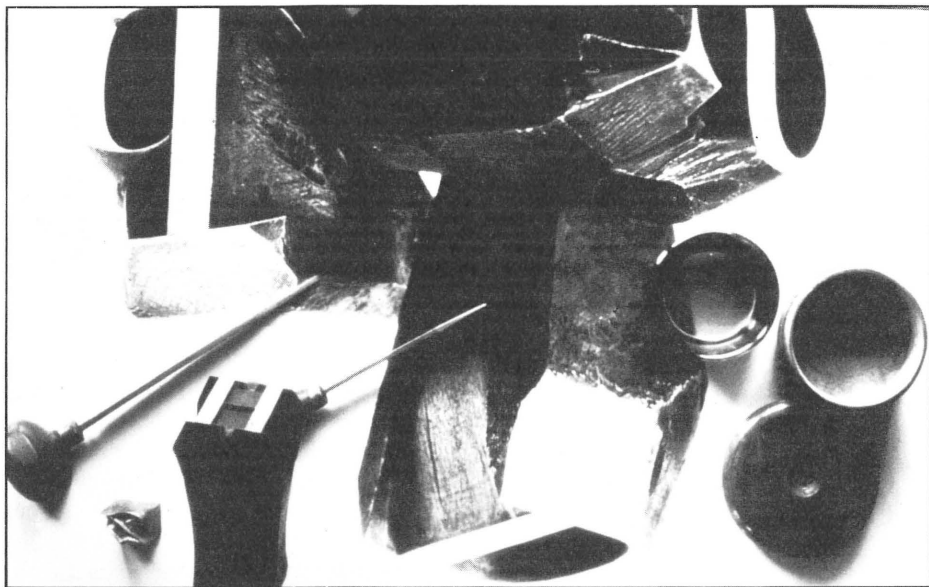


Future Tendencies in Type Design: The Scientific Approach to Letterforms

Hermann Zapf

For more than forty years I have been associated with type design. During this time I have had the unusual opportunity to observe the dramatic technological changes which have taken place, especially in the last twenty five years. These changes, particularly in computerized design, have affected my own approach and thinking about type design.



I kept hitting my thumb with the sharp engraving tool while learning to cut some letters by hand under the guidance of the master punchcutter August Rosenberger of the Stempel Typefoundry in Frankfurt, Germany. I did this in order to learn the technique of punchcutting, and to understand the basic principles before starting my first type design, a Fraktur alphabet called Gilgengart. This was in 1939 and it was then that I developed a high respect for the work of the punchcutters and for their precision and skill.



As I became more involved in type design, I made alphabets not only for hand composition use but also for machine composition, specifically for the Linotype. Later in the sixties, some of my faces had to be transferred to photo-composition for use on the Linofilm system, which used an 18 unit grid.

The first problems with the new technology started with Palatino, which had been designed originally for letterpress printing, but was used very often in offset printing. The same problems were also encountered with Melior. With Optima, I encountered many difficulties when this face was stored digitally. I will go into more detail about this later.

But first, I want to ask this question: Should we transfer all old metal typeface designs into the new technology of digitized typesetting using the CRT tube or even the laser beam? Here we touch a fundamental question. I believe we should have more respect for the work of the past centuries, and not copy every masterpiece of the past. In George Santayana's words: 'Those who cannot remember the past are condemned to repeat it'.



I think we are going about it wrongly if we take a classic face like the Janson roman and italic and make this alphabet available in a digitized font. How can you capture the spirit of Totfalusi Kis, the punchcutter of the Janson — the human touch let me call it — in the abstract and simplified bitmap of a digitized alphabet?

If you study Janson carefully, you will discover that each size of the roman and the italic varies from point size to point size. There is no basic character pattern; there are many irregularities of which some are accidental; others have developed over three hundred years, from their casting through recutting of punches. For example, the tail of the cap 'Q' is different in each size, as is the 'K' and the 'f'. You

