Modern for newspaper setting. Some

examples include: *Le Moniteur Universel* of Paris, 1813, set in the French Modern of Didot design; the *Gazetta di Genova*, 1820, set with the highly contrasted Bodoni Modern and openly spaced; *Le Monde* of Paris, 1866, shows that later in the century and particularly in France, condensed Modern versions with large lowercase x-heights were quite common; *The Daily News* of London, 1883, used a very typical English Modern of round and open appearance. The accentuated hair-line and serif stroke thicknesses give a general impression almost like an Ionic or Clarendon typeface.

The Modern style was the fashionable text type of the century, being produced by practically all typefoundries in extensive programs of point sizes. When printed with care, it has a pleasant appearance and good legibility; but this was exactly its problem, as a text type with marked contrast of strokes, for an area of use where bigger and bigger daily runs were constantly required. A relatively coarse paper surface, and constantly re-used types, together with badly balanced printing pressure, resulted in unsatisfactory quality of reproduction. Later on, in the second half of the century, the quality improved distinctly, partly owing to improved methods of composition.

With the construction of its own new printing press, a four-cylinder machine, in 1828, *The Times* increased its production speed to 4000 impressions per hour. 'Appetite comes with eating,' as the French say, and before the middle of the nineteenth century *The Times* set up another record in mechanical invention; a rotary 8-cylinder machine was installed which made possible an impression speed of 10,000 per hour.

Invention continued to flourish at Printing House Square, and after successful trials in stereotyping, *The Times* changed over to printing from curved stereo plates, on very large rotary machines, in August, 1858. The early stereotype technique with its indirect type reproduction through *papier maché* moulds must have had a negative effect on the most typical characteristic of the Modern, which is the marked contrast of strokes. Therefore, from this date on, serifs and hair-lines became thicker as they were in previous faces, and the entire aspect is not far from a Clarendon or even Egyptian design.

The next important innovation occurred ten years later with a further in-house development – the web-fed rotary machine. From December, 1869, machines known as *Walter presses* printed *The Times* from

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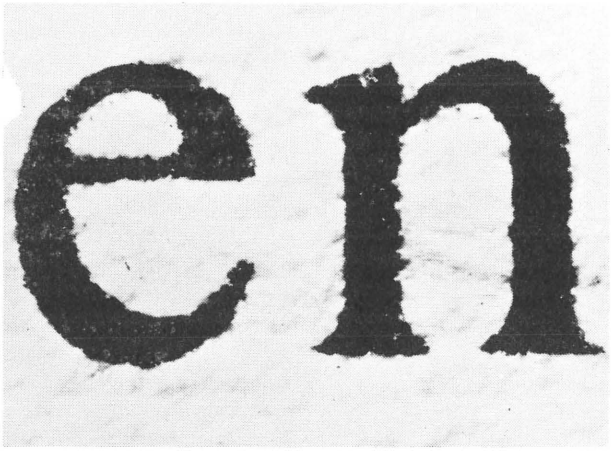


A comparison of the reproduction quality between the original type design and digital form reproduction in an offset printed newspaper.

paper in reels. The years following the installation of the Walter Press saw the utilization of a typesetting machine, introduced to Printing House Square by the German Karl Kastenbein. This was a keyboard composing system, enabling type to be composed by means of metal character magazines, filled by hand. With a specially developed type-caster *The Times* obtained brand-new types every day. There is no doubt that the new method of composition greatly improved the quality of the type as reproduced in the newspaper.

Out of more than 20 patents and makes of composing machine, the Monotype and linecasting machines emerged towards the end of the nineteenth century, with their famous representatives Mergenthaler Linotype (1886) and the Monotype Corporation (1897). The history of the two firms concerns us not so much on account of the world-wide acceptance of their reliable products, as because of their engagement in the field of type-design and typography.

