Meditation: Visual Transition as a Bridge Between Form and Meaning

Whereas the previous article was design using one typeface, this article employs t A system which incorporates both article content and images demonstrates the flex bility of type, and is more successful than design of the third, fourth, and fifth article

The book reviews which follow continue t demonstration, exapnding upon the possi bilities of the same two typefaces. As the number of elements such as typefaces, si styles and weights increase, it becomes n important for desktop publishers to have information and experience necessary to integrate them successfully.

Todd Cavalier, Department of Design

Carnegie Mellon University, Pittsburgh, PA 15213-3890

Meditation:

Visual Transition as a Bridge Between Form and Meaning

abstract Transition is the process of changing from one state, form, activity, or place to another. It affects objects, events, and phenomena, and is affected by them as well. As Hericlitus noted when he said "No man shall step in the same river twice", transition is described by the inexorable flow of space and time. It is the river as a continuum in which all things exist in perpetual change. Individual objects, events, and phenomena act as temporal intervals in its current. As a function of visual communication, the transition from one interval to another is a process of bonding one form to another, one identity to another in a deliberate composition.

The transition from one element to another facilitates the identification of individual form and function. As such, transition is a bridge that connects separate elements in the formation of a system. It is the process of bridging separate forms and functions. It is a linking process that identifies a particular system and, when occurring sequentially, can function to give meaning to what we see.
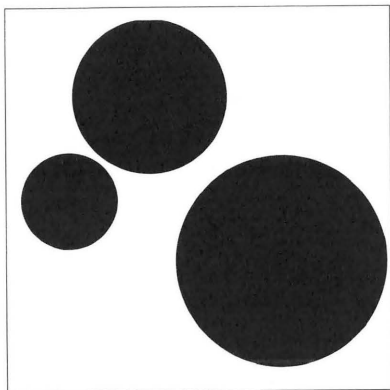
Figures 1a and 1b
Assignment developed by
Karen Moyer, Associate
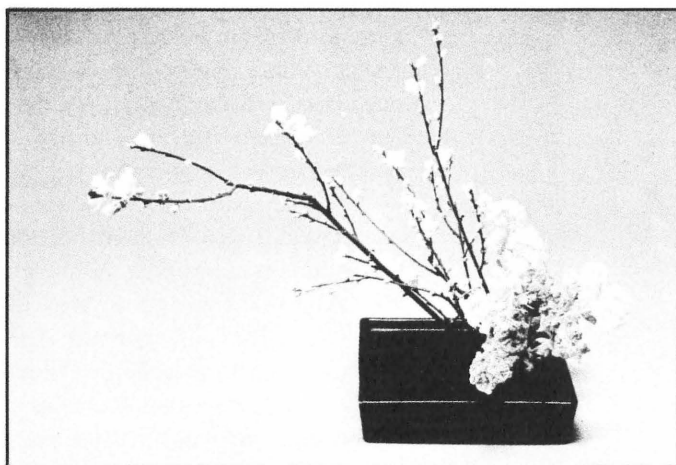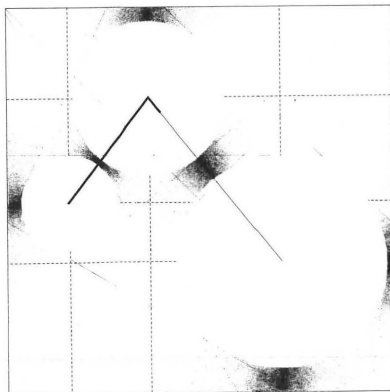Professor of Design at
Carnegie Mellon University.

Figure 2a
Morinba flower arrangement. Courtesy of the Sogetsu School, Akasaka
7–Chome, Minato–Ku, Tokyo 107, Japan.

structure as the guiding principle Structure is defined as the formal configuration of elements, parts, or constituents comprising a particular arrangement. Levi-Strauss noted that nothing can be understood short of the basic demands of structure. Although he was speaking of primitive society, his observations have implications that go far beyond a localized set of relationships.

For the designer of a visual composition, the transition from one element to another is controlled by placement (a selective process), and position (the arrangement of individual elements in relation to each other and to the overall frame in which they occur). Placement and position identify a structural framework through which unity is perceived between a diversity of elements (figure 1a). Structure guides the transition from one element to another in the formation of a deliberate composition(figure1b).

Transition is a continuous process. It is quantifiable only as a specific interval that joins or connects two or more features of an arrangement. As such, transition is recognizable only when operating between a finite (structural) set of relationships. It occurs in the space between individual intervals or positions.

For example, in flower arranging the movement of the eye spans the distance between individual elements to identify a deliberate composition (figure 2a). By joining or connecting individual elements, the space between them acts as a bridge that leads the eye from one point or position to another (figure 2b). It is a bridge that leads both ways, both to and from a particular place or position. The space between individual elements is the field in which transition occurs.

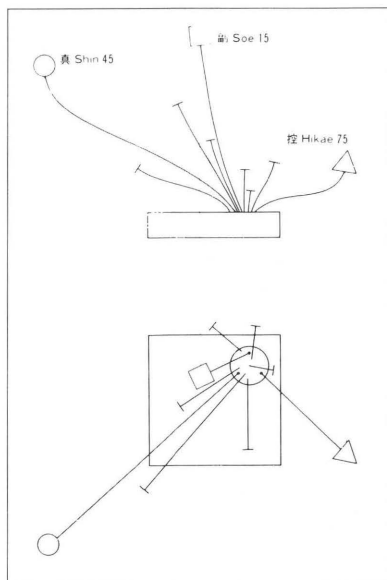Bridging links separate functions and identify a particular system. Identification of a

Figure 2b
Morimba flower arrangement.
Courtesy of the Sogetsu School,
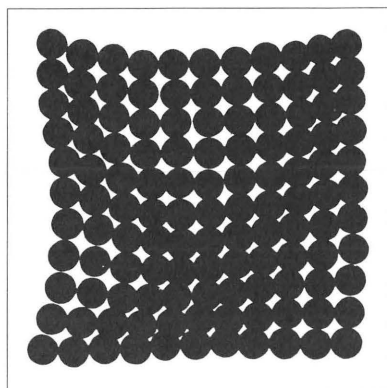Akasaka 7–Chome, Minato–Ku,
Tokyo 107, Japan.

Figure 3
Assignment given by the author
to beginning students to see how
individual elements are related to
each other within a system.

particular system depends on framing a set
of relationships. Motion is an effect of transition
that defines a set of relationships. It joins
one element to another by measuring the dis-
tance between them. Measurement is a limita-
tion placed upon structure that guides the
movement of the eyes from one place or position
to another within a composition.

Muybridge's photographic records show
motion as a function of measurement as they
document physical movement. They quantify
distinct processes and act as frame-by-frame
notation of interactive and inter-relative forces
neccessary to move from one place or position
to another through space.

We experience an intensification and
release of visual and atmospheric forces when
we walk from room to room in a house.
This is made possible by the identification
of structural channels through which move-
ment can take place.

Structure acts to guide movement. Struc-
tural passageways lead the eye to compartments
or subframes that, like rooms in a house, can
be examined independently as well as together;
transition is a linking process that occurs in
the divisions between these compartments. To
visualize structure is to compose units of
space which form sets in the construction of
a whole, this reveals part/whole relationships.
With a subtle hand we are taken through a com-
plex world where the familiar is rearranged
to intrigue. We are engaged by the disparity
between what we see and what we know.

Transition is only quantifiable as an inter-
val of change from one state, point, place, or
position to another. It connects various aspects
of the space/time flow and enables us to examine
a particular object, event, or phenomena

Figure 4a
10 x 6 meters.
From *Powers of Ten* by
Philip Morrison and The Office
of Charles and Ray Eames.
Copyright © 1982 Scientific
American Books. Reprinted with
permission.

Figure 4b
10 x 5 meters.
From *Powers of Ten* by
Philip Morrison and The Office of
Charles and Ray Eames.
Copyright © 1982 Scientific
American Books. Reprinted with
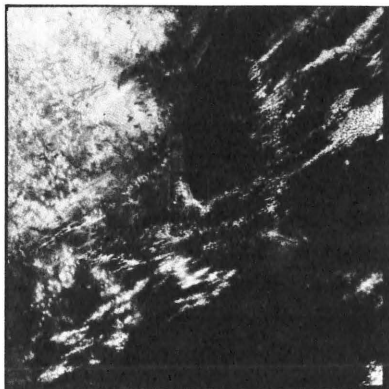permisson.

Figure 4c
10 x 4 meters
From *Powers of Ten* by
Philips Morrison and The Office
of Charles and Ray Eames.
Copyright © 1982 Scientific
American Books. Reprinted with
permission.

according to where and when it occurs. Motion is defined as the physical process of transition that occurs as a change of place or position. There are two kinds of motion when we speak of physical movement. Convergent motion describes mutual approach to a given point. It is a focusing, or intensification, of forces. Divergent motion is the movement away from a particular point. It is a diffusion of forces that decreases tension.

Converging and diverging forces act simultaneously (figure 3). In the Pantheon, spatial forces converge at the opening of the dome before dissipation in the sky. This creates an interaction between interior and exterior spaces that implies a metaphysical transition between heaven and earth. Convergent and divergent motion can be directed by a structure to bridge form and belief.

We are always in the process of leaving behind something and moving towards another. Motion occurs as a change of state, form, activity, or place. It is an effect of transition that allows us to make distinctions between and among places, positions, and in a broader sense, intellectual functions as well. We move from one thought to another as if traveling from room to room in a house. Here, the advance and retreat of transition are one and the same. Simultaneous with space and time, transition occurs in the physical world as well as in the mind of the viewer.

framing Framing is the imposition of a structure that makes image areas distinct. It causes the eye to pause in its travels through space. For an audience, it initiates a transition from the random texture of the environment to a specific point, or points of focus. The eye skims across the visual texture of an uninterrupted pattern.

or a corporate convention, the Roya
1 relaxation are a way of life. Our pe
your family's next vacation, or a cor
, Gulf Coast–where rest and relaxatic
/hether you're planning your family's

ville experience. Whether you're plan
ny found only on mississippi's fabulou
f the ARoyal d'Iberville experience. V
of the magic and beauty found only
ispitality are all hallmarks of the mag
ice. Come and enjoy part of the mag
us facilities, and warm hospitality at
is the first choice in excellence. Com
e, appitizing menus, spacious facilitie
tion, the Royal d'Iberville is the first
life. Our personal service, appitizing

d relaxation are a way of life. Our pe
your family's next vacation, or a cor
; Gulf Coast–where rest and relaxatic
/hether you're planning your family's
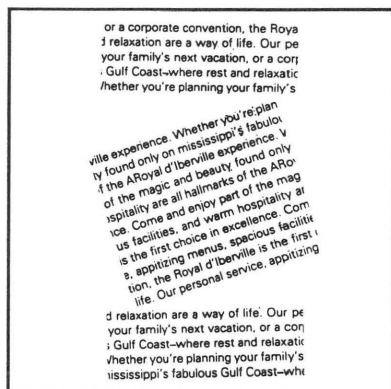iississippi's fabulous Gulf Coast–whe

Figure 5
Typographic studies notebook to
determine ways of visually
dividing a text and linking the
divisions according to structural
devices. These studies are
generic in the sense that they
work from a purely visual stand-
point without a meaningful text.
See figures 6a and b for appli-
cation of principles. From the
author's notebook.

Catalogue data will follow this format:

Native name
> Object

Entry number

Department: Town or village
Linguistic affiliation
Source .
Dimensions: inches and centimeters
· Yarn make-up
Fabrication
Iconography
Comments
Haffenreffer Museum number
References cited
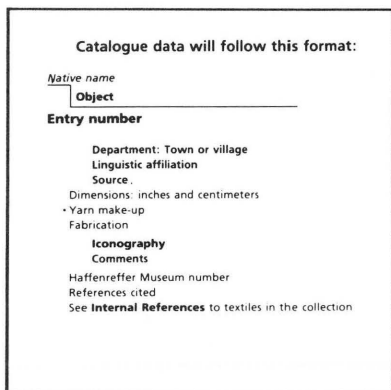See **Internal References** to textiles in the collection

Figure 6a
Categories of information are made
visually distinct by framing in a
catalogue of Mexican, Central and
South American textiles. Typography
and design by the author. The
transition from one level of information
to another occurs through visual order
(a column of text), and variation
(framing as an interruption of a par-
ticular order). Costume as Communica-
tion. By Margot Blum Schevill.
Courtesy of the Hafenreffer Museum of
Anthropology, Brown University.

huipil
> Long blouse

33
Oaxaca: Yalalag
Zapotec
C&BS 1970s 1985
37" x 33"   (94cm x 84cm)
· warp: cotton, pairs of 2-ply: white: 30 epi
(12 epc)
· weft: same as warp, 13 ppi (5 ppc)
Backstrap-loomed, warp-faced plain weave with
weft floats in shoulder area creating contrasting
texture; two pieces joined by wide *randas* of
multicolored rayon yarn, mutiple strands of 2 and
3-ply; rayon yarn braided with long fringes, sewn
onto front and back.
Neck decorated to protect cotton *huipiles*, re-
moved when washed as rayon yarn colors
run (Sayer 1985:133). The neck decoration, a
"cross bar" and textural pattern in shoulder
area are present in a miniature *huipil* found
in a Mixteca Alta cave, in Oaxaca; possibly of
pre-Columbian origin (Johnson 1967:188).
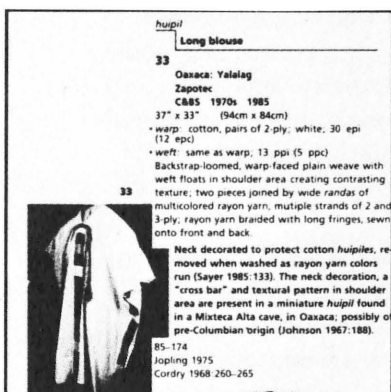85–174
Jopling 1975
Cordry 1968 260–265

Figure 6b
Application to a real text with pictorial
information linked to its description in
a cross– referencing system
comprised of interlocking frames and
visual divisions being based on
grouping information into categories
based on pragmatic, syntactic and
semantic function. Catalogue entry
number 33, Costume as Com-
munication. By Margot Blum
Schevill. Courtesy of the Haer Museum of
Anthropology, Brown University.