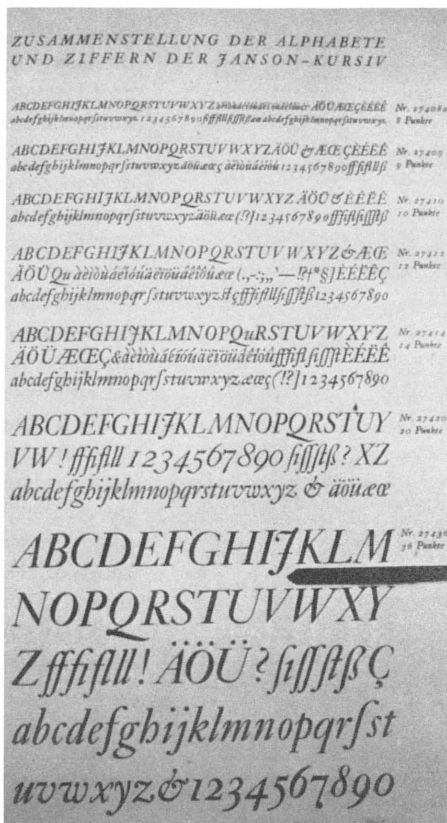
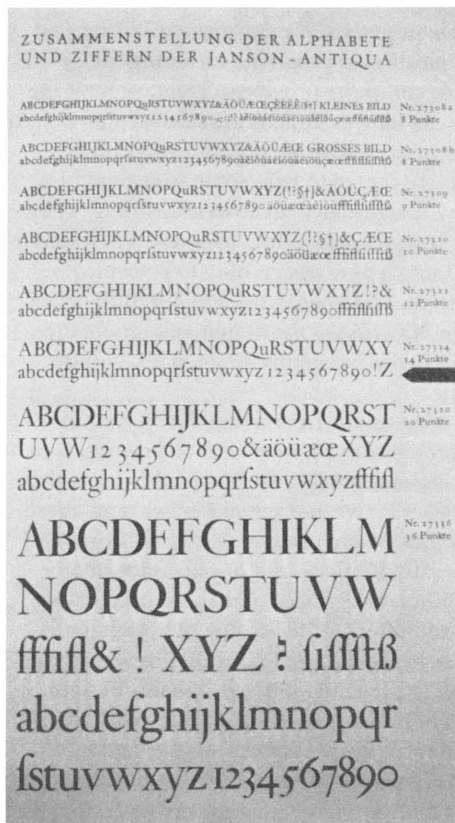
will also find the same problems in the italic, and in addition, some characters even have a different slant or slope. In letterpress printing we may like this personal and lively design of some of the characters, but I am not sure how Janson would like if it were refined, polished up, and made consistent. It would probably be impersonal and cool. Perhaps someone will expand the Janson designs and even add a semi-bold or a version in different weights and with all kinds of modification — for example a larger x-height and alternate characters — as was done recently with Garamond.

Janson is a typical seventeenth century typeface and should be respected as an original design of this historic period in the Netherlands. It was created out of the spirit and artistic background of that time. The Janson is, in my opinion, not at all an expression of the alphabet in the twentieth century. But I think Hunt Roman, the face which was used as a display face for the Stanford seminar, is in the style of Janson. It is possible to design something new within the structure of the Janson, but we should leave the foundry design alone and create a new Janson, not just make an ersatz design.

If we look with a critical eye at the Janson roman and italic, we will see several characters which do not fit into the overall design. We know that recuts of broken punches have been done in the typefoundry, not by the master punchcutter, but by less skilful punchcutters or apprentices. Look at the German sharp 's' in the roman which does not match the other characters and was never done by Kis at all. This character was done much later, perhaps in Leipzig by someone else. By the way, the 24 point and 48 point executed in 1956 have nothing to do with the original Janson. Both sizes are based on my drawings for the Linotype version of the Janson roman and italic and were added by the Stempel type foundry of Frankfurt to complete the range of type sizes for casting.

Let me give you some more background information about this Janson addition. The discussion first took place with the German Linotype Company to use the Janson designs which had been produced some years earlier by Nils Larson for the American Mergenthaler Linotype Company. I was against this idea because in my opinion it was not a good re-design. In addition, the Stempel foundry in Frankfurt, the manufacturer of Linotype matrices for the European market, owned some of the original Janson matrices and therefore had no reason to take over a second class design just to save money.

The typical Janson 'J' in the italic (the beautiful Dutch calligraphic J-form) was changed in the American re-design into the regular slanted 'J' of the roman. I picked the Janson as an example because it is a very good demonstration of the problems of adapting an historic and classic face to the technology of the twentieth century.



The same would also happen, I am sure, with other great faces cut by hand, such as Fleischmann, Fournier, Didot, etc., and with several of Rudolf Koch's designs like Marathon or some of Frederic W. Goudy's designs which were created by him for letterpress printing. Giovanni Mardersteig refused to allow his alphabets to be adapted for phototype-setting. I understood fully his decision after we had a long discussion about this fundamental question in the early seventies at the Officina Bodoni in Verona.

