



## TYPOGRAPHY IN MOTION

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### Introduction

The new media has raised new possibilities for graphics expressions. With a computer and access to the Internet, today designers can produce and distribute fonts easily than ever before. Every day new fonts are created. When a journalist asked Adrian Frutiger: "Why are there so many fonts?" His answer was a question: "Why are there so many wines?"

Type design, like all creative disciplines, must move with the times and reflect contemporary moods and philosophies [1]. New categories of type design arrived for example with street life, multimedia environments and with different groups of people who have own opinions. Thus typographers will always look for new letterforms and type designers will always try to create them.

In this paper we will show that digital tools have been very interesting in making typography much more flexible. By languages for programming and scripting we may create atypical relationships between the elements displayed in screen layout. In this paper we describe specific area of graphics design, which is connected with new media – virtual typography. The expression virtual typography in this paper we use in sense how it is used at research Matthias Hillner [2]. Other authors used the terms: temporal, kinetic, transitional, dynamic, expression, fluid typography and type in motion.

We present some examples of historical types of motion typography and we compare letterforms of

changing characters. The main aim of this paper is to research in creating new transitional typography by application of some mathematical constructions. We want to show that it is possible use several different letterforms which are changing over a period of time as static fonts.

### Definition and Categories of Motion Typography

Transitional typography elements evolve and change letterforms over a period of time, but also change legibility of the text. The effects of kinetic typography on readability was described by P. Ditterline, B. Engel, B. Yeung from Carnegie Mellon University [3].

Most useful definition of virtual typography comes from Matthias Hillner. Virtual typography is a term to describe shape which the viewer expects to resolve into typography over a period of time. Thus virtual typography breaks away from the traditional idea that texts should always be read as quickly as possible. His typographic work, as it is presented on [www.virtualtypography.com](http://www.virtualtypography.com) and in the article 'Virtual Typography': Time Perception in Relation to Digital Communication may be considered an experimental investigation into the limits of legibility [2,17].

Barbara Brownie tried to formulate basic categories of fluid typography [4,5]: Revelation by rotation. Three-dimensional object can represent different identities when viewed from different angles. Identity is presented for user through navigation around an object, or by the rotation of the object itself. Moment of revelation is moment when user recognizes a letter or sign in an object. Construction by rotation/navigation. Letters of modular construction (especially this one) may present letters only when viewed from specific angles. Single letter may be created by abstract shapes and identities are accessed through navigation or rotation. Construction through motion of parts. In this process any modular letterform is constructed through the rearrangement of its parts, which can move independently of one another. Letterform is presented by parts, which are for example moving to or overlapping each other over a period of time. Metamorphosis. Metamorphosis is another process, where letterforms are changing into other shapes

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without any sort of navigation or change in the position of elements. Overlap. Several letters which overlap can create a new abstract shape or glyph. This process makes use of the Pragnanz law from Gestalt psychology.

### Previous Works

Brian Lemen [6] presents different shapes from different angles of three-dimensional letterforms. He connected more than one letterform into the same shape.

Peter Cho is a designer, media artist and educator. He is interested in digital technology, virtual spaces and typography. He presents his projects: Type me, Type me not (1998), IBM Questions (2000), Letterscapes (2002), Money Plus (2003), Wordscapes (2008), etc. through his site [www.tytopopo.com](http://www.tytopopo.com). Letterscapes and Wordscapes are two collections of reactive typographic application. Each reactive letter of these dynamic environments can be seen as individual playful interactive experience. Letterscapes received Tokyo Type Directors Club Interactive Award and a silver award in 2002 from the Art Directors Club of NYC [18].(See Fig. 1.)

In 2002 Haltovsky's papercut [7] font won the 1st place at the international competition Euro Talent Award. His design solution was the base of the font on the 3 dimensional object. He used a cylinder as the base structure and carved out each letterform from this shape. The outcome is that letterforms viewed from different angles become abstract shapes. (See Fig. 2.)