Motion is regulated by differentiation when the eye moves between individual elements at a speed which is controlled by the degree to which they contrast with each other.

A frame is a spatial or temporal interruption of a visual pattern that allows the eye to find and focus upon a specific set of relationships (figure 4a, figure 4b, figure 4c). A pattern consists of the perceptual texture in which individual elements exist in uniformity without formal variation in features. It is a neutral state in which distinction is lost, a state of free association in which transition is continuous and uninterrupted. Interrupting a pattern makes an image area distinct (figure 5). Moving or shifting of position within an arrangement interrupts the viewer's expectation - what is visually apparent changes (figure 6a and figure 6b). In essence, a frame is a structural formulation that temporarily interrupts the continuous flow of transition.

Framing defines the limits of a particular space. It is a limitation placed upon what we see that concentrates perception on a set of structural constraints. Movement through time and space act to join one frame to another. Spatial and temporal formulations divide the world, but also unite it (figure 7). Transition acts to unite intervals which exist in space and time. The space between two or more intervals in a continuity defines the field in which transition occurs. That which is, and that which lies between, are bonded by an inter-dependence so strong that it is impossible to think of one without the other. This difficult concept is beautifully expressed by an ancient Chinese aphorism, the "Eleventh Aphorism of Lao Tsu":
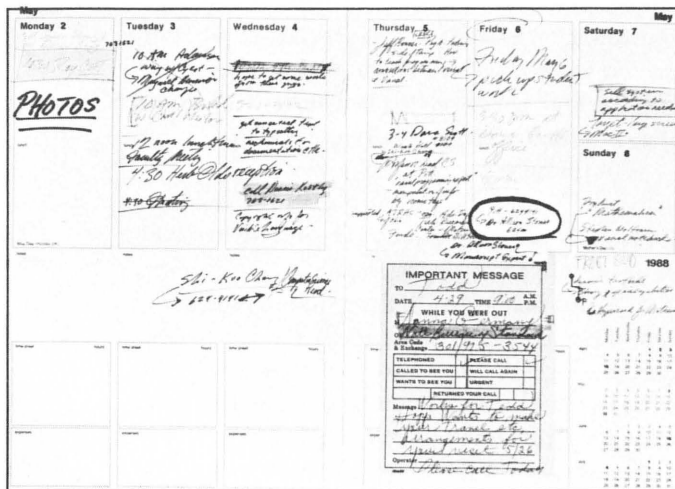
Figure 7
The transition from one day to another is marked by individual
events. Notations in the author's calendar are artifacts of the
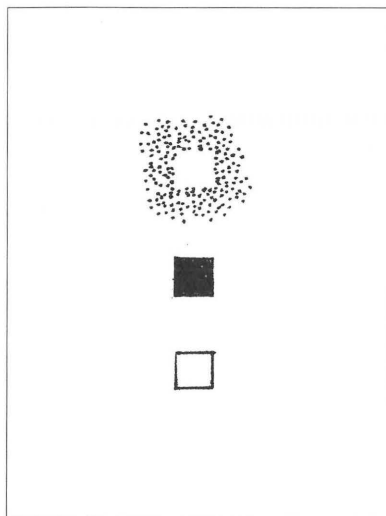process of transition through time.

Figure 8a
That which surrounds defines.

Figure 8b
That which fills describes.

Figure 8c
The transitions from definition to
description occurs at the edge of
form, where it bonds with the
surrounding space. Diagrams by
the author.

Thirty spokes meet the hub,
but it is the emptiness between
them that makes the
essence of the wheel.
From clay pots are made,
but it is the emptiness inside
them that makes
the essence of the pot.
Walls with windows and doors
form the house,
but it is the emptiness between
them that forms the essence of
the house.

The principle: the material contains usefulness, the immaterial imparts essence.

In other words, that which fills describes (figure 8a), that which surrounds defines (figure. 8b). The transition from definition (a set of constraints, in other words, a frame) to description (an operation within a set of constraints) occurs at the physical limit or outer edge of a form (figure 8c). It is at the edge of a form where the surrounding space conforms to define the limits of its individual components. These components are linked to a particular frameby that which lies between and around them. Framing establishes a set of relationships (figure 9). This facilitates a transition from the eye's external perception, that which exists in the visual field, to an internal perception— within the mind and emotion.

Framing is the imposition of a structure for admitting or enclosing. It differentiates form and function. By framing an aspect of a communication we create a perceptual stage through which information is delivered to a specific audience. As actors reflect the emotional and intellectual content of characters in a play, framing can amplify image areas with greater or lesser degrees of intensity (figure 10 - slide
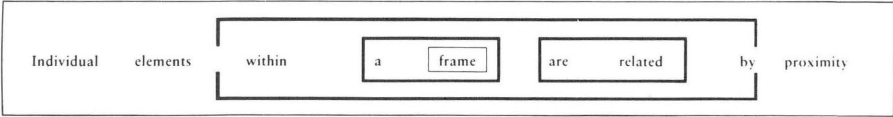
| Individual | elements | within | a | frame | are | related | by | proximity |

Figure 9
Diagram by the author.

Figure 10
Detail of a 12th century glossed–bible showing different levels of information made visually distinct. For a more detailed explanation of the processes affecting this detail, please see figure 15. *Oxford*, Bodleian Library, MS. Auct. E. inf. 6, fol. 86r (Bodleian shelfmark).

showing detail of manuscript page - for expla-
nation of principles please see figure 15). Visual
emphasis can be applied to information in a
manner that formally expresses the relevance or
importance of the contained message. This
becomes a formal manipulation of the image
area that signals the value of its content to
an audience.

A golden frame around a painting by
Rembrandt sends quite a different signal than
the outline of a body produced in a police
investigation. Both frames define a space. Both
are defined by surrounding circumstances
and linked by a frame to an audience. Framing
creates a structural channel that leads the
viewer to a message within. It facilitates the
transition from surrounding circumstances
to a specific set of relationships and identifies
a self-contained field in which individual
components are related to each other by a
shared space.

Like water displaced by a stone, the formal
constraints of structure are malleable in accom-
modating variations in form and function.
As new elements are inserted into a design they
alter its interpretation. If an element is taken
out or omitted its meaning is subtracted, and the
interpretation of the arrangement is modified
accordingly. To insert, omit, substitute, or in any
way change an element in a design is to create
contrast with other elements near it. The distur-
bance of an arrangement acts to call attention
to that which has been introduced, taken away,
or changed.

contrast Contrast is the formal characteristic of
framing that directs an audience to find and
focus on a particular aspect of the visual field. It
directs the eye to find particular points by
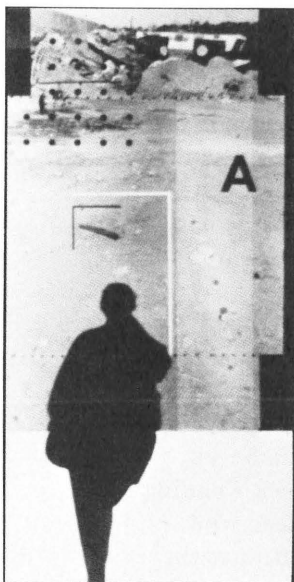creating apparent distinctions between them.
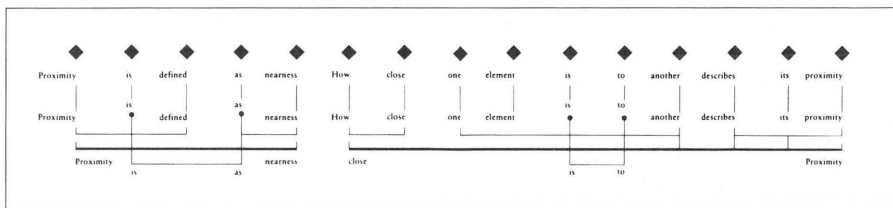
Figure 11
Diagram by the author.

Figure 12
Proximity allows individual elements to act together in the formation of a body or systems.
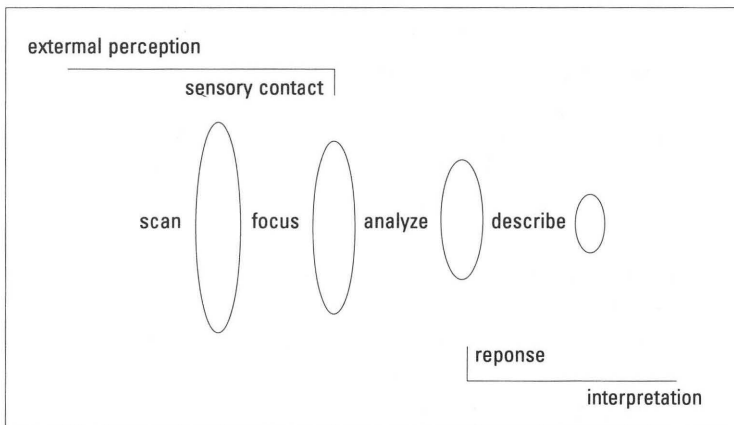Diagram by the author.

Figure 13
Diagram by the author.

To frame an aspect of a visual communication implies access to the visual field and begins a relationship with a viewer that goes beyond the borders of a contained image. It is a formal manipulation of an image area that gives emphasis to a particular aspect, or aspects, of a visual communication. To create contrast is to initiate a transition from one state, that of uniformity, to another state in which certain features become dominant, and others subordinant. To observe the process of transition is to receive a signal that something has changed.

Contrast is a formal emphasis that enables the eye to see one object, event, or phenomena as being different from another. Emphasis is an effect of framing that acts as a formal amplification and, like the actor on a stage, gives access to a particular point, or points of information (figure 11). To create access is to impose direction on the process of transition. It enables an audience to bridge the distance between themselves and a specific form or idea, and in doing so, facilitates the recognition of separate form and separate function.

Comparison links a diversity of elements according to similarities and differences. When giving form to a visual communication, we create relationships based on comparative judgments of relative value between individual elements comprising a composition. This identifies a complex operation in which individual functions coalesce around formal groupings and give meaning to what we see.

Often we remember something because of the degree to which it contrasts with other things to which it is compared. This disparity interrupts the pattern of expectation. If the disparity between what we see and what we know is too extreme it confounds or confuses,

and understanding is lost. Insertion, omission, and substitution change the meaning of a composition through the tension between familiarity and surprise.

order as a formal limitation How long does it take for the eye to recognize meaning? As long as it takes to bridge the distance between individual elements within an arrangement. Individual elements occurring within a frame are related by proximity. Proximity is defined as nearness, or closeness.

Proximity develops the expectation that what we see occurring in a particular frame forms a particular system. To create proximity is to interrupt a random pattern by grouping elements into sets (figure 12). It is a transition from a state of formal independence (patterning) to an inter-dependence (bridging) between individual elements as they appear and how they operate as a group. The space between individual elements unites them in the formation of an apparent system. Any system can be generative if it allows individual elements to act according to a particular order. Order functions to give meaning to what we see when it occurs as a sequence in which independent elements are progressively linked.

Sequence is a formal limitation placed upon the process of transition that causes it to occur and be interpreted in relation to what comes before and what follows in an arrangement. To generate meaning is to link components of an operation sequentially. The links describe the interactive (syntactic operation) and interrelative (semantic value) forces necessary to give meaning or articulate the frame in which they occur.

Within a visual arrangement, the transition from one element to another can be sequentially

directed by their physical organization. Order is a structural limitation placed on individual features that facilitates the identification of a purposeful composition. Arnheim states: "order is the necessary condition for anything the human mind is to understand...". Transition takes on meaning when regulated by the organizing principles of sequential arrangement. An apparent sequence initiates the expectation for a system in which individual elements are grouped in order of the role that they play as meaningful parts of a composition.