The cutting of the punches by hand has given some of our classics an outline which never can be copied by mechanical, photographic or digital devices. I strongly believe therefore, that we should respect some classic designs. Sadly, all these old masters have no protection. Even ATypI, unfortunately, has done very little in the past to protect the pre-war type designs or even those made after the war, as I myself am one of the victims of this rampant typographic piracy. Also, more protection for creative work is needed these days for sophisticated programs including menu-based typographic computer programs. Here we have the same conditions. As long as designs are seen as pure objects of business and not as creative works, and successful designs are willingly copied to help some firms build up a reputation, new designs have no economic future. Why should a young designer invest skill, time and the research of many months into a new design only to be copied in seconds by smart 'businessmen' who will give him or her no compensation but will sell the design and ignore the designer's name? This is like publishing a book without the author's name.

We as alphabet designers are missing the opportunity of promoting, through ATypI, new faces to printers, typesetters, ad agencies, and publishers. We need to teach these people the difference between original designs, and cheap, often inferior, copies. Many printers would not want bad recuts of old faces, translations into negatives for phototypesetting machines, or digitized alphabets, if they were better educated and informed as to why new techniques require new ideas in the design. I am sure this would lead to a stronger feeling for contemporary alphabet design.

The first years of phototypesetting machines offered designs which in most instances were simple copies of alphabets originally drawn for metal. Yes, some firms took the same master enlargements they used before cutting the metal type punches. One of the excuses given was that the customer wanted familiar designs and, in addition, some salesmen of the new phototypesetting systems told their clients the foolish story that they could mix metal and phototype. If the new machine broke down they could easily put a fire under the lead pot of their good old Linotype machine, and be back in business.

As was done at the beginning of phototypesetting, it looks now as though we are making the same fundamental mistakes in the digitizing of some old alphabets. This even includes companies with electronic printing systems, the so-called 'printing on demand' installations. We still have

all the technical information on hand about the art of punch cutting with the different engravers and the counter-punches and we know why metal faces have such an unusual crispness which is hard to describe, yet is readily noticeable. You can study the techniques of the punch cutting machines and the matrix engraving machines, invented by L. B. Benton about eighty years ago, which developed their own specific language and had a strong impact on the design of type in the past decades. But all this was for metal type. Today we have to find new solutions.

The additive effect of letterpress printing, which was taken into account by all the skilled punchcutters and craftsmen, was completely ignored in the designs or, let us better say, in the early adaptations of existing alphabets for phototypesetting. But it was not always realized that using negatives to shoot the characters onto film resulted in a subtractive effect which was completely different from metal type. The text produced by a phototypesetting machine was used for offset printing, in which there is no inksread as in letterpress, and the result was that the majority of those alphabets looked oversharpened, weak and vigorless.

Today offset printing and electrostatic processes offer some new possibilities in the transfer of letterforms to paper and may automatically require new design solutions. Digitized alphabets therefore should be designed for the bitmap.

As an example, digitizing my Optima roman presented many difficulties. The well-balanced shape of the stems is contrary to the digital principle, especially in low resolutions, some of which go down to 300 lines per inch. The design must be reduced to a heart-breaking compromise. The answer to this problem is that Optima was never designed for digital storage. If I had been asked, I would have done a new design, used another principle and another name, but would have tailored it to the needs and limitations of today's equipment.

Let us look at a few examples to show interpretations in contemporary designs. Study Times Roman, designed in England by Stanley Morison in 1932. It is a great design executed by Victor Lardent for the British Monotype Corporation based on historic type faces by Christophe Plantin of the sixteenth century without copying the old designs.

Caledonia, designed in 1939 by William A. Dwiggins for Mergenthaler and in Europe known as Cornelia, is a modern design based on Scottish types produced by William Martin of Glasgow in 1790. This design is not just

a warmed-up historic example, Caledonia shows Dwiggins' hand in every detail and is his idea of how a type should look if it were designed for the twentieth century. We could include in our list, of course, other examples of new alphabets based on letterforms of the past — designs by Eric Gill, Georg Trump, Matthew Carter, and Ed Benguiat. All have made contributions to contemporary type design, in the spirit of our time, the time in which we live.

ABCDEFGHIJKLMNO
 12345 PQRSTU VWXYZ 67890
 abcdefghijklmnopqrstuvwxyz

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Type design is a reflection of the cultural progress of mankind. We should not talk about the good old days of type designs. As Shakespeare wrote in the *Tempest*: 'the good old times — all times, when old, are good'.

