

Mnemonic Descriptors as Generative Principles in Digital Type

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Abstract

This paper analyses the craft methods responsible for determining the relationship between key visualizing mechanisms in the manifestation of language-determined symbolism from both objective and subjective perspectives within the parameters of a systematic metamorphic generative type-strategy, and explores the consequences of evolving fundamental principles associated with the visual requirements of a reciprocally introduced process defining the characteristics of experimental word definition.

Fundamental graphic concepts invite intuitive symbolic dexterity as a consequence of intersecting and dissecting the alphabets revealed by Phoenician merchants, Islamic visionaries, and key polemic demonstrators; these in turn prompted the adoption of free-styled creativity within the craft-maker/designer towards a transformation involving defined areas of tension between intertwining elemental responses and what were to become standard type processes; "ideas have to be massaged into reality" [Fletcher, 1995, p. 19] [1].

An evolutionary visual route through preliminary figurative development is shown to predict the inherent vectorization and digital patterns responsible for the fecundity surrounding formative progressions in systematic reasoning within the field of type design; "there is an invisible line that divides every sign" [Calvino, 1997, p. 269] [2] and by reflecting the impact of each successive relationship "between genesis, formal properties, and the possible reactions of the interpreter" [Eco, 1989, p. 166] [3] generative mnemonic devices are identified as defining catalysts in our conceptual appreciation of communication design.

Introduction

The sum total knowledge of any social network prior to the evolution of writing, would have been what its cleverest and most intelligent members could remember [Daniels & Bright, 1996]. "Primitive oral narratives, like the folk tale that has been handed down almost to the present day, is modeled on fixed structures" [Calvino, 1997, p. 10] [4], principles that formed a logical means of repetition and memory-retention; these were phenomenologically sound mnemonic devices for continuing information transference within primitive social groups. A culture has always been synonymous with the perceived collective quantity of understanding within its society, evidenced by its ability to retain and pass on learned knowledge.

The advent of the written word made it possible for ideas to be stored, transmitted and shared; for records to be retained, and for the first time it was possible to hold onto more knowledge than one person or a single group alone could remember - transforming ideas of transitory experiences passed linearly from generation to generation, to potentially permanent collections, allowing inter-tribal dialogue and the sharing of ideas. "Cognitively as well as sociologically, writing underpins 'civilisation', the culture of cities" [Daniels & Bright, 1996, p. 21] [5]. The expansion of populations, travel and the sharing of

information led to an increased demand for copies of whatever forms of visually recorded material were available. The problem was, that once writing did evolve, a suitable material was needed to complement it.

Craft Methods as key visualising mechanisms

“Various people at various times exploited the few geometric shapes that are relatively easy to make in clay” [Zimansky, 1985] [6], and the earliest true writing forms found to date, are the Vinca signs and the Near Eastern clay tokens. It is clear from examination of these scripts, recovered from the ancient Near East, that both are closely related, and were either adapted or intentionally influenced by each other [Daniels & Bright, 1996] [7]. As linguistic analysis demonstrates, the identification and location of common threads shows there were considerable similarities across the region, and these themes are to be found throughout recording devices such as the Sumerian cuneiform samples, largely translated during the last century.

The earliest unearthed formed ‘signs’ from 3100 BC to be identified are these cuneiform characters; they were impressions marked upon wet clay by a pointed stylus, formed from an individual reed, and involved a deliberate, conscious, linear action for drawing the shape. [Daniels & Bright, 1996] [8]. Subsequently, this method of forming cuneiform figures was superseded by a quicker impressing action, that was not only generative in nature, but aesthetically preferable and faster. This individual action produced the first true analog printing system, and was due to an expression of man’s inherent will-to-form through intuition. Unlike the organic degradable composites of the craftsman’s other domestic creative practices, e.g. garments, baskets and shelters, all of which were naturally recycled and decomposed quickly, the clay’s durability was to be significant.