Framing, contrast, and order are concepts that give focus to a communication. These concepts promote comparison and judgment in the process of structuring thought. They describe what is formally observed in terms of relative value within a particular order.

intellectual component The transition from what we see to what we know occurs through the process of linking phases of perception sequentially (figure 13, footnote number 1). As we move through the environment, we orient ourselves through a sequential progression according to judgments of near and far. We scan (position ourselves in relation to an overall framework and the objects, events, and phenomena within its borders) the visual field; we focus (define subframes, facilitated by their contrast with other things in their proximity) on particular points; we analyze (by comparing individual features to each other, and to impres-sions of prior contact with similar experiences); and we identify (by recognizing individual features composing a body or system). This enables us to describe what we see.

When we move through the environment we pass through the perceptual texture of space and time. Space and time are framed by
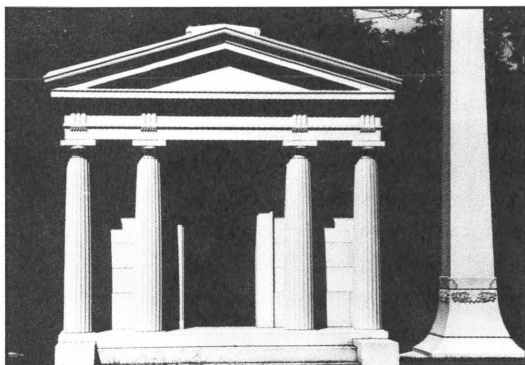
Figures 14 a–c
Photographs
by the author.
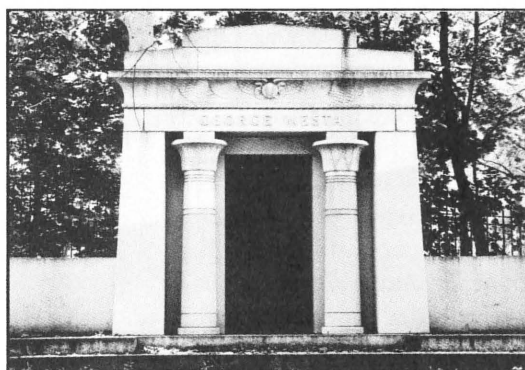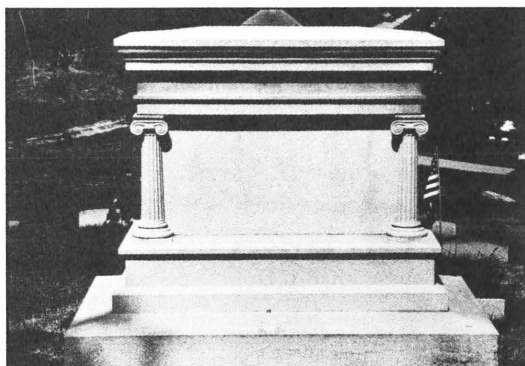
consciousness. This frame is the channel through which messages are sent and received. If something in particular catches our eye, we examine its components and analyze their relationship to each other. An analysis of what we see is based on what we know. Memory constitutes a kind of storeroom that is filled with objects, events, and phenomena with which we have prior experience. They exist as translations of an initial perception and are called into awareness from an inert state of unconscious storage. Awareness is a manifestation of the five senses in addition to the intellectual component of thought. The analytical mind allows us to map the transition from one thought to another. It is influenced by external and internal factors.

As social creatures we assign value to visual representations according to individual and collective experience; cultural beliefs form a mythology concerning structure. Across history we see a recurrence of certain forms that have come to express deeply imbedded cultural attitudes, beliefs and values. Classical architecture has become thematic in the shapes taken by other structures. We see this in funerary architecture where mausoleums are often derived from classical (figure 14a, figure 14b) and Egyptian form (figure 14c). Mythology, according to Joseph Campbell, is one way that we link our mortality to a higher purpose and express the value of our transition through life.

Recognition of extraordinary value initiates a transition from the expectation of a predictable everyday order between objects, events, and phenomena to something that is removed from ordinary experience and is of special value. For example, the garden at the

Palace of Versailles is in every sense developed to impress its audience. Radiating from a central core, it is symmetrical. The long promenade flanking a cruciform pool of water offers a visual channel leading up to the palace. The palace is placed on a hill; its position, from the garden, acting as a transition between earth and sky. From a distance, it is reflected with the sky in the pool. Fountains, centrally located in the garden, contain explosive sculptures of mythical animals and water spirits surrounded by reflections of the sky. These objects in this frame and order represent the power and place of Louis XV, the Sun King. They imply the participation of extraordinary forces in his movement through space and time. Formal position can both express ideas and emotions. They also express man's concept of himself relative to a perceived or imagined order.

The transition from ordinary to extraordinary meaning occurs in the way that we perceive structure. The imaginative mind, like that of the analytical, leads a receiver to bridge form and value. Idealized representation occurs through a visual organization and physical appearance that is special. Choices of materials, such as marble or gold, or placement, such as higher, lower, or centered within a frame, communicate something about what is seen as a component of a visual representation. We make choices all the time based on judgments of comparative value. An analysis of a visual representation is bound to be influenced by cultural beliefs and prejudices. For example, classical form is an idealized set of relationships based on preconceptions about proportions between the various components of an arrangement. These are removed from ordinary expectations - they accommodate no flaws or inconsistencies.

Across time certain beliefs, like dust on the shoes of a traveler, accumulate and appear again and again. These may be modified by present experience, but as with classical revival, they remain more or less intact and are generally unaffected by the continuous process of historical transition.

Concepts of "past" and "future" are called upon only in so far as they relate to the immediacy of the present moment. Present experience takes place as a thin veil of consiousness, pushed always ahead by time and space and memory (footnote number 2). These create the expectation that what we see will behave in a particular man- ner. Expectation is a pattern. Its interruption or disturbance makes an aspect or aspects of the visual field distinct. It can hold the attention of an audience for a greater or lesser period of time according to the degree to which it contrasts with other things that occur. The transition from uniform expectation to surprise can make important aspects of communication memorable.

hierarchy The imposition of hierarchical structure on order results in a formal arrangement of elements according to function and relative value (figure 15). Without hierarchy, order can occur as a uniform pattern which lacks the tensions necessary to direct the viewer to a specific point or points of focus. To create hierarchy is to initiate a transition from one state, where individual elements function at the same level of value (as in a visual pattern or passive intellectual state where the mind scans and is unencumberd by pauses for concentration and judgment), to another state, where individual elements are given greater or lesser importance.
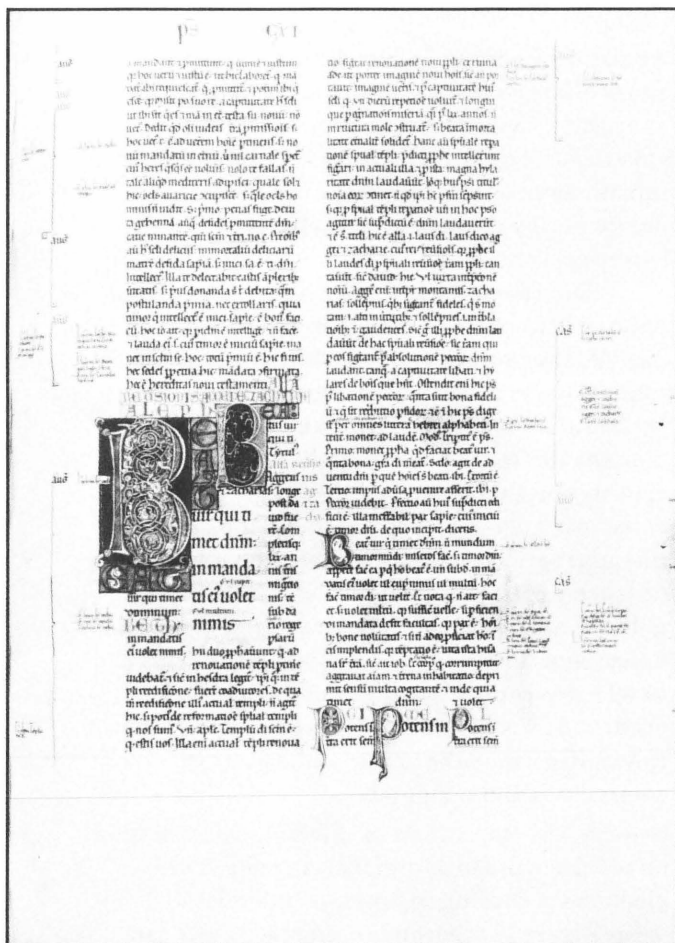
Figure 15

A page from a 12th century glossed–bible showing different levels of informa-
tion made visually distinct by framing. Hierarchical divisions of the text are
clarified by contrasting size (biblical text appears larger with alternate line-
spacing, commentary is half the size of biblical text with single line spacing)
and degree of ornamentation in illuminated letterforms. Brackets and color–
coding are used to divide the gloss into individual comments. These are
cross–referenced to specific points within the biblical text by a sophisticated
marking system (calligraphic dots and dashes appearing by abbreviated
names of commentators and cross–reference to their comments within the
gloss) that enables the reader to make a transition between the subject
and the written analysis appearing in the margins surrounding the biblical
text. In addition, spaces were provided for readers to add their own insights
and interpretations to the gloss.

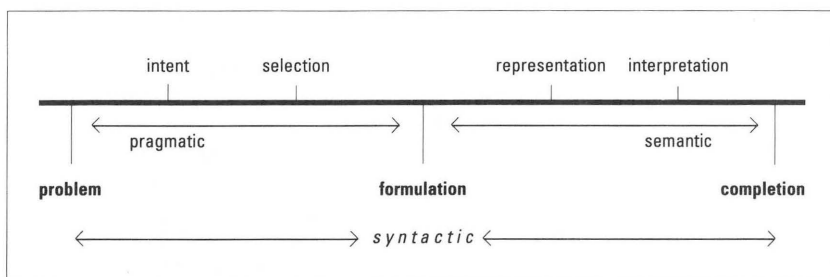*Oxford*, Bodleian Library, MA. Auct. E. inf. 6, fol. 86r.

Figure 16
All communication occurs within the perceptual channel between a designer and his or her audience. The transition from intent, in other words, what a design is supposed to communicate, to representation, what we see as a message, is limited by the context in which communication occurs. All communication occurs as an overlap of mood representation. Diagram by the author.

Hierarchy is a condition which structures sequential operations between diverse components. It regulates the process of transition so that it occurs between functions which are arranged and linked in order of importance. Hierarchical arrangement sets the stage for the identification of meaning.

We identify, or name, a visual representation when it is shaped by a recognizable intent or purpose. The intent of a particular communication is a limitation placed upon the designer who must choose relevant visual elements to assemble in an accessible visual code (figure 16). A design is a set of constraints placed upon an audience, a visual frame to which they are directed and in which certain features are stressed by the designer according to their relative value. The designer acts as mediator between his client and a particular audience. A visual message links a particular audience to the formal representation of an idea composed by elements chosen according to the intent. The designer mediates between a problem and a solution; the design links communication and audience. The
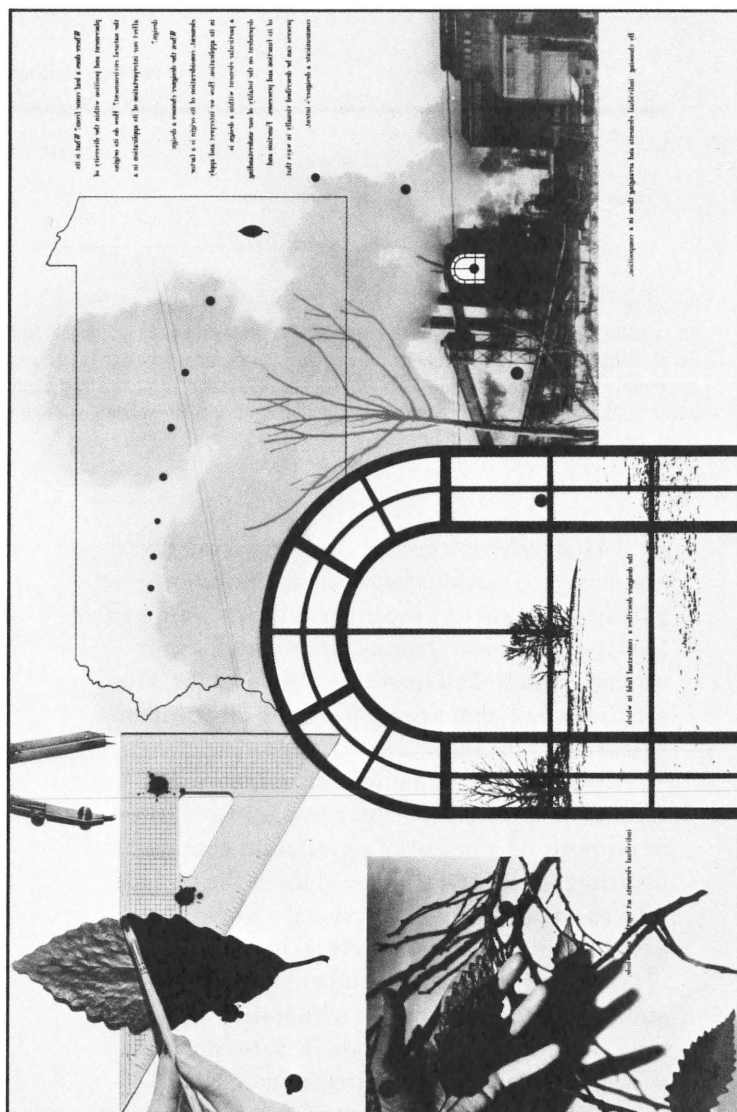
Figure 17
In an assignment developed by the author and given to his advanced graphic design
students, they are asked to map the transition of a visual element (in this case, a leaf)
from where it is found to the context of the studio where it undergoes a graphic
translation (it is drawn and painted to become a stylized representation of the leaf).
The intent is to show how time (as the channel in which the design process occurs)
and process affect meaning in a transition from one context, where individual
elements are diffused, to another, where they are united by design.
Student, Sarah Allen.

designer's understanding of the parameters of a particular problem, in other words, its intent, is a limitation on his or her selection of elements to use in a design. By choosing and placing independent elements in proximity to each other, we initiate a transition from independence to a semantic overlap through which a particular message is perceived. An object, event, or phenomena can be assigned meaning according to what occurs in proximity to it. That which precedes and that which follows has an effect on our interpretation of a visual event. As the eye moves from point to point in the visual field, it accumulates familiarity with what it has seen in its travels. Judgments are made on visual experience as the intellect adjusts to what is perceptually experienced. When a designer chooses an element to use within a design, our understanding of its origins influences our interpretation (figure 17). Visual information can accommodate different kinds of representation. Each element within a design brings with it some sense of its original meaning, otherwise its use in a graphic communication would be inaccessible to its audience. There is a vocabulary of forms and images just as there is a vocabulary of words.