Matthias Hillner[2] is author of at least six fonts: Sculptura, Cubico, Cubico st, Oblivion, Wireframe, Kinetica. His Studio for Virtual Typography offers work on transitional typography in the context of graphics design, motion graphics, film titles, and digital media. Matthias Hillner produces fonts that are constructed through motion of parts of letterforms. His fonts have thoughtful conception and sometimes create illegible dynamic texts with graphics expressions. (See Fig. 3.)

There exist also a lot of interesting moving titles in films. For example: film Se7en – title design by Kyle Cooper; film Hollow Man – title design by The Picture Mill; film Matzes – title design by Karst-Janneke Rogaar & Roel Wouters [8].

Dan Waber [4] created minimalistic works with kinetic typography. He formed different words from the same curve. These miniformat sequences (each lasts several seconds) have graphics expressions related with the meaning of words.

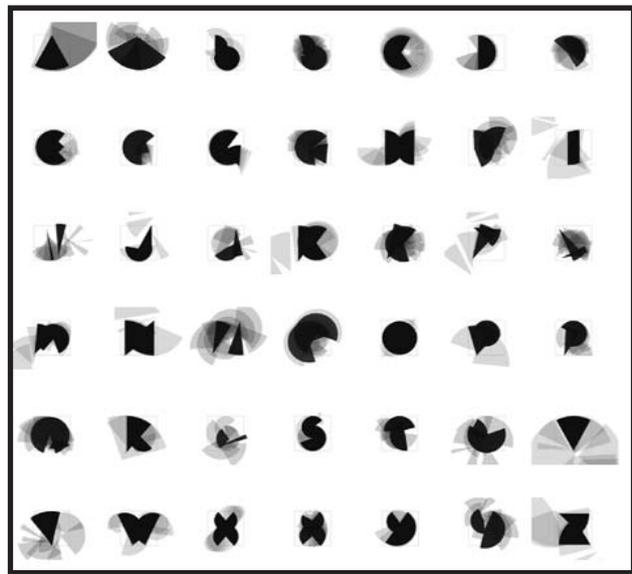


Fig. 1. Peter Cho, Type me, Type me not [18]

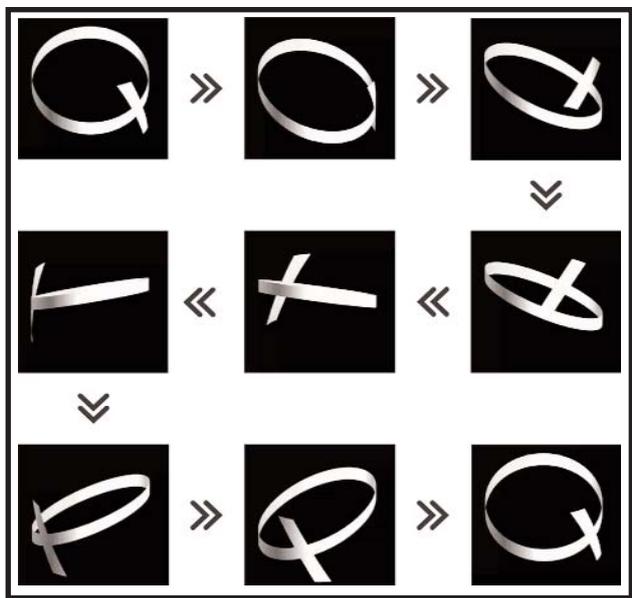


Fig. 2. Haltovsky, kinetic font Papercut [7]

### Definitions and Basic Conception of our Work

Principal aim of our work was to create a system as a toy for type designers. We took free bitmap font and substituted every black pixel with a simple animation. We experimented with various types of animations. In this paper we want to focus on animations with fractal structures.

### Fractal

In Mandelbrot's book *Fractal geometry of nature* [9], we found this description of a fractal. A fractal is fragmented geometric shape that can be subdivided into parts, each of which is a reduced-size copy of the whole. Self-similarity is a typical property of fractals. Self-similar object is exactly or approximately similar to a part of itself [10]. A typical example of fractal object is the "Snowflake Curve" (devised by Helge von Koch in 1904).