In alphabet design — I do not want to use the term type design anymore, for type design to me means metal, and is associated with Gutenberg's invention for casting type — we should take advantage of today's possibilities and needs, using the new tools like Ikarus and Metafont. We should create designs that fit within the structured pattern of the digital principle.

We should try to understand why it is an anachronism to squeeze a design like my example of the Janson roman and Janson italic into a bitmap, copying seventeenth century details into the storage of a modern computer.

There was a note in a Frankfurt newspaper a few weeks ago of a new electronic sewing machine by the German company, Pfaff. This fully electronic sewing machine has a built-in program to make irregularities in the stitching process so that it will look like it was done by hand, not the abstract perfection that everybody wanted in the past years.

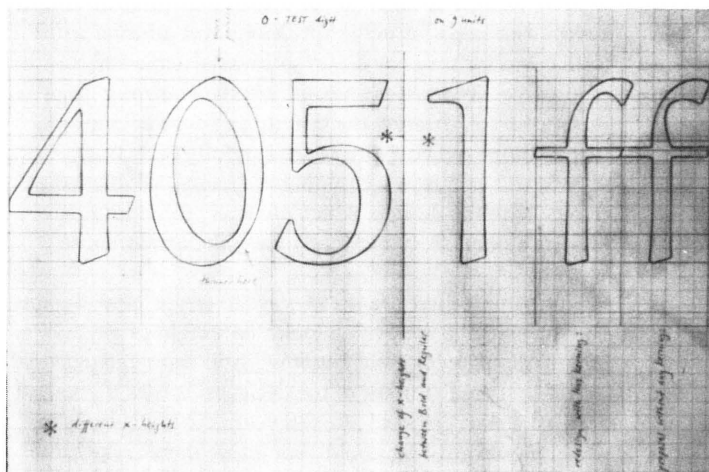
I would not be surprised if somebody were to translate this into alphabet design. This would mean we could build into some of our future designs the irregularities of the hand of a designer. This would be foolish, somewhat like trying to copy the spirit of past centuries in alphabet design, and of course I would not recommend this. We should try to make better designs with the help of the electronic equipment now on hand, but the designs should follow the rules of good industrial design: they should be clear and functional for our age of electronics. Fewer designs — there is no need at all for a ‘Garamond version no.99’ — fewer designs, but better designs.

By a reduction in the overall production of new alphabets, I should explain that I am talking here about text faces — not about display faces. In display faces there will always be a need for new expressions and unusual letterforms, and for more or less experimental achievements. But in text faces we must get away from the warming-up of historic forms, to show the thinking of our generation in a medium which expresses so carefully and clearly science and progress, like alphabet designs. We have the chance to make designs which are really different from existing alphabets, rather than look-alike or ‘similar to’ versions.

Some think there are smart ways to create ‘new’ designs. You may change the overall look, the weight of a typeface, and manipulate it a little, but it will still show the personal details that are the mark of the designer. It is as if you had married a slim girl, and after 20 years she is a lady, let us say in our terms, ‘semi-bold’: but inside there is the same personality as when she was slim and nice looking. The basic character has not changed at all. This we should know if somebody wants to sell us a copy as if it were a new design.

In the past as in the present the cultural and scientific expression of a time is reflected in the arts, in architecture and in type design. We no longer build Gothic cathedrals like St. Patrick’s in New York City, or erect new offices in state capitals in the style of Greek temples, like the Supreme Court building in Washington, D. C. What would you think if you found baroque ornaments with cherubs on your computer equipment like on printing presses built in the nineteenth century? The progress in society should also be seen in our alphabet designs, for we are all observers of the electronic age. What a poor society this must be if it is unable to express itself and is only able to copy the past.

In the future, science and computerized text processing will probably influence our thinking about design solutions just as industrial progress did in the past. This means letter design will be very strongly affected; legibility, aesthetics, and high speed generation will be dominant. The simplified simulation of characters on our VDTs today can only be a first step. In the near future, we will want to see the real image of the characters prior to actually setting the type; we will want to see the inter-character spacing precisely because this is so important for readability. We will want to see the precise shape of a Souvenir or Tiffany. The next generation of VDTs may look very different from the screens now used everywhere.