The Monotype and Linotype companies came into being at a time towards the end of the last century when there was a new appreciation of older values and new artistic and formal guidelines were beginning to be defined by reform movements. Within this new direction, both firms were pioneers in the creation of newspaper typefaces.

To accept this responsibility was easier in that the previous century had brought few innovations in the field of text-type design, and a vacuum existed in face of the tremendous achievements and discoveries of technology and industry. Most of the typefoundries of the time were rather concerned with out-bidding one another in the production of new display faces of all kinds, and out of this great number, there emerged only very few remarkable novelties, which made typographical history.

What interests us here in particular is the typefoundries of England, which created certain trends in contemporary type design with a series of Clarendon and Ionic faces. As we will now see, these trends had a great influence on the newspaper faces of the twentieth century.

In 1894, the American Linn Boyd Benton created an important new text face for *Century* magazine, and in our opinion he thereby initiated the first impulse in the field of type design for newspaper setting. Influenced by the English Old Style faces, Benton designed his new typeface with bolder serifs and hairlines, thus

achieving a rather blacker overall image compared with the magazine's former typeface. Century Old Style first appeared in print in 1895.

With some modification, the face was later adapted for newspaper setting by Mergenthaler Linotype in 1904 and the Monotype Corporation, as No 211, in 1934.

If we now compare these two versions with the original *Century Magazine* typeface, we note that there are marked differences, which are due not only to the modifications made in the meantime by Benton himself, or to the technical implications of mechanical composition. Quite apart from Benton's own corrections, a genuine insight into the design of newspaper text faces had been achieved. In the search for usable models from the nineteenth century, Ionic and Clarendon faces had been rediscovered. The influence of these models, or the growing insight into the matter, was based on the recognition that more robust typefaces with stronger serifs and hairlines and thus a stronger overall image, as shown by the Ionic and Clarendon families, are more suitable for newspaper setting.

This view was given clear expression in 1925, when Mergenthaler-Linotype issued its Ionic specially designed for newspaper setting. One year later the typeface was put into use for the first time, at the *Newark Evening News*. With its powerful image, strong serifs and relatively large lower-case x-height, it obtained wide acceptance, especially in the United States.

As the first genuine newspaper typeface, Ionic was soon very successful everywhere, and rated as highly legible on account of the advantages mentioned; but precisely because of its large lower-case character image and the resulting, relatively wide lower-case alphabet length, it eventually became critically judged by newspaper people. The text had to be leaded between the lines; and, in addition, the narrower column width, which had in the meantime been generally adopted by newspapers, required typefaces with narrower character widths.

Linotype's response was to design a new face *Textype*, issued in 1929. Compared with Ionic, the reaction was very marked, since the lower-case alphabet length is much less and the character image considerably smaller. We are not sure about the commercial success of this type, but it is significant that Linotype brought

out yet another new typeface for newspapers only two years later.

This was *Excelsior* (1931), which shows considerable differences in character width and size compared with Textype. With Excelsior, Linotype achieved a very successful extension of its existing typeface library. Today, this typeface is still being used. Probably because of a positive echo to this type edition, the Linotype Company felt compelled to issue further news text typefaces four years later.

And with *Opticon* and *Paragon,* whose alphabet lengths showed further increase, until they finally reached that of Ionic again, the firm introduced seven new typefaces for newspapers by the end of the nineteen-thirties. Thus, in conjunction with its setting system, Linotype was a prolific and important contributor to this class of faces.

If we compare a few letters from the Linotype faces of the twenties and thirties with one another, we see that, with the exception of Caledonia which is Modern in design, these body types follow the Ionic model, by and large, and differ from one another only in a few details of form. Only the lowercase x-height and the alphabet length or stroke weight show some clear difference here and there.

In the meantime, other manufacturers of composing machines and printing types followed on, and by the late fifties the number of available faces had grown to about twenty. In relation to this considerable number, most of the faces concerned show little or no innovative or individual design features and they differ little from their predecessors. This gives the impression that no real research was carried out into newspaper typefaces at that time. Considered as a whole, these alphabets typify the same concept and formal language which were already in force for the design of the first newspaper face.