### Artists which Worked with Fractals

Fractal structures also inspired some artists' imagination. Research professor Richard Taylor showed that Pollock's dripped patterns approximate fractal structures. Taylor's discovery of Fractal Expressionism was greeted with considerable enthusiasm from the scientific and artistic communities [16].

M.C. Escher experimented with several fractals. In his prints: *Division* (1956), *Smaller and Smaller* (1956), *Circle limit IV* (1960), *Circle limit II* (1959), *Part of life III* (1966), *Snakes* (1963), etc. we can see irregular objects which show self-similarity or something close to it. Escher presented these art works as "Regular Division of the plane by similar figures of which size and content rhythmically diminish in size, receding towards the center." [13, 14]. Escher inspired a lot of other artists. One of them was Kim Scott. His skills include work in graphics design, user interface design, programming and mathematics education. Very interesting is his animation *Tree*, which makes use of features like infinite zooms on self-similar recursive figures. Near each E in the word *TREE* we can see the same word *TREE* in smaller and smaller sizes [15].

Anton Stankowski was a German graphics designer, which is known for his "Functional Graphics". In his works we can find the "visualization of informational content (visual thinking) in which form and content compromise a visually logical unit" [11,19]. Vladimir A. Shlyk described A. Stankowski as Fractal Graphic Designer. V. A. Shlyk wrote about him "He devised and applied a principle of organizing forms in pictures by means of two components, branching and regeneration, both of which are properties of self-similarity and the underlying bases of fractals"[20]. We can see Starkowski's ability to visualize fractal structure in his works: lino cuts (two-part, 1961), *Systematic planning* (Viessmann calendar page, 1964). He impressively demonstrated the potential of functional graphics. (See Fig. 4.)

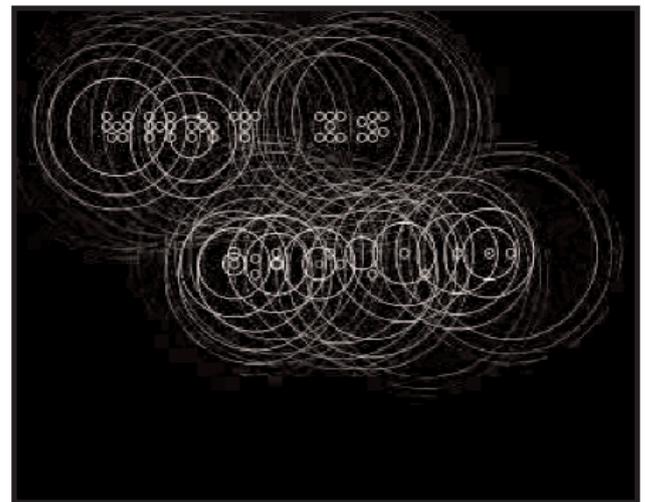


Fig. 3. Matthias Hillner, Music video [2]

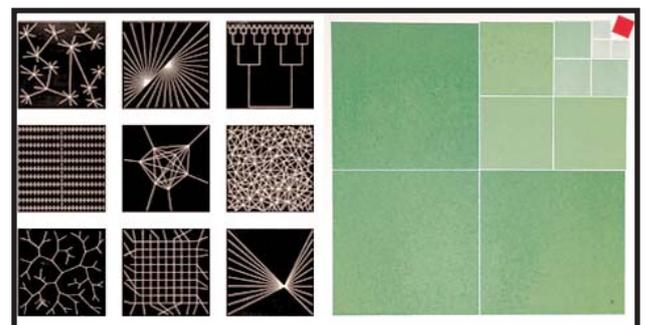


Fig. 4. Anton Stankowski, Lino cuts from 1961 (in the left figure), *Systematic planning* Viessmann calendar page from 1964 (in the right figure) [21]

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The Emotional Fractal of Jared Tarbell [12] uses English words describing the human condition. In any place of specific rectangle area Jared places an arbitrarily sized word. The result is a region filled with increasingly smaller type height.