The syntactic process of putting together visual elements generates meaning. Meaning exists in a context. We find equivalency between verbal and visual processes of simile and metaphor. For example, simile occurs when two or more unlike elements are compared (figure 18a, figure 18b), such as apples to oranges. By visually framing an apple and an orange we create a context in which meaning is shared by formal comparison. Simile occurs as a comparative relationship. It facilitates the transition from one interpretation of an object to another
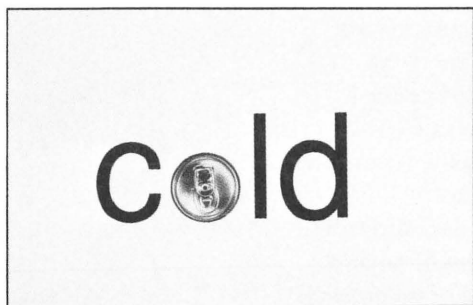
Figure 18 a
Student, Richard Mihm

Figure 19 a
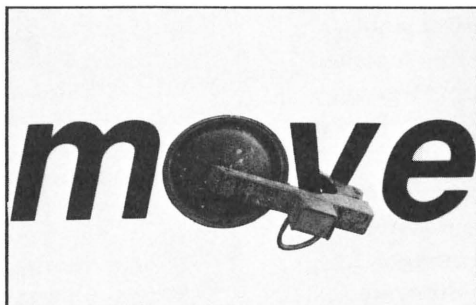Student, Valery Peterle

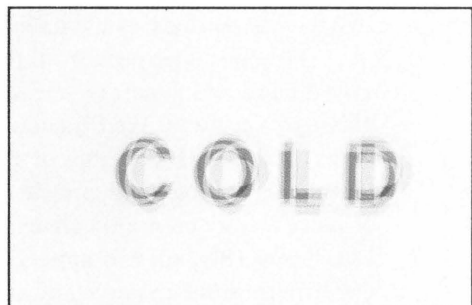Figure 18c
Student, Jamie Apel

Figure 19c
Student, Susan Tribone

In an assignment given by the author, students are asked to develop a typographic interpretation of a word in such a way that what is seen communicates something about its meaning.

by comparison. Metaphor, however, is a formal overlap through which elements are described in each other's terms, in this case, apples as oranges. It establishes an associative relationship and marks the transition from description to invention (figure 19a and b, solutions resulting from the assignment described in figure 18a and b).

Only through the effect of familiarity do we span the distance between what we see and what we know. Prior experience allows us to apply meaning to the things that we see. We think in terms of similarities or differences and can analyze progressively as when dealing with technical data. What we observe as a visual communication assumes meaning as individual elements are linked to form sets, or subframes. These are united by the overall frame of the page.

The formal dimensions of a frame are a structural limitation that allow us to group elements according to their function. The organizing principles of hierarchy make a message accessible to an audience by providing formal clarity and semantic coherency between its components. A visual arrangement can be put together with individual elements that are sequentially linked. The change from one state, where individual elements are diffused, to another state, where they act as an apparent body or system, represents a transition from independence to unity.

Content is defined by more than a particular object serving an author or designer's intent. Rather, it is an overlapping of fields (figure 20, solution resulting from assignment described in figure 17). Intent is a translation of will that is formed by individual and collective experience. What we intend to com-
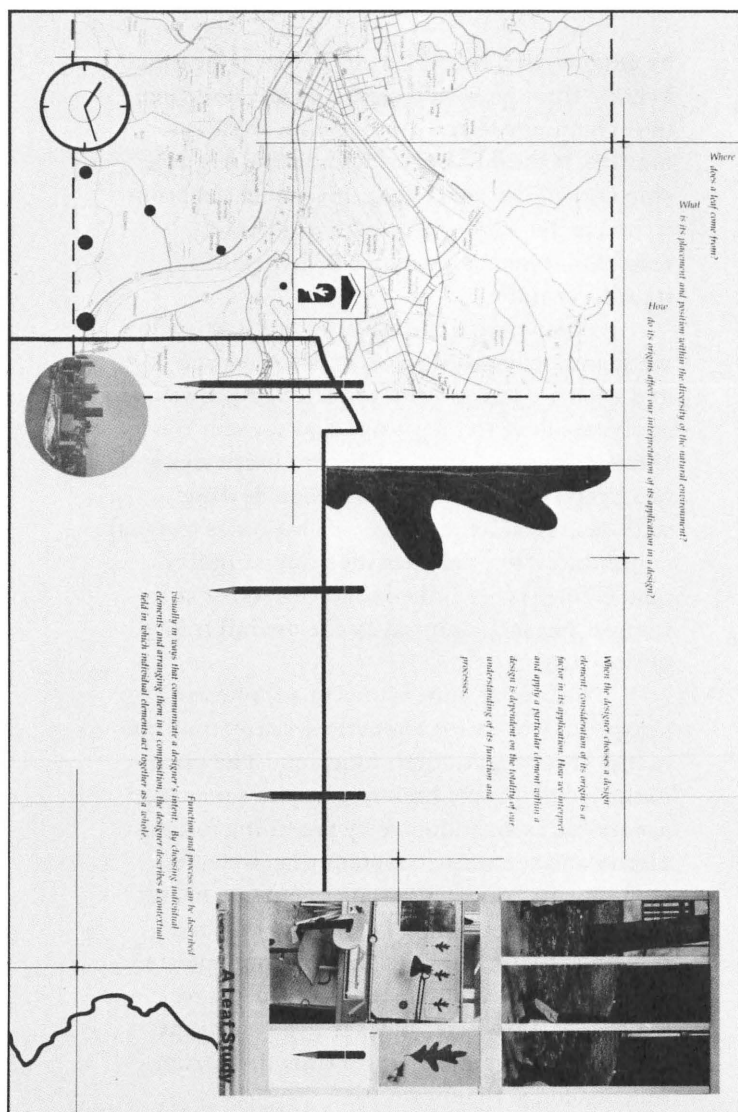
Figure 20 Another solution resulting from the work described in Figure 17. Student, Yin Yin Wong.

municate and how we do it is context dependent. For example, the designer is restrained by the audience's ability to understand the intended message. We perceive and give direction and meaning to the process of transition.

The mechanism of transition, its process of operation, gives it significance and meaning. It is the character and value of motion from one interval to another, one state to another, that enables us to to judge where we are in relation to where we have been. It allows us to link thoughts in the formation of an idea. Transition is a formal process that in observation and analysis allows us to identify separate aspects of reality. Separation and distinction allow individual functions to occupy center stage and then fade into the sideline. The transition from one element to another within an arrangement creates distinction by measuring the distance between them. It also joins separate elements in the formation of an arrangement. The duality of transition, its simultaneous properties of convergence and divergence make its meaning relative to that which precedes and that which follows within the configuration that guides it.

Selected Bibliography

Arnheim, Rudolf. *The Power of the Center: a Study of Composition in theVisual Arts.* Berkeley: University of California Press (1982).

Klee, Paul. *The Thinking Eye, the Notebooks of Paul Klee.* Edited by Jurg Spiller. (Translated by Ralph Manheim from the German ed. "Das bilderische Denkin." 2d rev. ed.) New York: G. Wittenborn (1964).

Klee, Paul. *Pedigogical Sketchbook;* (introduction and translation by Sibyl Maholy-Nagy). London, Boston: Faber and Faber (1968).

Kepes, Gyorgy. *Language of Vision*, with introductory essays by S. Geidion and S.I. Hayakawa. Chicago: P. Theobald (1944).

Kepes, Gyorgy. *The Nature and Art of Motion.* (authors: James S. Ackerman. Donald Appleyard and others) Vision and Value Series New York: G. Braziller (1965).

Dondis, Donis A. *A Primer of Visual Literacy* Cambridge, MA: MIT Press (1974).

Wittgenstein, Ludwig.*Philosophical Investigations* Oxford: Blackwell (1968).

Gibson, James J. *Reasons for Realism: Selected Essays of James J. Gibson* Edited by Edward Reed and Rebecca Jones Resources for Ecological Psychology Hillsdale, New Jersey: L. Erlbaum (1982).

Journals

Semiotica Vol. 52-3/4 (1984) Special issue: The Semiotics of the Visual: On Defining the Field Guest editor Mihai Nadin Amsterdam, The Netherlands: Mouton (1984).

Visible Language Vol. XV No. 1 Special issue: The Spatial Arrangement of Text Cleveland: Visible Language (1981).

Periodicals

Scientific American. July 1959 Vol. 201, No. 1, pp. 56-60. Wallach, Hans: "The Perception of Motion" #409 Scientific American offprints.

Scientific American. June 1975 Vol. 232, No. 6, pp. 76-88 Johansson, Gunnar:"Visual Motion Perception" #564 Scientific American offprints.

Scientific American. August 1956 Vol. 195, No. 2, pp. 42-46 Miller, George: "Information and Memory" #419 Scientific American offprints.

Footnotes

1   At this point it is important to remind the reader that this paper is a meditation on the subject of visual transition. As such, the views expressed are my own and are derived from contemplation, not from rigorous testing provided by cognitive science.

2   The notion of awareness occurring as a thin veil of consciousness is dicussed by Alexandra David-Neel and Lama Yongden in their book, The Secret Oral Teachings in Tibetan Buddhist Sects. It is also discussed by Professor John R. Hayes, who teaches in the Psychology Department at Carnegie Mellon University.

Nicholas Kis:

A Hungarian

Punch-Cutter

and Printer

1650-1702.

GYÖRGY HAIMAN

SAN FRANCISCO:

THE GREENWOOD

PRESS, 1983.

452 PAGES,

8 COLOR PLATES,

173 FIGURES,

97 FACSIMILE

REPRODUCTIONS,

BIBLIOGRAPHY

OF KIS' PRINTS,

9 ENCLOSURES

$60.00.

NICHOLAS KIS was known to his European contemporaries as the outstanding punchcutter of the day. In 1687, at the request of Archil, Sultan of Georgia, he cut the first typographic version of the Georgian language. It is believed that the Grand Duke of Florence, Cosimo III de Medici, ordered him 11,000 florins worth of matrices and invited him to settle in Florence. Kis, who was then active in Amsterdam, decided to go home to his native Transylvania instead.

This was a fatal decision for both himself and the course of typography; the name and the fame of the 'Phoenix of Transylvania' became extinct for more than a century. His material was scrapped by accident at the end of the 19th century.

Ever since, his compatriots have been digging archives and libraries in a search for their typographic hero, regardless of political, national and economic vicissitudes. In 1899, Lajos Dezsi published an important biography. In 1940, Imre Kner, a prominent Hungarian printer, publisher, and typographer, made the first of five successive republications of Nicholas Kis' *Mentsége* (Apology of Miklos M. Totfalusi Kis for his person, life and strange deeds, which he was forced to write in the year 1698). Given the stature of Kis and his work, an English translation of this Apology was long

overdue. In due course, in spite of the language barrier, anyone in Europe who had a stake in the history and the art of typography became more or less directly involved. The one decisive contribution to the re-identification and reassessment, in the western English speaking world, of Kis as an individual and the correct attribution of his type designs, was the Harry Carter and George Buday article: "The Origin of the Janson types: with a note on Nicholas Kis" in *Linotype Matrix*, March 1954, no. 18, p.7.; to be followed by "Nicholas Kis and the Janson Types" in *Gutenberg Jahrbuch* 1957, pp. 207-212. New types which were recut following historical type specimens and renamed after Janson (Leipzig, 1678) and Ehrhardt (Leipzig, 1720) were the occasion. In 1972 György Haiman's own contribution arrived. A labor of love and of a lifetime, it was also the sum of the cumulative work of successive scholars and, finally, of a devoted team of collaborators, assistants, bibliographers and students. The present volume is far more than an English translation: the additional chapters, appendices and indices amount to more than one hundred additional pages.