The only comparable medium to damp clay for the cuneiform-maker was wax; boards produced from wood were covered with wax and impressions made by a stylus created texts from the third millennium BC onwards. While the Persians developed tablets of clay, the Greeks made boards of ivory or precious metals, and the Romans used wood, beech and fir. Once completed, the boards could be joined with hinges forming ‘polyptychs’, in other words, early forms of books.

The cuneiform clay tablets and polyptychs provided clear examples of two distinct characteristics of printing in analog form; that is, “reproducibility and immutability” [Daniels & Bright, 1996, p. 884] [9], and once it had become general known how to reproduce texts, man was one step nearer the discovery, or realisation, of how to print using movable type.

For this leap to occur, a number of craft practices already in daily use had to come together, aggregated in an inspirational manner - a form of true cross-disciplinary collaboration; (a) ink technology, (b) paper technology, (c) block-printing technology, (d) wine press technology, and (e) goldsmiths’ and jewelers’ technologies. To understand how these various disciplines were emerging, it is necessary to view the individual medieval craft practices from a number of different perspectives. The insight that led to the printing-press phenomenon in the fifteenth century, originated from these crafts that were widely practiced throughout Europe during the Middle Ages, and it was therefore not one single invention, but a coming together at the right time, in the right place of multiple disciplines during their evolutionary cycles.

(a) Around 2500 BC both the Chinese and Egyptians developed an ink made from carbon, lampblack; the scraped up particles were mixed with glue, an animal/fish-based gelatin, for use around stone and on walls when it became necessary to develop an alternative, permanent and more fluid process for visual expression. The Roman word ‘encaustunt’ derives from the Latin ‘incaustum’ i.e. ‘burnt in’ [Lindquist] [10], and translates literally as ‘burnt ink’; the French name for ink is ‘encre’, the Old French word was ‘enque’, while the Old English for ink was ‘enke’. The subsequent transition from carbon based ink to its successor, iron gall ink, was a lengthy process. Between the eighth and eleventh centuries a superior ink, iron gall ink, was produced from gallnuts.

These nuts originated in Syria and China and resulted from insects laying eggs at the stems of leaves on oak trees; swellings appeared on the trees called galls, and when gathered and soaked in water, tannin and gallic acid were released. By combining this solution is combined with iron salt, a dark liquid forms and increases in depth as it oxidises, i.e. dries, on paper or parchment. Theophilus, a German Benedictine monk in his "An Essay Upon Diverse Arts" [Theophilus, c.1125, 'De Diversis Artibus'] [11] described ink preparation from a similar process involving dried thorn wood, that had been previously soaked in water thus releasing tannin, and after drying was mixed with vitriol or iron sulphate; also Albertus Magnus (AD 1193-1280) describes ink preparation using green vitriol in 'De Rabus Metallicis et de Minerabilis' [Magnus, 1280] [12]; Pliny mentions ink produced from soot, charcoal and an unspecified 'gum', though he also records the use of acetic acid or vinegar as a good medium for sticking the solution to papyrus [Pliny, AD 77] [13].

(b) Paper making as we know it today originated in China AD 105, with Eunuch Ts'ai Lun, and was produced from linen and diluted cotton fibers [Hunter, 1943] [14]. It was so highly prized, that the craft was originally kept secret from the rest of the world. After the Chinese defeat at the Battle of Samarkan, in Turkistan, A.D. 751, many skilled paper-makers were found among the prisoners, and thereafter, the art of paper making spread helped by the high quality flax and hemp growing along the River Tharaz at Samarkan. The first true paper-mill was reputed to have been built at Baghdad, and the skill soon spread to Egypt and through Morocco during the tenth century [Fuller, 2002] [15]. High quality paper, made predominantly from linen, was polished and buffed, providing a smooth writing surface. Early paper was also known as 'cloth-parchment', and often contained straw and wood, all mashed to a pulp before being formed and pressed into paper sheets. However, as demand grew, the quality of the paper also deteriorated as more and more cotton plus whatever vegetable or rag fibers were available, was included, to spin-out the pulp-base. Although paper was superior to parchment in its flexibility, durability and strength, the cotton-rich paper that was mass-produced was still rough, thick and the polishing procedure known to the Persians appears not to have been adopted in Europe during the thirteenth and fourteenth centuries. As a result, the Church decreed that paper was forbidden for use by copyists for manuscripts, as it was deemed an unworthy medium on which to carry the word of the gospels, and Frederick II of Germany went so far as to forbid any official documents to be produced on paper from 1221 onwards. Makers of playing cards and image-prints, however, continued to use the mass produced paper, and as popular demand increased, this crude paper was gradually superseded by a more refined, linen-rich paper. Therefore, by the fifteenth century, paper-making had reached a position where it was ready for inclusion in the imminent new printing process [Carvalho] [16].