### Results of our Work

We introduced our basic concept hereinbefore. We have taken some animations which we substituted by all pixels of given bitmap font.

First animation was inspired by fractal tree. We worked with six parameters: recursion, bend angle, branch angle, trunk ratio, branch ratio and height. By recursion we can control degree of abstraction of fractal structure. We can see fractal trees with different levels of abstraction in Figures 5-9. Motion of the characters over a period of time can be reached with five fixed parameters. We evenly change one parameter in time. It is necessary to define interval in which the changes occur. (See Fig. 5.-6.)

When we created one of the first experiments we noticed that it is possible to use several different letterforms which are changing over a period of time as static fonts. Some of these fonts have not excellent legibility, but they are visually attractive.

Second animation was inspired by T-square fractal. T-square is a two-dimensional fractal, which has a boundary of infinite length bounded by a finite area. (See Fig. 7.-8.-9.)

### Conclusion

In our visual examples we used only one bitmap font with each character having maximal width of four pixels and height of five pixels. In near future we want to apply this procedure on fonts that have more pixels. Visual results are very interesting and we can apply them to practice.

Another interesting way of our research is to apply another fractal structures like: Menger sponge, Dragon curve, Space-filling curve, Koch curve, Sierpinski triangle and carpet, etc. Part of our future work will include applying our ideas to 3D environment.