Nicholas Kis was born in Also-Misztofalu in 1650. At that time, politically, Transylvania managed a precarious independence between the warring Turks and Hapsburgs. To give some

measure of their spiritual independence, it
will suffice to say that they eventually signed
an alliance with the Turks to fight the
Hapsburgs. Thus the calvinist Nicholas Kis
would eventually print for the Unitarians as
well as for the Jesuits, the arch-champions
of the Counter-Reformation.

The Turks were ever present, even when
not invading the territory. To translate and
to print the Bible was therefore a top religious,
social, and political priority in Transylvania.
The New Testament was first translated and
printed in Hungarian in 1541, the first complete
Bible, in 1590. In 1650, at the time Kis was
born, the widow of the Prince György Rakoczi
I had invited no less a reformer than the illus-
trious Czech John Amos Comenius (1592-1670)
to organize a school in the Hungarian town
of Sárospatak. It is on this occasion and in this
place that Comenius wrote and designed his
revolutionary picture book *Delineato*, an
outline of a model school along his pansophic
ideal. It was the first picture book ever to intro-
duce Western illiterate pupils to Latin through
a study of things around them. Only eight
pages were printed locally under the title *Lu-
cidarium*, in 1653, because there were no wood-
cut artists available. The book as a whole was
eventually printed in Nürnberg in 1658. By
then Comenius had been gone from Hungary
for two years. He had not been an immediate
success. But the school he founded continued
in Sárospatak until 1950.

By 1680, Chancellor Mihaky Teleki and
Mihaly Tofeus, bishop of the Transylvanian
Reformed Church, decided to have a new edition
of the Bible printed and they thought no one
could better supervise the work than Kis. Every-
body, including Kis, was also aware of the fact

that typographical capacities were even more needed in Transylvania than preachers. So he was not content with preparing the text and correcting the proofs but had to become familiar with the printing process–which he did to such an extent that he ranks in a category with Garamont, Granjon and van den Keere, as a punchcutter and as a printer; but also in a category all of his own as a master of the intellectual as well as of the visual editing of the Bible or any other piece of printed matter. In other words, he was a unique combination of the talents of Plantin, Estienne, Granjon and Arias Montanus (as a theologian).

Belgium, as they called the Netherlands in Central Europe in those days, was in its Golden Age. France and Germany lay prostrate for two or three more generations as a result of the Thirty Years War. Anyone who had any ambition and talent had to go to Belgium in order to meet the best. In the case of Nicholas Kis, he would necessarily address himself to the Elseviers and to the Blaeu's as printers. Whoever the printer, Kis was not found wanting: by 1687 the new Hungarian Bible, two Psalters and a New Testament had been corrected and printed under his supervision. After this he stayed two more years in Amsterdam making a fortune as a punchcutter. This means that while he directed the translation and supervised the preparation of the copy to be printed, he became familiar with not only the printing process but with punchcutting as well. The amazing thing is that everything he printed in Amsterdam and later in Kolozsvár was printed with type of his own design, with punches he cut, and matrices he struck from which he cast his own letter supply. All this he learned

from a Dutch master (maybe Dirk Voskens?)
who himself cut roman and script but no italic.
Not only did Kis learn how to cut roman and
italic but Hebrew as well, and Armenian,
Georgian, German, Greek, Syriac, Samaritan,
Coptic and music, too. (Incidentally, he is even
known to have composed music.)

He had customers in Poland, Sweden,
England, Germany and Italy, in addition to the
Netherlands. In 1686, in Amsterdam, he printed
a type-specimen displaying 37 series in all: 17
roman, 15 italic, 3 Hebrew, 1 Greek, 1 music.
This made him self-supporting in all and every
respect, i.e., he could achieve without any
material assistance much more than what he
himself always considered his main purpose:
the printing of the Bible and the education of
the people. That is why, in 1689, he returned to
his beloved homeland instead of going to
Florence. The rest of his life was tragic until
the bitter end in 1702. Even so he managed to
print and publish 110 titles in less than 12
years in spite of untrained personnel and
invidious colleagues.

These are staggering achievements. Even
if they could to some extent be explained by the
invention and the use of the 'Contrapensum
Contrapensorum" of which only the name is
known, this and more to come would never
come near to explaining such a unique combina-
tion of mechanical ingenuity and intellectual
genius; of a total and simultaneous grasp of all
the physical and metaphysical aspects of written
communication. But this of course explains
how and why his designs were an inspiration
for the so-called Janson (Stempel, Linotype)
and Ehrhardt (Monotype) typefaces in this
century and as only the very greatest can be:

Garamont, Granjon, Caslon, Fournier et al. It also explains the sustained efforts of the best historians and bibliographers in his homeland first, and abroad at present.

György Haiman is an outstanding professional educator and typographer, printer, designer, and author in his native country and language. He is head of the Department of Typographics of the Hungarian Academy of Applied Arts. Right from the start he makes it clear that his subject is Nicholas Kis as a champion of public education and the spread of literacy. He fully discusses type design and typography as contributions to the treasury of forms and as a means for written communication in any language and format. He does this through a wealth of comparative material: typefaces and sketches, figures and detailed comment as well as a wealth of real size illustrations of texts of many descriptions: title pages, tables, preliminaries, contents, indices, etc. He also vividly demonstrates in what sense Kis' typefaces are the fullest expression of the typographic style of the period, a precursor of the 'modern' style and of the even more modern notion of a 'type family made up of variations on the shape such as, for example, the semi-bold, bold, condensed, etc. series of the roman letter'.

The text stood at the center of Kis' approach to typographic design. Professor Haiman, therefore, has very aptly included a separate and substantial section on the subject. The incunabula text was once the only test of professional skill. This is no longer so, of course, but the rules of spacing between words, leading between lines, of composition and register are and must remain the essence of clarity in typography. Professor Haiman makes the

important point that printing as a technique affected the visual editing of texts from the linear narrative to more functionally diversified forms of visual expression. Since separate elements could be assembled, changed, rearranged and displayed to bring about the desired forms, the typographer became familiar with the decorative forms of title-lines, line groups, openings and closing pages, etc., not to mention decorations, illustrations, vignettes, and ornaments. As a consequence, any typographic style since that time can be described as more or less text-centered, functional and/or decorative.

Just as he demonstrated the baroque element in the individual typefaces of Kis, so Professor Haiman goes on to isolate the baroque element in text composition generally, in Hungarian, and in Kis. And just as he stressed the difference between handwriting and typography so he also stresses a particular example in an Hungarian-Latin law book where Kis breaks all the typographic 'rules' and reaches back to a scholastic handwriting practice. Some marginal notes were as long as glosses so he quite sensibly let them run right into the text area and across the two columns in order not to disrupt the alignment of the following marginal note with its reference mark. He applies the same 'principle' to the Hungarian text which runs out longer than the Latin; so, whenever it helps, he lets the italic of the Hungarian column extend from the right under the roman of the Latin and run across the full length of the two columns. And why not? Why should a man who is a law unto himself blindly obey so-called typographic rules?

Rules make sense of course but only when they help make sense of the text. But then they

are no longer rules to be obeyed blindly, they are guiding principles which help the reader even more than the typographer. The division of words in the titles and in the text is accordingly discussed at length. It seems that Kis composed recommendations and typographic prefaces. Here again, as in the case of the Apology, any consciencious reader will feel that translations are long overdue. Imagine having typographic recommendations by Garamont, Granjon, and van den Keere! Now that Professor Haiman and his American publishers have introduced the Western world to the work of Nicholas Kis as one of the typographic all-timers in Western culture, now that we suspect that the man was as great as the typographer and know that he left an Apology, typographic prefaces and recommendations, we have a right to read them as well as his translators.

A book like this will reach a small readership of specialists. The latter should spread the news in other quarters not only to art historians and art teachers as a matter of course, but also to educators generally. This book can make them realize that in a daily changing scientific and materialistic environment, the one permanent and universal technology, as well as the one aesthetic of social and spiritual value, is written communication in all its diversity. It can help them realise that written communication is in fact the only universal means to acquire knowledge as well as to record and transmit conventional know-how.

Fernand Baudin

is a book designer,

writer and teacher

in Belgium. He is

a member of this

journal's advisory

board. His most

recent book is

La Typographie

au Tableau Noir,

Paris, 1984.

Please write.

How to improve

your hand-

writing for

business and

pleasure in

ten quick and

easy lessons

THIS IS A MODEST BOOK (79 pages), with a specific purpose, to offer a method of learning to write legibly–thereby avoiding the present system or lack of system in the United States which, owing to the practise of poor handwriting leads through "unreadable records, botched orders, bookkeeping errors, undeliverable mail, etc. into losses running into millions". The history of the teaching of handwriting varies in different countries, but certainly in Britain we are going, partly for the same reasons, in the same direction. The handwriting on letters I receive, addresses on business letters, and the signatures on typed communications suggest this. We have not suffered from the systems of Spencer and Palmer, but we see similar deplorable results often directly related to the script taught to children.

The book is in two parts. The second part of this book is devoted to suggesting how anyone may, by following the lessons described, improve their writing. The lessons are simple, and should produce a reasonably legible hand. While this section is clear and reasonable, the first part of the book is concerned with the history of writing, and here the author is at sea. He quotes various English language authorities, but he is no historian and the historical statements which he makes are misleading; "writing

was first used on gravestones, monuments and temples"– but how do we know about what may have been written on perishable materials? or "the Roman Empire began to fall apart, and Christianity became the official religion in most of Europe, civilization was mainly preserved in the busy monastic scriptoria"– no mention of the invasions by barbarian peoples or "The first written versions of the Roman capital are Rustic and Square capitals"– what about Roman cursive? There are many more misleading and half-true statements.

Perhaps such statements do not matter much in an elementary book such as this, but what does matter is the statement that the alphabet we use today is based on the Roman capital "changes were essentially prompted by changes in the tool used, now that letters were written rather than incised in stone". The author does not however detail how such drastic changes as that between the Roman capital and half-uncial, or between the national hands, Beneventan, Visigothic, Merovingian, or Insular could have been introduced by the pen, since all scribes used a quill. In fact different forms of various letters had been evolved long before the apogee of the Roman Capital, (as on the Trajan column 114 A.D., executed seven centuries after the traditional date for

the foundation of Rome, 753 B.C.), particularly in cursive scripts, whence different forms and practise of four-line writing was introduced, for instance b, d, g, q, and also m. Students of writing would do better to concentrate on sixteenth century Italian italic, and the simplified version offered by Alfred Fairbank rather than to see origins in Capitals.

Von Eckhardt rightly blames the practise, common also in Britain, of starting a child on 'ball and stick' i.e., sans serif letters, and then telling them to add joins and do 'real writing'. The mistake is the same as that which assumes that the Roman capital is 'the basic letter'. There is no basic letter; letters have varied forms as a child recognizes. They are ideas, not ideal forms, and therefore vary with the instrument used.

And here I have one more comment to make. Von Eckhardt credits the pen with initiating alterations, but he has no use for the pen which is most commonly used today–the ballpoint. Why not? It is of course responsible for deplorable handwriting, when treated as an inferior italic pen. But why do we not start instead with its distinctive qualities? It runs over the paper with a new ease, so we need to learn combinations of letters, such as occur in our language, st, th, gh, etc. And we need to learn a new rhythm breaking up combinations, as well as joining them, so that legibility survives; since, as Von Eckhardt rightly remarks, legibility is the primary requirement of handwriting. We need a primer on how to write with the ballpoint and fibre-tipped pen.

Nicolette Gray is one of the founders of the Central Lettering Record at the Central School of Art and Design in London. She is the author of *Lettering as Drawing* and *The Paleography of Latin Inscriptions in Italy, 700-1000 A.D.,* among other books.

Author Biographies

Eugene R. Kintgen is a Professor of English and Associate Dean of the Graduate School at Indiana University. He has written extensively on style and the perception of poetry, and has recently edited *Perspectives on Literacy* with Barry Kroll and Mike Rose.

Richard Bradford is a lecturer in English at the University of Ulster at Coleraine, Northern Ireland. He has previously taught in the University of Wales and in Trinity College, Dublin, and has published articles on Milton, Poetic Form, and Eighteenth Century Poetry. His study of the novels of Kingsley Amis will be published in 1989.

Martha S. Lange is an Associate Professor of Visual Design at the School of Design, North Carolina State University), where she teaches history of graphic design, typography, and graphic design courses. Her design practice has been primarily in book design. Her research interests have included typographic history; graphic design in Italy, specifically vernacular design and design for political parties, and visual poetry. She has published articles in *ID*, *Print*, and *Design Issues*.