(c) Wood-block printing, was a popular traditional craft form in China, and travelled to Europe from Asia at the end of the thirteenth century with Marco Polo. The adaption of this process by artisans in the West, had reached a stage of refinement where it was influential in shaping contemporary visual ideas and image application onto fabric. As a result, by the fifteenth century, it was an ideal time for these design solutions to cross disciplines from traditional wood-block printing to the new printing press.

(d) Wine production has been traced back to the Macedonians around 6,500 years ago, and wine making technology continually improved from the two-stone constructions found in Sinai, with burnt pottery piping [Hosney, 2008] [17], to the screw-presses depicted in medieval tapestries and miniatures. Wine presses also improved significantly during the time of the Roman Empire, and thereafter the Catholic Church's requirement for wine as part of its celebration of mass, meant that wine surpassed beer in popularity as the sophisticated option across Europe. Therefore, by the fifteenth century, wine making skills and the presses were considerably well developed.

(e) Gutenberg himself was primarily a goldsmith, and it was his finely tuned craft-skills combined with the knowledge and technical expertise of the jewelers' collectively in Europe at that time, that paved the way for his development of a punch and mould system for manufacturing type. What Gutenberg's conception of movable type produced

was a revolutionary system for not only creating precise, finely mechanised pieces of type, but most importantly, he presented a means for mass producing them. Therefore, for the first time, not only could type be mass produced, but also fine paper and specially developed ink for printing could be mass produced as well. Due to a soaring demand for books at the increasingly popular European book fairs of the fifteenth century, a significant market opportunity was also emerging. Although the printing press has become synonymous with the rise and spread of information, reading and ideas, it also, “resulted in the destruction of the clergy and nobility and allowed the rise of new forms of political, economic, social, cultural and religious systems” [Altschull, 1984, p 4] [18].

Defining the printed word

During the early colonisation of the Mediterranean area, the Phoenician linear process of writing generally became referred to as the foundation of the alphabetic writing form. The freedom with which these images, or letter-symbols, were produced does not suggest any reduction in aesthetic discipline; what it offered was a “selective affirmation of some aspect of the organic world” [Read, 1968, p. 261] [19], an idea transformed into the germ of a concept that required to be understood and adopted generally in order to evolve and become the premise for subsequent future configuration, becoming a, “hypostatized autonomous entity” [Eco, 1989, p. 162] [20]. The symbolism associated with the earliest alphabets, according to Ernest Jones [Gombrich, 1963, p. 30] [21] can be seen to comprise “never-ending series of evolutionary substitutions, a ceaseless replacement of one idea... by another”. What was becoming available was a system for transferring idealism, storing and exploring and understanding earlier symbolism with the ability to continue, to re-represent the truth from one era to the next; combined with intellectual development this came to signify the capacity to reflect, to reason, and for the first time realised a method of expressing this knowledge to a wider audience.