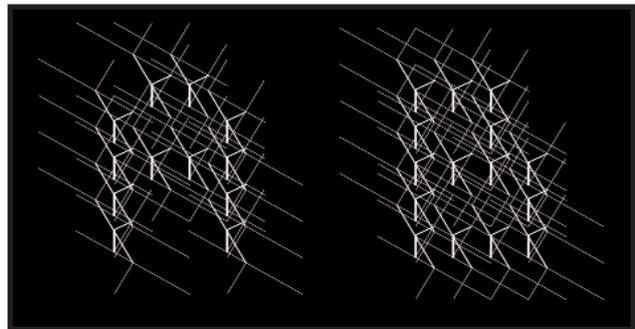


Fig. 5. Fractal trees. We can see character A, B with low level of abstraction

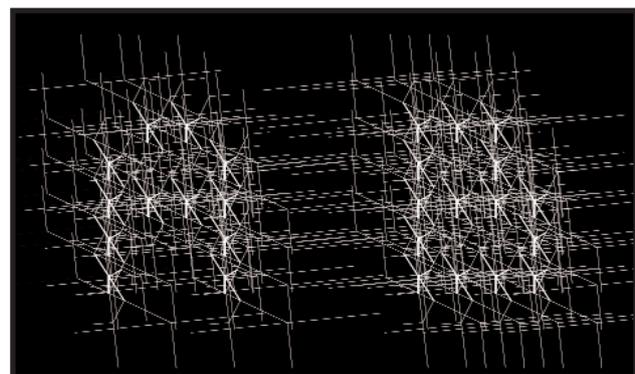


Fig. 6. We can see one level more of abstraction that in figure 5

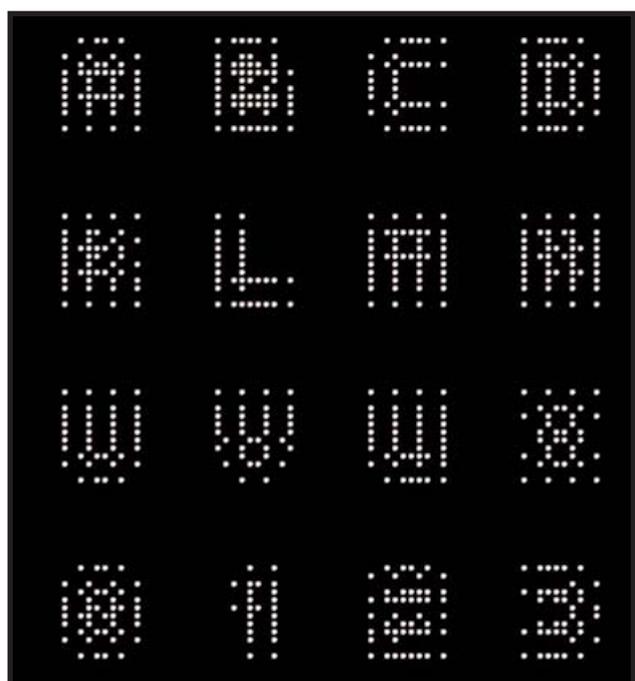


Fig. 7. Fractal modular font inspired by T-square fractal

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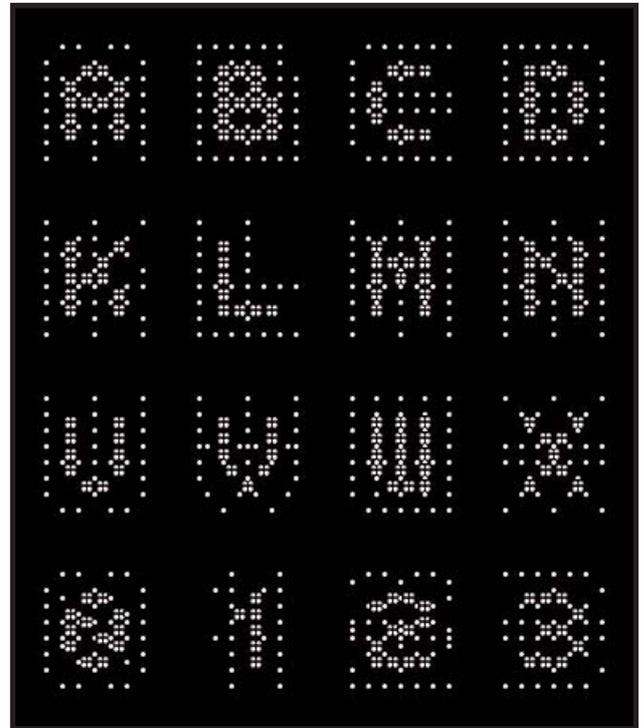


Fig. 8. Overlap of two figure improved legibility of our font

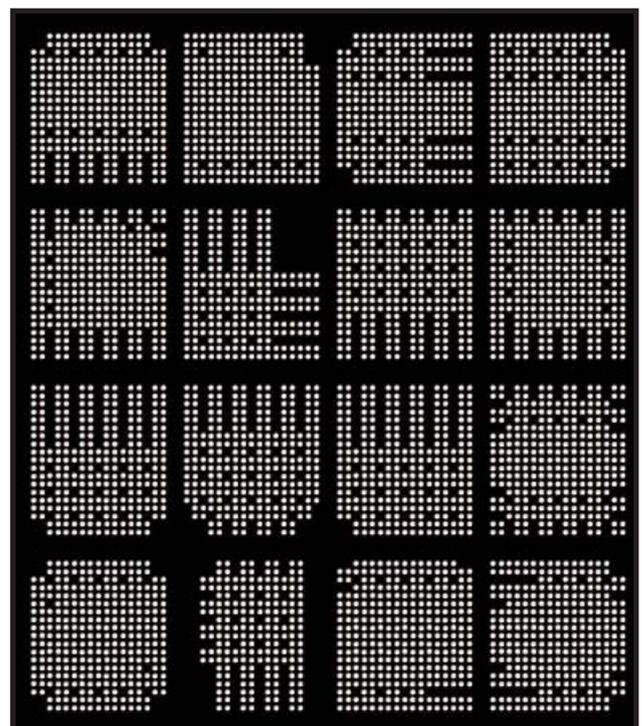


Fig. 9. High level of abstraction caused higher frequency of points in letters

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