We may now ask: What was it that made the success of an Ionic, an Excelsior or other newspaper faces of similar character? Basically, our view is as follows. The first of these faces were pioneer achievements, if only because during more than 130 years, the general appearance of newspapers had been stamped by virtually only one typeface family, the Moderns. Therefore, to challenge the reader's attachment to a traditional visual image with a completely new typeface presented a risk, whose acceptance called for more than merely commercial considerations. Furthermore, we

find that the Ionic design, with its various derivatives, was the adequate answer to the techniques of rotary letterpress printing, owing to its generally powerful stroke thickness.

What astonishes us as designers, however, and leaves some particular questions open at the end of these comments, is the fact that, at a time when experiments were being made with typefaces for the private presses, at the Bauhaus in Germany and for other areas of printing, there were no real innovations in the field of newspaper type design, with only one sole exception. This single exception, of significance in the history of design, took place at *The Times* in Printing House Square.

Up to 1909 there were no further innovations of importance in the Times printing office. In that year, the first Monotype machines were installed there, giving the occasion for the cutting of a new text type for the newspaper; but the only significance of this type is that it was cut specially for the new method of mechanical composition. Its design was highly traditional and it is a close approximation to the design originally cut by William Miller in 1813. From 1909, the Times was set in this Monotype face for two decades – in other words, *The Times* of the mid-twentieth century was not yet prepared to give up its Victorian inheritance.

This was soon to change, for the *Times New Roman Adventure* began on twenty-ninth of October, 1929. On that date *The Times* published a special issue devoted to *Printing in the Twentieth Century*, which contained an article by Stanley Morison – a critical statement in which he not only complained that the Times text face had remained the same between the previous printing supplement of 1912 and the present one, but also that no constructive suggestions had emerged from the account of the difference between eighteenth and nineteenth century newspaper typography. He also regarded newspaper typography, in comparison with contemporary book typography in general, as inadequate. This judgment also applied to *The Times*, although it had always been in advance of other newspapers throughout its history, both in its typographical appearance and in its nature and position.

The management of *The Times* reacted promptly to this criticism and Morison strongly advocated the view, to a group of senior executives, that the newspaper's text type had to be redesigned. For the first time in the history of type design, a research study was then

commissioned by a company with a scope and depth which has never been surpassed to this day.

Commissioned to undertake the task, Morison, in his long and extensively illustrated printed memorandum, explained all the aspects which had to be taken into account in the design of a new typeface for newspaper setting. His arguments impressed the special working committee to such an extent of the need to create a new typeface, that Morison was immediately entrusted with the job. The result is well known.

Under the working title *Times Old Style*, the Monotype Corporation cut the future 9-point body size in April and printed the first trial proofs. The final form of *Times New Roman* was worked out over the following eighteen months by means of corrections and wide-ranging tests. The complete typographical change-over of the newspaper was completed during the weekend of the first to the third of October, 1932.

We all know of the success of the Times New Roman. For example, about 70 percent of the daily newspapers in Switzerland use it today. Whatever the reasons for this success may be, or what set up this milestone, in the typeface creation of the present century, they partly led back to a happy combination of the following circumstances:

- the far-sightedness and determination of the client;
- the technical and manual competence of the manufacturer;
- and the professional skill, historical knowledge and sense of form of the designer.

If we value Times New Roman on this occasion, it is not only because of its design. We are far more interested in the thoughts and considerations, the studies and clarifications, which led to the company's achievement. We find this procedure exemplary and also unique, especially in terms of today's newspaper press.

With this important example in mind, we would like to make the point that genuine, basic typographical research is also capable of bringing out long-lasting achievements in quality. And also, that such research work must be undertaken and supported, not only by individual designers or schools of design, but also, and increasingly, by industry. We may now ask:

- What has happened since Times New Roman, especially in Europe, became the most used text face?
- And where do we stand today, in newspaper typeface design, in the light of this example?