Szymon Bojko is an art critic and writer in Warsaw. Among his many publications are *New Graphic Design in Revolutionary Russia* (London: Lund Humphries, 1972), *Alexander Rodchenko: Photographic Works* (Cologne, 1977) and *Alexander Rodchenko* (London, 1980). He has prepared museum catalogues on the *Russian Avant-Garde, Lissitzky, Malevich,* and *Women Artists in Russian Avant-Garde.*

Krzysztof Lenk teaches at the Rhode Island School of Design where he has responsibility for courses in typography and information graphics. He earned his MFA from the Academy of Fine Arts in Cracow and was professor of graphic design at the School of Design in Lodz, Poland. His work as a designer and educator is specialized in editorial design and the visual presentation of information (diagrams, charts and graphs).

WILLIAM J. VANDE KOPPLE is Professor of English at Calvin College. He is currently pursuing interests in the theme–rheme division of sentences, in the nature of basic writers' composing processes, and in the nature of a viable grammar for discourse.

ALLEN SHOEMAKER is Associate Professor of Psychology at Calvin College. His current interests are specialized research methodology and applications of computer technology to education.

KAREN GAROFALO holds a Masters of Science Degree in Design from the Institute of Design, Illinois Institute of Technology where she was awarded several departmental scholarships. She is currently working as a visual communication designer for a Chicago–based advertising agency.

TODD CAVALIER is an Assistant Professor of Graphic Design at Carnegie Mellon University. He has received a Carnegie Foundation Grant to study the evolution of visual structure in twelfth century page design at Oxford University. He is currently working on a project focusing on screen organization for computers which grows out of his work with medieval manuscripts and is supported by the United States Department of Commerce, and the National Bureau of Standards. In addition to practicing graphic design he is working on a solo exhibition, based on this paper, at Form Mediation International in Amsterdam.

HANA BARKER is currently completing her MFA in graphic design at the Rhode Island School of Design. She is interested in desktop publishing from a design and an educational point of view.

TYPOGRAPHICAL POINTS
ON THE DESKTOP

ABSTRACT

Desktop publishing has been oversold by technicians
and salesmen who do not understand the limitations
of computer systems or the limitations of the user.
Quality is as much an issue as cost, control, security,
or speed. This paper focuses on the problem of poor
design quality in the average desktop publication. The
desktop publishing market is expected to grow at a
rate of approximately 24% per year for the next several
years[1]; its quality does not enjoy the same outlook
unless strides are made in education and training.
While desktop publishing presents many benefits to
its users, the computer does not inherently bestow any
aesthetic grace upon computer assisted productions.

Problems inherent in desktop publishing systems to-
gether with an historical perspective follows which
explains why the average desktop publisher's back-
ground is no preparation for the complexity of publi-
shing. Next, basic typographic principles are described
in terms of their application to desktop publishings.
Several strategies are subsequently explored which
may be used to address the problem of quality in desk-
top publishing. Finally, conclusions are drawn based
on these examples.

The articles in this issue have been designed to provide examples relative to the previous points. Throughout this issue of *Visible Language*, the first three pages of each article were designed to serve as an example of particular aspects of publishing, while the remaining pages were designed following a consistent format.

INTRODUCTION

Desktop publishing (DTP) is one of the newest branches of the personal computer revolution. Individuals and businesses are turning to the computer to improve their productivity, to gain greater security and control, and to improve their image. A statement from the premiere issue of the International Typeface Corporation's (ITC's) magazine *Desktop* says it well: "The advent of desktop publishing has provided a powerful tool for the creation of presentations which can increase productivity, boost sales, and improve corporate identity."[2] With a DTP system, the typical user can produce just about anything: newsletters, memos, reports, brochures, presentations, slides, overheads, charts, graphs, letters, etc. A glance through any magazine devoted to desktop publishing provides a convincing demonstration of potential applications.

Advertisements focus on the most appealing aspects of DTP, while in reality, many new system owners discover that the computer is not as easy to use as depicted by advertisements, and that it takes time to reach the skill level required to realize productivity gains. "What [some] fail to take into consideration is that while productivity makes time, creativity takes it"[3].

A sampling of desktop productions reveals what many users are now beginning to realize—that the computer offers many options, but does not offer any suggestions as to what is an effective design. The average desktop publication is poorly designed and visually unappeal-

ing; its computer origins are more noticeable than the message. The novice and experienced publisher alike need to be concerned with the design of their publications, because as standards (and expectations) rise, it is the not the computer production but the *design* that will make communications effective and successful.

Available clues indicate that desktop publishers are aware of mediocre quality, and the majority wish to improve their abilities. The existence of magazines directed towards desktop publishing is additional evidence that desktop publishers are eager for information which will help them provide better communications. For example, Adobe, (a type manufacturer), produces *Font & Function*, a magazine which, in addition to selling fonts, introduces basic typographic concepts. ITC also sells type, and has just released their premiere issue of *Desktop*. Both magazines feature basic typographic information, but fall short of satisfying their audience's needs since too much information is presented at once, out of context. By reading these and other magazines, desktop publishers may learn to identify 'bad' situations. However, the concepts are not distilled to the point where desktop publishers can apply them to difficult situations, making appropriate adjustments.

To understand why desktop publishers run into problems, and why certain effects occur, it is helpful to consider the origins of the office system and the resulting contributions they have made. These considerations provide a basis for understanding the problem, as most desktop publishers do not have design experience or training. They come from business rather than design backgrounds, and their experience with production *before* the introduction of computers is from a business context, not from a design context.

HISTORICAL PERSPECTIVE

A hundred years ago, offices communicated by producing correspondence on the typewriter. Fifteen years ago, offices were using wordprocessors, photocopiers and dictaphones. The skills required to communicate well in these systems were simple in comparison with those required for successful communication with computer–based systems. Offices today use computers in conjunction with telephones, computer mail, fax machines, photocopiers, and overnight mail services— all for successful communication. These tasks are suited to the computer's capabilities in desktop publishing, but desktop publishers require assistance and education to make effective decisions when facing the flexibility the computer offers in the preparation of a document.

An examination of figures 1 through 3 will show how the formal habits developed over time have influenced the appearance of desktop productions. It also demonstrates how desktop publishing programs do not share the same limitations as typewriters and wordprocessors. These programs demand that many decisions be made where previously none were required.

TYPEWRITER Communication in the office went through the transition from handwritten correspondence to typewriter production in the late 1800s. The advantages the typewriter offered outweighed the initial drawbacks, and it was enthusiastically incorporated into offices. Typing increased speed and productivity, and was more consistent than handwriting. The first three pages of Kintgen's article, *Literacy Literacy,* are an example of a typewritten document. The article pages are reproduced here as figures 1a–c (see page 349 for figures). While the forms of typewritten documents were inspired by the formal characteristics of handwritten correspondence, they were also limited by the physical constraints of the machine.

Common features of typed matter are:
Headings are centered,
(which for large amounts of text is hard to read. The
eyes fluctuate back and forth
on both ends of the lines.)
The first line of each paragraph is indented
five spaces, and the entire page is filled with typing.

WORDPROCESSOR Offices made the next transition when
wordprocessors were introduced during the '70s. A
wordprocessor consists of a keyboard, screen, and
the memory/program unit. Although limited function-
ally, wordprocessors brought the computer into the
office for the first time along with its related concepts.
These concepts changed the way offices viewed them-
selves in terms of print production, as they were now
able to produce form letters and other documents
internally. This ability changed the working habits
and expectations in the office.

"What You See Is What You Get" (WYSIWYG, pro-
nounced whiz–ee–whig) is an idea that provided a
major breakthrough in small scale publishing, forming
the basis for desktop publishing today. A wordproces-
sor's screen shows an entire typed page, permitting
the previewing of text before printing. This means that
a relatively unskilled person can use the machine
because elements are arranged by eye. Previously,
trained secretaries judged letter text based on experi-
ence and started the first line of type accordingly,
following traditional formats. WYSIWYG allows some-
one without experience to type text and then arrange
it as desired on the page.

Wordprocessors have a large amount of data stored
on floppy disk. This translates into a reduction in
the amount of paper an office is required to store. With
electronic memory, once text is entered into the ma-
chine, it can be edited endlessly without retyping the

entire text. Using a wordprocessor to create correspondence, text can be entered quickly, printed out, and subsequent changes made. Wordprocessing eliminated retyping letters with errors, but numerous redrafts resulted in a longer process.

The wordprocessor also introduced the negative peculiarities of the computer, such as its tendency to 'crash' (lock up and shut down) when overloaded or when static electricity and humidity were high. Offices were then forced to cope with the situation created when the computer shut down, trapping all documents inside.

The visual format of wordprocessed documents changed very little from the typewriter even though the production methods changed significantly. The wordprocessor features functions such as: automatic bold (the machine double-strikes slightly off-register), automatic centering, and automatic underlining. The first feature is new, while the last two features listed save time.

The first three pages of Bradford's article (reproduced in figure 2a–c) are an example of a wordprocessed document which follows a standard format. It is similar to figures 1a–c; the headings are centered and the paragraphs have been indented 5 spaces. This example also demonstrates the ability of the wordprocessor to justify text.

| Justification means that all of the lines of text |
| end at the same point along the right–hand |
| side of the page, making the text appear as a |
| uniform block. The machine achieves this by |
| holding an entire line in memory, and then |
| when the maximum number of characters for |
| that line has been reached, it figures out how |
| much space is necessary between the words |
| to make the entire line take up the given |
| amount of space. This results in uneven |
| spaces between words, as demonstrated by |
| the preceding eleven lines. |
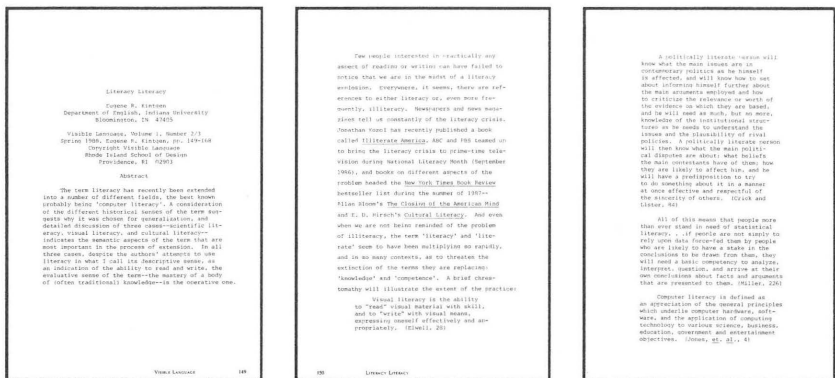
Figure 1a–c
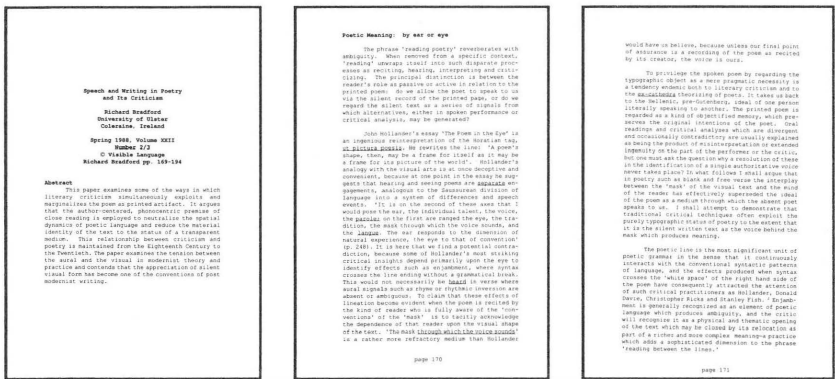
Figure 2a–c
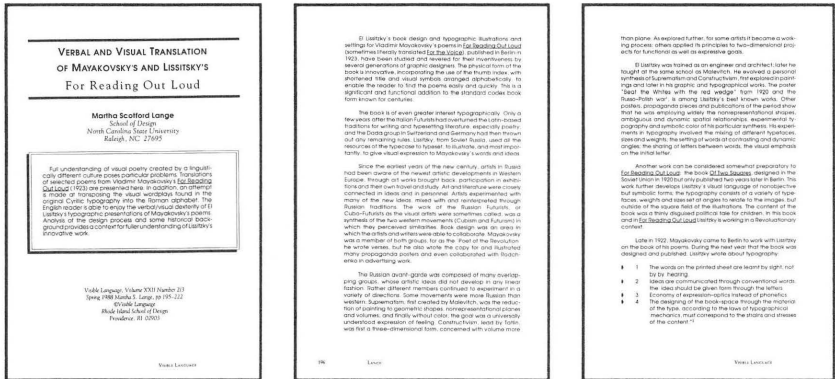
Figure 3a–c

Figures are numbered corresponding to the number of the article being referenced; (Kintgen = 1; Bradford = 2; Lange = 3; Bojko/Lenk = 4; Vande Kopple/Shoemaker = 5; Garofalo = 6; Cavalier = 7; Book Reviews = 8). Letters following the numbers refer to specific examples. For instance, "figure 1" refers to the group of figures 1a through 1e; whereas "figure 1c" refers to that specific figure.