A craftsman, like any artist “depends on the community – takes his tone, his tempo, his intensity from the society of which he is a member”; his natural will-to-form is instilled within his distinct personal make-up, and this intuition ensures that he “use materials placed in his hands by the circumstances of his time” [Read, 1968, pp. 261, 267] [22]. This forming concept involves a realisation that a ‘work’ steers its own creation by an act of self-centered empirical formation [Eco, 1989, p. 161] [23]. It also opens the continuous possibility for analysis or interpretation; which can only be realised by “retracing its formative process, by repossessing the form in movement and not in static contemplation” [Eco, 1989, p. 163] [24].

The development of a writing system required mnemonic devices in order to teach and learn the alphabets associated with it. Logo-syllabic writing systems, e.g. Chinese, include semantic and graphic sets of patterns situated linearly across both groups and characters; while, logographic systems rely on graphic similarities as a logical means of acquiring alphabetic knowledge. The Arabic order combines Levantine and graphic similarities, whereas Ethiopians incorporate a type of Phoenician-Hebrew order [Daniels & Bright, 1996] [25]. The alphabet when viewed as a mnemonic device works by its simplicity, the fewer characters or symbols, the better. The number of letters is what matters; up to 30 is relatively simple to learn, while the linguistic nature of words themselves appears to be of limited importance.

Fundamental graphic concepts & free-styled development

Man’s receptivity to the intellectual implications of cuneiform practices and alphabetic systems is governed by his sensibility; it is this sensibility that informs his intuition and forms his understanding of concepts. Through conceptualising these early responses he was supplied with instinctive generative principles that allowed him to influence and determine his future path as a literary progression. To understand how important it is to limit the number of letters in an alphabet for developing communicable systems, we can examine a series of situations that came about from extreme situations. For example, at

sea, great distances and restrictions on visibility meant a way had to be found for passing on information, thus semaphore was developed using two flags, with one flag in each hand, the combinations of these geometric shapes produced alphabetic variations that have since been adapted for further methods of communication. The telegraph required an even simpler transformation, comprising just three elements; similarly morse-code devised by Samuel Morse was based upon a series of dots,dashes and spaces which interpreted letters and numbers into flashes or sounds.

Learning to write is a challenging process, whatever the system, and involves numerous mnemonic devices to assist the memory in recognising shapes and forms. Little wonder then, that the cuneiform writing, 'cuneiform' derived from the Latin 'cuneus' meaning wedge, - so literally 'wedge-form', prevailed in the ancient Near and Middle East regions amongst several different language-groups for over 3,000 years until the Jewish Diaspora (70 AD) [Daniels & Bright, 1996] [26].

Figurative development

The ability to visually interpret signs and patterns, led to a fecundity which unified cultural experience. "The capacity to obtain representations through the way in which we are affected by objects is called sensibility. Sensibility alone supplies us with intuitions" [Kant, 1781, p. 20] [27]. Once style is instrumental in the forming process, it can be said that the notion of form is informed by its structure and that the act of communicating is a result of the subsequent interaction between two people. Pareyson [Eco, 1989, p. 164] [28] informs us that a cultural universe is open to communication as a result of the similarities that exist between people. A 'form' is not capable of possessing an impersonal entity, "rather it actualises itself as a concrete memory of both a formative process and a forming personality" and these only come together through "objective texture... i.e. its style" [Eco, 1989, p. 164] [29].

"There is no definitive or exclusive interpretation, just as there is no approximate and provisional interpretation" [Eco, 1989, p.165] [30] that can define the graphic symbolism that evolved from the cuneiform era, but what it produced, was a communication process situated between the receptor and the addressee [Eco, 1989, p.196] [31]. This area of tension defines a unifying code, the interpretation of which is universally understood and consequently results in an interaction of creative descriptiveness and personal objectivity. What evolves is a psychological disposition achieved as a result of differences in operative forming and openness against a backdrop of historical context. Any ambiguity experienced by the addressee or the receptor can only be overcome by a common interpretative technique or a mutual commitment to understanding the newly formed codes.