There is food for thought when we consider *further developments* in this sector, with reference to our own and future times.

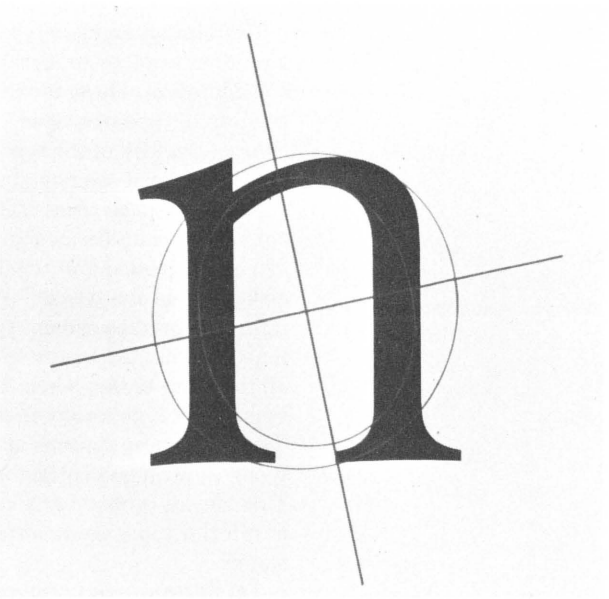
- Times of great enchantment and deep anxiety about micro-electronic techniques;
- Times when we feel obliged to produce more, more quickly, and – at all costs – more cheaply.

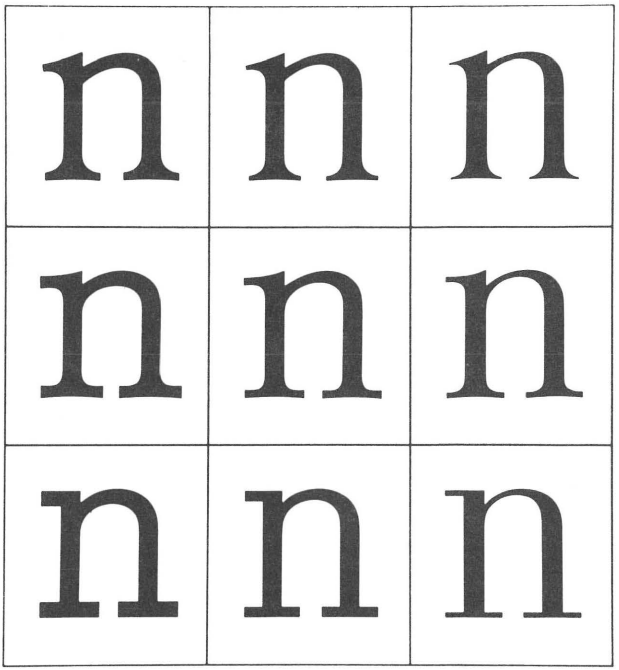
In a brief review, the years from 1960 to 1972 show us about ten newspaper faces, issued mainly by the Linotype and Intertype companies. In their formal concept, most of them derive from the traditional designs of the Twenties. A number of them were drawn by well-known designers, and there is no doubt that professional knowledge and design sensibility underlie these efforts. Two examples from the group, *Linotype Modern* (1969) and *Olympian* (1970), have an individuality in their formal details which distinguishes them from the Ionic and Excelsior group. We do not know how far research work was undertaken with regard to the practicability of the two typefaces, but we are sure that something completely beyond the designer's control must have happened between the original design and the way in which the two typefaces appear in newspapers. For example, Matthew Carter surely did not design something like an 'Olympian 1/4-Bold Condensed' to go with the 'Olympian Roman.'

Results like these two examples are fully representative of the quality of everyday typography in the newspaper of today. This is all the more a matter for concern in view of the fact that here, without any doubt, qualified typeface design has been really deformed by modern high-performance technology.