Notice how justification (figure 2a-c) differs from the right–hand edge in figure 1a–c. The margin in figure 1 and in all paragraphs (except for the preceding one) is called "ragged", as each line varies slightly in length.

DESKTOP The designs from which figures 1 and 2 are based are limited by formal constraints. As earlier styles and production characteristics necessarily define the initial efforts on the computer, typewritten and wordprocessed documents have influenced the appearance of the average desktop publication.

The first three pages of Lange's article, reproduced here in figures 3a–c, is an example of a desktop publication. Desktop publishing became possible in 1984, when personal computers were combined with layout software and printers. This article contains many elements not seen previously, such as different typefaces , styles, and sizes, together on one page. These effects are simple to achieve using the computer. Some of the formal elements have carried over from the typewriter—much of the information is centered, and the body text is justified. This example represents a style based on typewriter and wordprocessor formats augmented by the new effects the computer is capable of producing. The result is visually confusing and prevents the contents of the article from reaching the reader clearly.

The progression of articles shows how the habits formed initially with handwriting and the typewriter transferred without significant change to the wordprocessor, but did not transfer well to the computer. The computer's increased flexibility requires the user to make many new choices—choices he is not experienced enough to make successfully.

DETAILS

There are many small decisions, other than those dictating conventional styles, which together determine the final appearance and effectiveness of a document. Figures 1–3 provide examples of the elements that combine to produce the results seen above. These same elements are the building blocks for better quality publications. This secondary examination of figures 1–3 reiterates the point that the computer requires skilled decision making.

HORIZONTAL SPACING Letter and word spacing affect the readability of the text. Poorly spaced letters and words are difficult to read and may produce eyestrain. The following examples show how the typewriter and wordprocessor offer a very limited selection of letter and word spacings, while the computer has many options. The computer's flexibility leaves decision-making regarding letter and word spacing the user's responsibility. Although default settings are provided, they are not necessarily the best choices for all situations. ('Default settings' are like cake mix. They provide generic settings on the computer which may be manually overidden.)

Character spacing on the typewriter consists of equal units. The space each letter fits into and the space made by the space bar are exactly the same width, regardless of each letter's width. Figure 1d is an enlarged example of several lines from a typewriter. The boxes show the identical space around each character. The typewriter's even spacing is not ideal—ideally, spacing should respond to the width of each character.

Figure 6 is an example of the letter and word spacing produced by the computer. Characters are arranged individually, according to their width and relationship to the surrounding letters. Unlike typewriters or word-

processors, the computer has settings which can adjust the word and letter spacing with infinite precision. Figures 3d and e are examples of poor spacing. In figure 3d, the letters are too far apart. Figure 3e has the opposite problem; words and letters are too close together. Both of these examples are difficult to read and they highlight the range of the computer's settings.

Because of the wide variety of typefaces available on the computer, the given default settings are not appropriate for every face. However, the parameters are flexible enough to fine tune any situation for ease in reading. For example, figure 3f is an enlarged version of the text from article 3. The letters are very close together and difficult to read. The parameters for figure 3f are the same as the settings for the base text. While these parameters are fine for the base text, they are inappropriate for this particular use.

TYPESIZE Another option unique to the computer is the choice of typesize. The typewriter and the word-processor offer two kinds of type,

```
for example, this is Courier.
```

```
This is an example of Prestige Elite.
```

In contrast, the computer has the ability to create type in virtually any size. The typographical unit of measurement is the point, and all typesizes are referred to in terms of points. For example, this text is composed of 9–point type.

Figure 1d.

1 example of sta

The spaces arou

rm, regardless o

Figure 6.

Ideally, text should be spaced both vertically and horizontally for optimum ease of reading. This text has been adjusted to increase the letter spacings slightly from the default setting.

This is an example of poorly spaced type. It is hard to read because the letters are too far apart. In addition, the word spaces are small. The end result is text that strains the eye.

Figure 3d.

Thisisanexampleofpoorlyspaced type. It is hard to read because the letters are too close together. In addition, the word spaces are small. The end result is text that strains the eye. Not much fun to read, is it? While these examples exaggerate, similar situations occur when using default

Figure 3e.

standing of visual poetry cre
nt culture poses particular pro
poems from Vladimir Mayako
923) are presented here. In ac
transposing the visual wordp
llic typography into the Rom
er is able to enjoy the verbal/\
ographic presentations of Mc
the design process and som

Figure 3f.

This sentence is an example of 14–point type.

And this is an example of

36-point type.

The smallest type available on the Macintosh is 4 points, which looks like this. There is no upper or lower limit to the size of type available, as laserprinters can enlarge and reduce type.

Because the computer is capable of creating any point size of type, it is often difficult to decide which size is appropriate for a particular use. When there is not enough variation between presented point sizes, the difference is indistinguishable to the reader. Figure 3a shows that mixing different sizes of type is ineffective unless the sizes differ significantly.

VERTICAL SPACING Vertical spacing, known as *leading* in typographical terms, also plays a role in the readability and legibility of the text. If lines are arranged too close together vertically, it is difficult for the eye to return to the next line accurately to continue reading. This disrupts the pattern of reading and interferes with communication. In addition to this paragraph, Figure 3 is an example of too little leading.

On the other hand, lines that are arranged too far apart

are distracting and difficult to read. They are aestheti-

cally offensive as they form stripes rather than text.

The three types of vertical spacing available on the typewriter are referred to as single spacing, space and a half, and double spacing. Large bodies of text typed single spaced are tiring to read; a full page of text requires double spacing. The wordprocessor offers an additional size of leading beyond those found on the typewriter, otherwise known as triple spacing.

The computer, unlike the typewriter or wordprocessor, offers an infinite variety of spacings. Thus leading is another detail that is left for the operator to manage. Ideal leading considers many factors, such as the line length, typeface, and typesize, as well as purpose. This paragraph shows the computer's flexible application of leading. Another factor which influences the effect of leading is the length of the line. In general, shorter lines do not require as much lead as longer lines to create readable text. For example, if this paragraph were composed of shorter lines, then the leading used for the first line of this paragraph would be more appropriate.

LAYOUT The combination of horizontal and vertical spacing combined begin to present some issues related to layout. Layout is concerned with the organization of elements on the page. It is apparent that the limits of the typewriter and wordprocessor make layout decisions for users, while the computer relies on the user to make all layout decisions. The wordprocessor's and typewriter's limitations reduce the user's ability to create typographical errors which result in unreadable

text. Limitations do not mean that quality is impossible to achieve; on the contrary, they increase the odds that a good combination of elements will occur.

The previous examples show that the computer offers adjustable character and word spacing, type size and style, and leading and line length. These details together result in many complex decisions for the desktop publisher. Figure 3 demonstrates the possible result of a series of inappropriate decisions.

STYLES Typewriters have one style of type. So do wordprocessors. The computer, on the other hand, features many different *styles* of type. For example, *this is italic*, and **this is bold**. The computer also has special effects such as OUTLINE and *shadow!*

These brief examples make it clear that the limited choices experienced while working with the typewriter and wordprocessor do not provide desktop publishers with any background for making decisions concerning letter and word spacing, typesize, and style. These are not the only parameters that need to be considered. There is yet another feature peculiar to the computer—the availability of many different typefaces.

TYPE FACES

Readers are aware of, and unconsciously react to, many typefaces every day without recognizing the specific details of each. Once desktop publishers become familiar with the standard three or four faces supplied with the computer, they tire of the standard assortment and begin to search for others. What the educated user realizes is that the typographic details such as the placement and use of type are much more important than the variety. Unfortunately, many people believe that typefaces are a panacea to all of their design problems, and much valuable design time is wasted searching for the perfect face.

A new typeface will not fix most problems. Rather, careful consideration and arrangement of the elements in combination with white space on a page are what makes a design work, regardless of typeface.

More typefaces are not necessarily better, and *mixing* faces **and** *styles* *only* confuses **the issue**.

Unless, *of course,*
that IS
the issue.

STRATEGIES

The preceding discussion of the development of style and its attendant details provides the tools for a discussion of the remaining articles in this issue. Articles four and five, by Bojko and vande Kopple, respectively, are examples which utilize some of the current options available to desktop publishers—templates, and guidelines such as those found in magazines and books. While these materials certainly help desktop publishers make decisions, they do not necessarily help them make appropriate ones.

Articles six and seven, written by Garofalo and Cavalier, as well as the book reviews, are designed to show possible solutions to some of the problems experienced in articles three through five.

TEMPLATES The fourth article, by Bojko and Lenk, has been designed with a template. Templates are layouts that operate in conjunction with a layout program such as Pagemaker, Quark or Ventura Publisher[4].

Templates are useful because the user's sole responsibility is to "dump" text into specified areas of the template. The template pre–defines the typeface, style, leading, line lengths and placement of elements, thus providing solutions to many of the problems introduced above. Templates also offer a head start for more experienced users who prefer to further develop their own layouts.

The template used in figure 4a considers many of the details presented earlier. It defines the typeface, style, size, leading and line length. Typefaces are limited to two: *Helvetica Bold* is used for authors' names, copyright information and title. The other, *Times Roman*, is used for the text. This establishes a system of one face for text, and one for headings.

Typeface, together with size, establishes hierarchy. The straightforward characteristics of *Helvetica Bold* work well for headings, while *Times Roman* is an appropriate text face. Size helps to indicate the title is primary, and the authors' names and copyright information are secondary.

One of this template's shortcomings is the specified typesize, leading and line length chosen for the text. One possible solution retains the given line length and typesize and increases the leading. Another possibility is to retain the leading and decrease the typesize and line length. This illustrates the interconnected
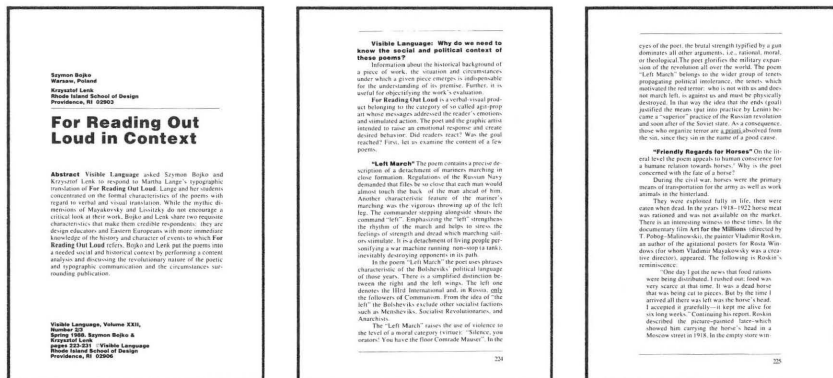

Figure 4a–c

nature of design details; they need to be balanced in relation to each other to work effectively.

The headings differ in size to differentiate the two levels of information, but the sizes specified on the template are too large. A smaller size differential would be more appropriate, and just as effective if placed well. Even so, the template used here is a better option than the previous example because it provides hierarchy and organizes the levels of text information.

Good templates offer guidance for developing publications and can speed production for both the beginner and the more experienced desktop publisher. But templates do not offer solutions for every problem. Because successful templates tend to be designed for a fairly specific use, many users cannot find templates that suit their purpose. Templates run under complex page layout programs that may make application difficult for novices. As more experienced users have the ability to develop their own designs, they often do so without realizing the benefits a template can offer.

GUIDELINES The fifth article is an example of what might be produced by a desktop publisher more experienced with page layout programs. Many magazines offer rules, hints, and tips for desktop publishing. Books, program handbooks, and other guides also provide tips on design; some are sound if employed correctly.
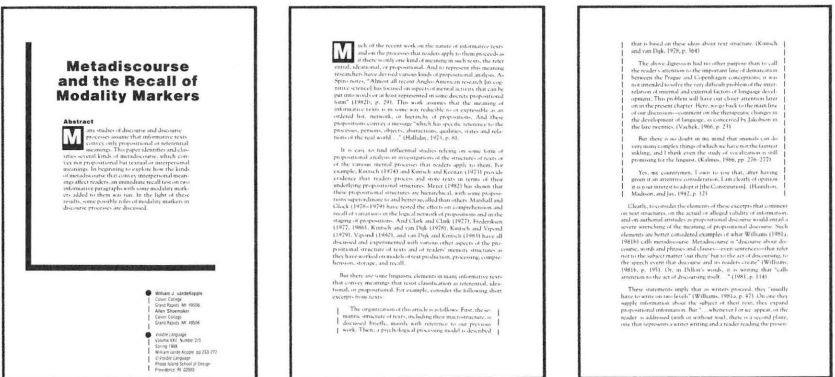

Figure 5a–c

This article follows a set of suggestions from *Publish!* magazine[5]. Figure 5a–c reproduces the first three pages of the article. The chaotic effect of the design is similar to that produced in article 3, and illustrates how the lack of context supplied with most hints leaves something to be desired in terms of application. While the visual elements are more sophisticated, they are not being used to their best advantage—the visuals overpower the text. The bullets are too large, and the page shadow and large type only distract, rather than guide the reader. The leading is tight, so the text parameters are not set for reading even though the article is composed of long text. This problem is similar to the leading problem shown in the previous article.