Many of us, and I mean the users of electronic character generation, have lost the feeling for good letterforms or for legible letterforms. Too many poor designs have been done within the limited dot matrix of 5 x 7 or 6 x 9 that engineers take for granted.

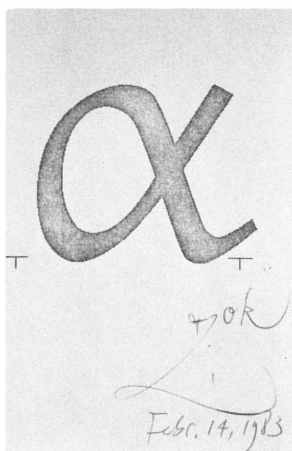
Take a look at the various videotex systems. It is not easy at all to catch a message on your cable TV in these primitive letterforms. Scientists and designers must find better solutions. It is not the bright colors on the screen of your TV set that are important; instead, one must easily identify the characters or understand the message clearly and quickly. The main purpose of typography or character generation is the same today as it was when Gutenberg invented type casting: to transfer a message in the best economic and visual way to the reader.

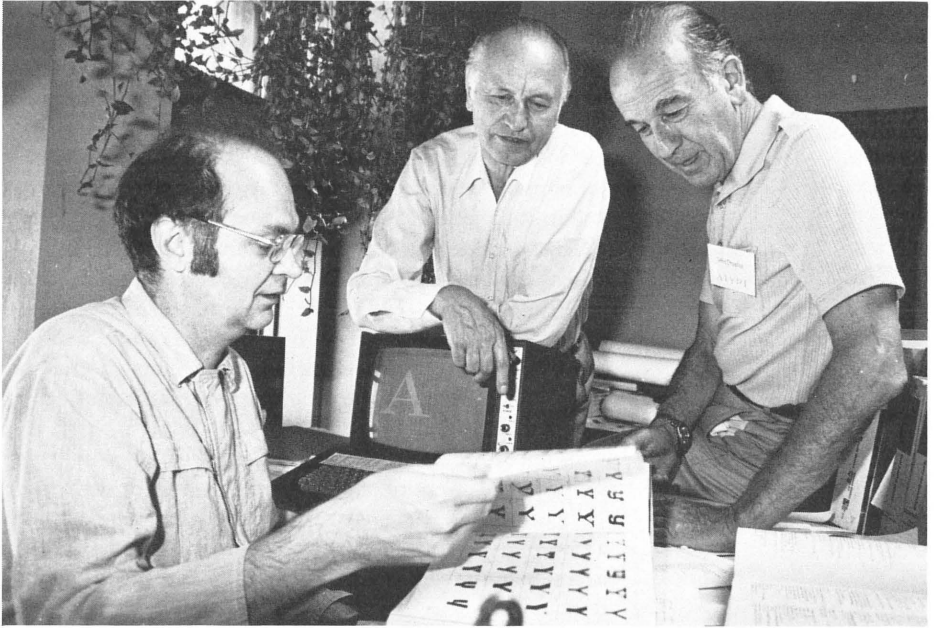
Scientific considerations are much more involved in our designs now as compared to the past. As an example, I want to mention here the AMS-Euler, a design I did for the American Mathematical Society, with Donald Knuth at Stanford using his Metafont system. AMS-Euler is a complete family of several hundred characters and symbols worked out in collaboration with mathematical experts from universities all over the United States. This design project, which has run over several years, includes designs for a special roman, an upright script, Fraktur and Greek with bold and italic.

In the future, special designs will be needed everywhere, but they must be designed within the new scientific approach. An analog design by a designer, scanned automatically, will show only pixels (picture elements) on a VDT, in a precise arrangement generated in the form of a bitmap via the VDT. The designer will make his corrections perhaps with an electronic pencil. Using an interactive process and a display screen, the designer will work out the best solution or the best compromise between the original idea and the image of the generated letter.

The type designer was always confronted with compromises. The Linotype principle did not allow kerned characters. The high speed electrostatic technology in resolutions of 300, or even 600 point per inch (as used nowadays), sometimes has the effect of melting away parts of serifs, just to mention one of the problems facing an alphabet designer.

In the future most of our letterforms will be completely stored in the memory of a computer: on tape or on a disc. They can then be generated via a cathode ray tube onto a screen, paper or film as an analog image to be recognized again by human eyes. And we should never forget that the human eye is still the best critic and judge. Our eyes are not different at all from the eyes of five hundred years ago, of Gutenberg's time.





From left: Donald Knuth, Hermann Zapf, and John Dreyfus