In order to face up to this critical situation, we must thoroughly reconsider the assumptions of type design today. To summarize and conclude, we would now like to systematically examine and illustrate, from the historical and technical development of the newspaper and its typefaces, the criteria and factors which influence the qualities of form and legibility of a newspaper face.

If we start with the layout of the front page of a newspaper, we see at once that the visual image is marked by a number of typographical layout factors which form the different typographical structure of a newspaper. These include the assembly of pictures and text, the relation between headlines and body type, the choice and mixture of the various typefaces and the number and arrangement of columns.





To vary a form or its formal details like serifs, is part of the design process when defining formal and aesthetic aspects of a final design.

Examining the body typefaces rather more closely, a number of other typographical factors come into consideration. These include column width and its relation to type size, space between lines and the character width of the typeface, and not least, such factors as word-spacing and justification of the lines.

Admittedly, all these factors have no direct connection with the design of the typeface, since they can be controlled and regulated by the typographical designer and the typesetter, but they do have a decisive influence on the readability of a newspaper face and must be included in any such investigation. This applies all the more today, when it is precisely in the field of newspaper typography that modern electronic text and data processing systems are making the control of these typographical quality factors more and more difficult. This view is quite clearly confirmed by the large number of inferior typographic products to be seen on the newsstands.

Let us now turn to the basic element of a newspaper's typographical structure: the image of the body type letterform. In order to judge all the factors which influence the characteristics and qualities of the type image, we must classify them into two different criteria of quality:

We distinguish between the design quality of the typeface, meaning the qualities of its æsthetic form, and its reproduction quality, meaning the qualities of its technical use.

Design quality, or the æsthetic factors of a type image, can be classified, investigated and judged by the following formal criteria:

1 The character of a type-form is substantially marked by the formulation and development of its stroke-endings: the stroke-end form, with or without serifs. The different visual appearance is clearly seen in the word-image. Even relatively fine differences in the shape of the serif have an important influence on the overall character of a type image. The formal principle of a typeface is, broadly speaking, derived from one of two historical models: first, the more dynamically conceived Renaissance roman letters, derived from the broad pen of Italian manuscript writing, and second, the more static and constructively developed form of neo-classical roman. Examples of these two alternative principles of form are Garamond and Bodoni, both historical typefaces in modern versions.

The modulation of strokes, the relation between

powerful and fine parts of the stroke, between emphasized basic strokes and serif forms, is another element in shaping the formal character of a typeface.

As a synopsis of all these design elements which mark the character of a type-form, we can use a *morphological box* to register the modulation in the vertical from dynamic to static, and in the horizontal from strong to slight contrast of the stroke.

This scale of serif forms can be supplemented by a corresponding scale of sans-serif type-forms to provide a comprehensive morphological graphic representation of typeface characteristics.

2 As a further factor in design quality – we must investigate the formal proportions of the type image. The weight of a typeface, and thus its blackness, or *color* on the page, are influenced mainly by the thickness of its strokes. The stroke-weight in relation of the *counter*, the white part of the sign, produces the image-weight. Relatively small deviations in stroke-weight have a decisive influence on the image-weight, the color of a text-face, which may range from almost Light to almost Bold.

The proportion of letter-width to letter-height produces the image-width – a narrower or a wider letter-form. In this case, too, quite small differences in proportion produce very different type-images.

And finally, in the proportion of x-height to total type-height, the image size, we have a type-image criterion which is still disputed today with regard to readability. A smaller x-height harmonizes with the ascender and the greater white space between the lines emphasizes the line-image of the typeface. A greater x-height certainly produces a relatively more open letter-image at the same point size, but the line-image tends to get lost within the compact typesetting structure, often at the cost of legibility.