A growing number of periodicals offer guidelines for creating publications on the desktop. With so many sources to choose from, the desktop publisher needs help in deciding which tips to apply. Brief tips do not discuss the context in which they could be applied effectively. Even the best advice, taken out of context, can form the basis for poor design. The user needs a visual framework in which to locate both problem and solution.

DESIGNER The sixth article is Garofalo's typographic text study, reproduced here in figure 6a–c. It is important to realize that the computer is a tool for designing rather than a source of design creativity, therefore, parameters need to be assessed before the computer is turned on. Many people who have purchased desktop systems have been misled by advertising hype that emphasizes the ease of use while neglecting the importance of design fundamentals and process.

This article's design considers article content and its publication in *Visible Language*, and responds by limiting the typeface to *Palatino*. Text has a leading, line length, and character spacing for optimal reading.

The line is sufficiently long so that readers eyes are not forced to dart back and forth, and leaded so that the eye easily runs along the line and returns to the next one. The text body is left–ragged, with regular spacing between words, creating an even rhythm for reading. The character spacing has been increased from the default setting, making word recognition easier. These details combine to reduce distractions and eyestrain.

All spacings were tested on the Linotronic 300 to determine how the specifications would appear in final form. The "Linotron" is a more accurate printer than the laserprinter, and testing is necessary as most typefaces become lighter and more detailed when "linotronned".

This article provides an example of many of the details that need to be designed and their interrelation-ships. These details create difficulties for the person new to desktop publishing because the problems only become more complex with each new feature the computer offers.

ARTICLE SEVEN The last article, Cavalier's *Meditations*, is an example which builds upon the elements used in the design of the preceding articles. The article is re-produced in figure 7 a–c. It uses two typefaces, *Univers Condensed* for the title, headings, and figures; and-*Trump Medieval* for the text. This design employs the same number of typefaces as articles four and five, but
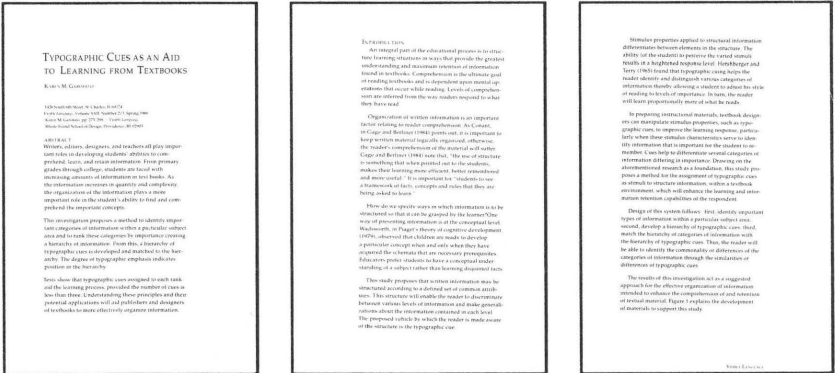

Figure 6a–c

is not as visually confusing because the text groups and weights are integrated. The typesizes are carefully balanced to develop a system of hierarchy and to help the eye move down the page.

As the number of elements such as typefaces, sizes, styles, and weights increase, it becomes more important to have the information and experience necessary to integrate them successfully. In many ways, a designer's knowledge of details is like that of a stereo or wine connoisseur; not everyone can hear or taste the finer points, but there is no doubt that they exist and that trained people can detect and respond to them. Discriminating between average and high quality is clear to all.

BOOK REVIEWS The book reviews utilize the same elements as Cavalier's article, but are organized differently. *Univers* is used for the headings and reviewer biographies, while *Trump Medieval* is used for the text and information related to the book being reviewed. Although the typefaces used are the same as those in the previous article, they demonstrate the flexibility that can be achieved with only two faces. This emphasizes the concept that successful design is based on the careful organization of the typefaces used, rather than a wide selection of typefaces.

The strength and flexibility of layout software make the computer a valuable design tool, but this feature is
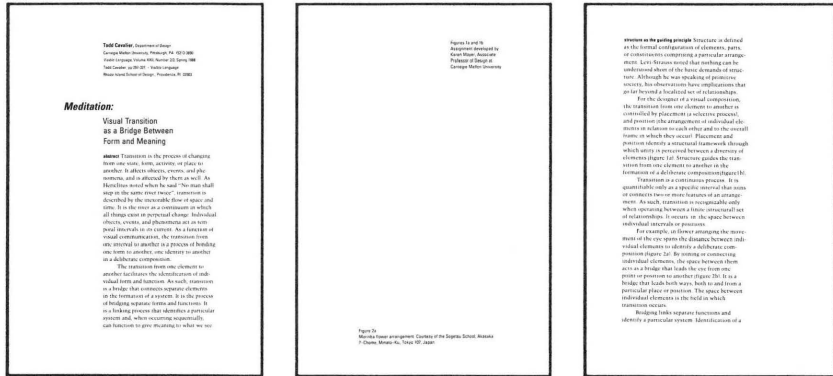

Figure 7a–c

easy to overlook in favor of the variety of superficial visual elements available. Desktop publishers need experience to see beyond the computer's seductive visual elements to the real communicative opportunities it offers. They need to shed the assumption that the computer creates designs in order to realize successful applications on their own.

SOLUTIONS

The progression of articles has presented evidence of the average desktop publisher's background and demonstrated that it offers little guidance for dealing with the infinite range of details that accompany desktop publishing on the computer. Templates and handbooks were presented as possible options, each having its own benefits and problems.

Templates offer specific solutions to many common desktop publications, but require users that are proficient with page layout programs. More experienced users prefer to produce their own templates without realizing the benefits templates offer. Unfortunately, even simple modifications can render a template ineffectual. A desktop publishing system does not save money if production is reduced and image is compromised. A hybrid alternative is to use a template developed by a designer in conjunction with a desktop publisher, directed towards the publisher's specific needs. The desktop publisher saves time and money in production and benefits from the understanding of details a designer brings to the problem.

The many available handbooks and how–to guides provide another source of information for desktop publishers, but do not offer any assurance of quality. The proliferation of how–to tricks and gimmicks requires sifting through literature to find pertinent information. There are inherent problems with these

guides; many explanations allow readers to recognize the problems in the given example, yet leave them incapable of solving their own problems. Few examples provide enough contextual information to make their suggestions truly useful.

Tips do help to introduce some elements of a visual vocabulary, and slowly work to encourage an awareness of typographic details. Their benefits are limited, though, as it is difficult for written information to transcend the passive learning stage and to play an active role in desktop publishing. This suggests that specific recommendations for details such as spacings, leadings and layouts would be of use to the unexperienced publisher. Gradually, through use, a desktop publisher could gain an understanding and appreciation for the concepts behind the initial specifications.

Self-instruction is likely to be most successful if guidelines regarding parameters such as type sizes and leadings are fixed. This leaves the user free to concentrate on relatively more flexible parameters such as placement. Through the process of working with a combination of specifications and limited options, desktop publishers could experience a controlled investigation similar to some of the methods designers use. Information provided in such a way would expand the user's experience base while allowing them to further develop their desktop publishing skills.

The difficulty of self-instruction makes training seminars and classes a potentially more effective alternative. Although more expensive than purchasing a 'smart' program or template, training reaches beyond solving immediate problems and into the realm of considering what the elements templates and programs are based on and their inter-relationships. Education for desktop publishers should incorporate both

training on page layout programs and an introduction to basic design concepts that address their interests. Education in design should include all of the details presented and begin to develop an awareness of good design. Education can provide specific answers to desktop design problems, while appreciation/awareness develops a desktop publishers experience base so that they can realize the potential as well as the limitations of their own systems and skills.

Training which increases awareness as well as teaches specific concepts can help desktop publishers discover the elements of quality design and good communication. Training is integral to recognizing the capabilities and limitations of the given system, including the users' own limitations. Appreciation is relevant because as desktop publishing becomes more developed, it is the design of the material that will make it successful, rather than the ability to manipulate programs.

Design adds personality and life to published material, and the best design should remain 'invisible'. The following analogy may help explain the transparency of good design. When you sit at a table for dinner and your knees hit the underside of the table, you notice it was badly designed–it is too short, and your legs hurt. When you sit down at a table that is perfectly adjusted, you notice dinner and don't think twice about the table. Good design helps you to get to the message without becoming entangled in the form that carries it. If used well, many of the special effects offered with desktop publishing programs can help make your publications exciting; if not, they take away your appetite.

FOOTNOTES

1   *Desktop Publishers Forum*, National Association of
     Desktop Publishers, January/February 1989, p. 1.

2   *Desktop*, International Typeface Corporation, March/
     April 1989, p. 34.

3   *101 Best Desktop Publishing Tips*, Publish!, p. 8, 1987.

4   Pagemaker is a registered trademark of Aldus Corpo-
     ration; QuarkXPress ; Ventura Publisher is produced
     by Xerox for IBM PCs.

5   Lamar, Laura. "Newsletter Design TIPS", *Publish!*,
     March 1989, pp. 65-68.

BIBLIOGRAPHY

Beach, Mark. *Editing Your Newsletter, how to produce an
     effective publication using traditional tools and computers.*
     Third Edition, Coast to Coast Books, 1988.

Carter, Sebastian. *Twentieth Century Type Designers,*
     Taplinger, 1987.

Craig, James. *Designing with type, a basic course in typogra-
     phy.* Watson Guptill, 1980.

Design for Business Communications Aldus Corporation,
     1987.

Design Quarterly 142, 'Editors Notes', p. 3; 'The New
     Graphic Languages', pp. 4–17. MIT Press for the
     Walker Art Center, Minneapolis, MN. 1989.

Gates, Henry Louis, Jr. *Whose Canon Is It Anyway?* New
     York Times Book Review, March 1989

Gerstner, Karl. *Compendium for Literates*, MIT Press,
     english edition. 1974.

Hirsch, Jr. E.D. *Cultural Literacy, what every American needs
     to know*, Vintage, 1988.

Hirsch, Jr. E.D., Joseph F. Kett, and James Trefil. *The
     Dictionary of Cultural Literacy, What Every American
     Needs To Know.*, Houghton Mifflin, 1988.

Hurlburt, Allen. *The Grid.* New York: Van Nostrand Reinhold, 1978.

Lichty, Tom. *Design Principles for Desktop Publishers.* Scott Foresman, 1989.

McLean, Ruari. *Thames & Hudson Manual of Typography.* London: Thames & Hudson, 1980.

Miles, John. *Design for Desktop Publishing, a guide to layout and typography on the personal computer.* London: Gordon Fraser, 1987

One-Hundred and One Best Desktop Publishing Tips, from the Editors of *Publish!*

Ready Set Go! Users Guide. Letraset USA, 1987

Reference to Microsoft Word . Microsoft Corporation for the Apple Macintosh, 1987.

Rogers, Bruce. *Paragraphs onPrinting,* Dover Publications, New York. 1979.

Ruder, Emil. *Typography,* Weber 1982.

Spiekermann, Erik. *Rhyme & Reason, a typographic novel.* Berthold A. G. Berlin, 1987.

Tufte, Edward R. *The Visual Display of Quantitative Information.* Graphics Press, 1983.

Typing the Easy Way, second edition, Barron's Educational Series, Inc. 1988.

Warde, Beatrice L. *Printing Should Be Invisible,* New York: Marchbanks Press.

White, Jan V. *The Grid Book, a guide to page planning.* The Compage Company with Letraset USA, 1987.

MANUSCRIPTS, INQUIRIES ABOUT research articles, and other contributions to the Journal should be addressed to the editor. Letters to the editor are welcome. The Editor will also relay to the author questions or comments on any article. Your response—and the author's reply—will not be published without your permission and your approval of any editing.

If you are interested in serving as guest editor for a special issue devoted to your specific research interest, write to the editor, outlining the general ideas you have in mind and listing a half dozen or so topics and possible authors. If you would rather discuss the idea first, call the editor at 215–565–9747.

Editorial correspondence should be addressed to:
SHARON HELMER POGGENPOHL
Editor, *Visible Language*,
6 Cold Spring Lane
Media, PA 19063–4510. U.S.A.
Telephone 215–565–9747.

All orders must be prepaid. Checks must be payable to Visible Language in U.S. funds.

SUBSCRIPTION INFORMATION

Subscription rates:	one year	two years	three years
Individual	$25.00	45.00	65.00
Institutional	40.00	75.00	110.00

Non USA subscribers: Add $4.00 per year for postage.

Missing Issue claims must be made immediately on receipt of the next published issue.

A limited number of all back numbers is available at a per issue cost of $6.00 (institutions) and $5.00 (individuals) through Volume XX. The back numbers beginning with Volume XXI cost $6.00 per issue (individuals) and $7.00 (institutions). A booklet listing the contents of all past Journal issues is available on request. Individual reprints are not available.

Detailed information about advertising is available on request.