What writing systems preserve is language, and its application and conveyance, not only across distances, but also time. Their development has systematically moved into carefully managed systems that subsequently enable people to make sense of, and construct order within the world in which we live. The fact that writing systems convey language, and the manner in which the alphabet is configured, i.e. its order, are two distinct, yet highly important phenomena [Baudin, 1993] [32].

For man to attain literacy, it is necessary for the order and sequences within the alphabets to be succinct, and within the grasp of his mental capabilities. Prior to the development of movable type, all documents had to be produced manually; using either ink with pen or brush on paper or papyrus; by stylus or reed on wet clay; or by chiseling into stone - and to produce a copy the craftsman could make a rubbing over the surface of the latter. What this meant was that for a print of anything to be manufactured, it entailed an 'analog' method of reproduction, but once movable type was discovered (by Pi Sheng in mid-11th century China; and by Gutenberg in 15th century Germany) [Daniels & Bright, 1996] [33] all of that changed.

Digital Type

“In terms of their fundamental principle of modularity, there is no difference between the latest digital fonts and the metal typefaces cut by Gutenberg”; what is clear is that ‘type’ is not the same as ‘lettering’, as “type... was from the outset designed for duplication and reused to set other messages” [Baines & Haslam, 2002, p. 72] [34] i.e. type is generative, whereas it is the letter-writer himself who is the generator.

Ellen Lupton states, “typography is an interface to the alphabet” [Lupton, 2004, p.75] [35], and that the current capacity for the dissemination of digital information and communication is as significant for us today, as the impact made by the print revolution was during the fifteenth century. While Maximilian Vox described the “two great means of human intercourse...speech... and the written word. Deflected from its natural course as soon as Gutenberg dissociated them” in his “La Mort de Gutenberg” or “La Revolution du demisiecle” [Baudin, 1993, p. 120] [36], Roland Barthes for-saw the unstructured chaos that would ensue once the internet’s decentralisation had taken place within communication design [Lupton, 2004] [37]. Barthes also described the reader as the former consumer who now transformed the produce into meaning [Chow, 2008, p. 373] [38]. George Landow’s view is that the internet is capable of realising this post-structuralists’ dream by means of ‘hypertext’ [Aarseth, 1994], while Genette describes “hypertext... a kind of generative text” [Chow, 2008, p. 375] [39].

Conclusion

The measure of success for any piece of written work is a combination of its ‘linguistic grammar’ and its ‘visual grammar’; and the problem with computers is that “ready-made alphabets achieve such a degree of precision, and are so attractive as a result, that even educators may be tempted... to use them” [Baudin, 1993, pp. 126, 127] [40]. Though, “good typography tries to make the messages as legible and accessible as possible ...typography will consequently have to be regarded as a ‘psychological’ problem” [Zachrisson, 1965] [41]; it is also true that, “typography is concerned with the transmission of linguistic material through the medium of visual patterns” [Sassoon, 1993, p. 150] [42]. When it comes to linear versus spatial, the database with its non-linear definition of structural quality is one of the most significant forms of information storage space we possess. Lev Manovich describes “language itself as a kind of database, an archive of elements from which people assemble the linear utterances of speech”, thus, if “database and narrative are natural enemies... competing for the same territory of human culture” [Manovich, 2001] [43], then, the growing desire for designers to utilise and address the manifestation of space is in sympathy with typography’s location within the digital era. Since the end of the last century, our ability to program as a limitless form of societal communication has meant that “the machine had already evolved from a tool of programmed computation to a means of cultural expression” [Chow, 2008, p.373] [44]; the internet has become subsumed by text, and simultaneously digital type has become revolutionised by the dynamics of text-perception. So, while digital type can be described as the generative manifestation of letter-forming, because Gutenberg’s printing press was the generative realisation of movable type, it must be true that cuneiform was the generative process that transformed spoken language into written words; and therefore the craft methods used for changing language into its written form are also the same practices responsible for its metamorphosis into digital type.

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