3 Character width, the consecutive rhythm of the typeface, is of particular importance. The rhythm of a typeface can be judged from two different viewpoints:

- on the one hand by the balanced or unbalanced sequence of vertical main strokes, that is to say the stroke-rhythm,
- and on the other hand by the relationship between letterspace and counters, that is to say the *white-rhythm*.

In addition to these two elements of rhythm, a number of other factors have to be borne in mind in the organization of the character widths of a typeface. The

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stanford university california.
typefaces for typewriters and
for word-processors, which in
combination with the development
of new copying and duplicating
techniques will certainly not be
limited to the revolutionising
of office information. ag/cm

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stanford university california.
typefaces on the video screen:
beyond the use of screen type-
faces in phototypesetting and
computer bureaux, everyone will
very soon be confronted with the
type-forms of these new media
through teletext and videotext.

Many-sided design problems exist in today's mass-communication, e.g., office information or letterform on video-screen.

width of a typeface is also substantially dependent upon its formal character: a serif face has a different rhythm from a sans-serif, the rhythm of a condensed face differs fundamentally from that of an expanded face, and different optical criteria apply to the organization of the character width of a bold face, from that of a light face.

And last but not least, the type size must be taken into account in the specification of the character width. In metal setting, it was possible to design and cut the various sizes individually, so that the whole range of sizes was matched to the optical needs of legibility in stroke weight and character width.

In phototypesetting systems there is often only one original image, whether negative or digital, for the projection of each sign, if not in all sizes, then at least over a large range of sizes. However, phototypesetting does make it possible to alter the set width under software control as a compensation for the invariable letter image. By this means, small sizes can be made more open and therefore more legible, and large display sizes narrower and more compact. But if this electronic facility is used to manipulate set width irresponsibly, as is all too often the case today, the rhythm of the typeface and its legibility are destroyed.

In listing all the factors of design quality in a typeface, we wanted only to demonstrate how many-sided and complex are the design criteria which must be taken into account in any newspaper typeface project. No less many-sided and important is the reproduction quality of a typeface, the criteria of technical reproduction and its influence on the final form of a face as it reaches the reader.

In connection with the design of Times New Roman, Stanley Morison established the fact that type design and production should be considered as a single process, reaching back from the printing press to the drawing board.

This idea is all the more topical today in view of the fact that the rapid technical development of the setting and printing process practically forces us to rethink the assumptions of typeface design. In this connection we would now like to consider a number of technical factors and their considerable influence on typeface quality.

In conventional metal setting, the design and production of a printing type were closely linked with the handwork of the punch-cutter: from the type drawing to the punch and the matrix, then from the

matrix to the cast type. The composed type, that is the letterpress form, is inked and pressed into the paper. Relief and *ink squash* are the characteristic marks of letterpress printing. Excessive inking, bad impression setting and cheap paper quality can greatly deform the original type-form.

In conventional phototypesetting, the film negative replaces the metal matrix as the original image-carrier. The character is exposed on film or photo-paper and (for offset printing) etched into a metal plate, inked up and indirectly transferred via a rubber blanket to the paper. The ink lies flat on the paper, without any squash. The reproduction quality of the type will mainly be influenced by the quality of the printing paper. In the photographic process of typeface exposure, film development and finally the transferral to the offset-plate, careless operations and unfavorable technical conditions can equally well damage the original image to a great extent.

The digitization of printing characters for the CRT and laser typesetting processes brings new problems to the reproduction of forms. Technically speaking, the reproduction quality depends mainly on the *raster* or grid density in relation to the type size, that is to say on the fineness of digital resolution of each type form. A relatively fine resolution makes the grid pattern almost invisible to the naked eye with a type size of 9-point. Nevertheless, a certain distortion of the original may still be perceptible. In offset printing, a grid pattern becomes homogeneous with the structure of ink and paper. However, if a digitized typeface is printed with a traditional newspaper rotary press using Nyloprint plates, as is internationally very common today – the original letterform is often distorted almost beyond recognition.

A similarly disastrous result for the typeface is experienced in rotogravure printing. The CRT grid pattern and the gravure dot pattern, between them, often leave little that is recognizable from the original type image. If the reader then has poor lighting conditions – or less-than-perfect vision – or is travelling in a swaying tram or train, then there is no more pleasure in reading a newspaper.

We may have exaggerated slightly, but if you believe that you have only been shown extreme and rare examples of bad reproduction quality – please make your own comparisons to see how one and the same typeface, printed in various well-known and respected

newspapers with the most modern technique, finally reaches the readers.

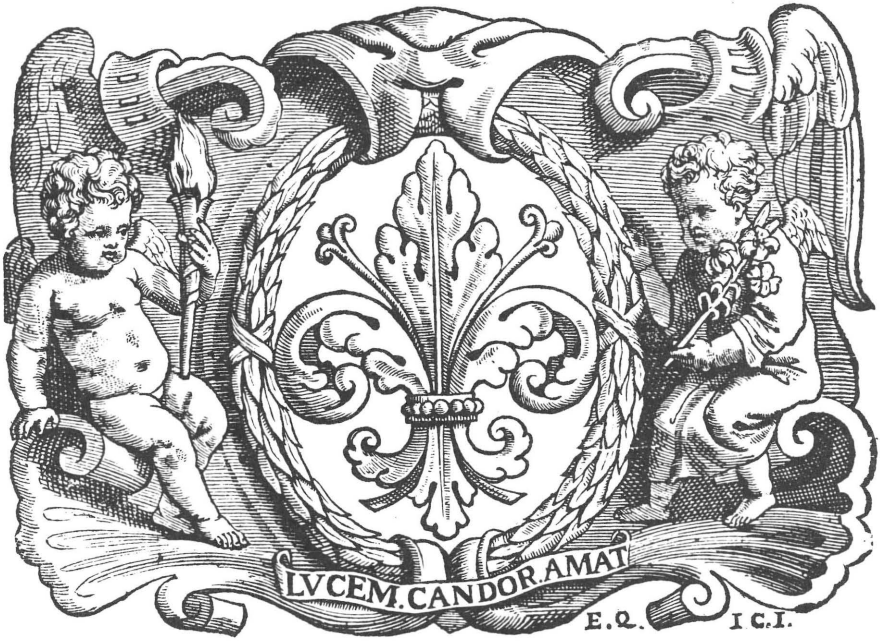
Hot-metal composing machines have now been out-of-date for some time, while CRT and laser typesetting systems become more refined and productive from year to year, but we still have to judge the quality of the type in newspaper printing very critically. The often poor readability of many newspapers stands in unhappy contrast with the technical development of newspaper production.

As we have seen, the æsthetic and technical criteria of this quality are so many-sided and complex that only a full collaboration of all departments of research and industry in the production of type and print – including scientists, technicians and designers – can lead to new answers for the newspaper typefaces of the future. By this token, as we said at the start, it is quite unthinkable to present design suggestions alone, nor do we wish to offer any prognosis concerning possible future solutions, but we would simply like to invite you to consider a few open questions from the problems demonstrated:

- Will the old-established newspaper typefaces from the days of the mass-media pioneers, such as Excelsior or Times New Roman, still be favorites in 50 years?
- Will sans-serif faces drive serif faces out of newspapers in the future? Faces such as Univers, perhaps, with its open and austere image, or more dynamic textfaces such as Syntax?
- Or perhaps will there be new possibilities in the marriage of the best qualities in serif and sans-serif forms?
- And last, will the type forms of the TV and video screens have a detrimental influence on newspaper typefaces and perhaps lead to the acceptance of quite unconventional forms?

Like these few questions relating to the case of newspaper typography, there are many other questions open in many other areas of basic research concerning letterform design in the past, present and future.

This paper was originally delivered in a primarily visual format, using a double projection system of one hundred and eighty 2 1/4 inch slides.



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