Visible Language

The Journal for Research
on the Visual Media
of Language Expression

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Using the Diagram of Contents

The diagram of contents charts the way certain themes flow through this issue of Visible Language. The articles share an overriding concern for the visual organization of information. The order in which they appear, as explained in Aaron Marcus's introductory essay, is based on their relationship to diagrammatic expression.

But above and beyond that, texts and illustrations form an intricate web of other related themes. Articles on completely different topics use similar perspectives and methods. An idea proposed in one essay is clarified or contradicted in another. There is an unusual amount of visual interplay between consciously unrelated images. A number of ways to organize different aspects of this material is suggested in the diagram of contents.

With this diagram, the reader can follow a question or concern through the volume and turn to related articles quickly and directly. Six thematic categories (which are discussed to the right) are identified by a series of discrete coding bands on the edge of appropriate articles (the edge of meaning?). A traditional reader can refer to the previous page to consult a more conventional list of contents and page numbers.

Order
Organizing and structuring different kind of information—verbal, visual, concrete, abstract.

System
Organizing information by means of rational, empirical, objective, technological systems.

Lost and Found Systems
Ordering information lexically—using more open or random systems.

Context
Finding the meaning of words, images, concepts in and through their environments.

Manipulation
Playing with words, images, concepts—for their own sake or for the sake of meaning.

Evolution/Revolution
Calling for change—can the written word remain unaffected by a changing world and radically new technology?

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At the Edge of Meaning
Aaron Marcus

ypographic/calligrap ic symbols of visibl la guage are abstract vessels for man's conceptions about spac -time. The perception of their visual form has evolved over millenia, fluctuating in its recognition of their manifold nature as pictographs, ideographs, physical marks on a surface, t o-dimensional and three-dimensional entities. Today the introduction of electronic communication and computers has created strong forces to reshape letterforms. At the boundaries of accepted usage, at the edge of meaning—whether it be in research la oratories, in art and design scho ls, or in professi nal studios—new conceptions about the role of these familiar forms are emerging. On the one hand, there is a struggle to create new forms; on the other, there is a return to a better understanding and re-interpretation of older approaches. The question is: where are we now in our understanding of the process of change?

As a graphic design student, I was once told by an instructor that typography at its best is "invisible." In such a state it permits the reader's eye to pierce effortlessly to the core of (verbal) meaning. Although many professionals regard this invisibility as a desirable objective, it is always literally unattainable. The net[2] of typography is anything but invisible. In fact, some designers of visible language compositions (e.g., designers of alphabets or designers of magazine and boo pages) regar it as xtremely important to ake the re der co stantly aware of the me ium of typography. Their intention are similar to those of many recent avant-garde artis s. Researc in many disciplin s illumi ates th conscious or unconscious a areness that the reader has of visible language; it is the nearly infinite set of distinctly different possibilities for formulating visible language statements that continually delights and informs both the graphic designer and the reader.

After recognizing, then accepting the visible nature of the medium, it is possible to be simultaneously respectful yet dissatisfied ith the accomplishments of a relatively small number of symbols (especially in the case of non-ideog aphic languages such as the alphabets of the western languages) n a rela iv ly confined visual fo mat. Such a

judgment is arrived at after an exam nation of the variety of forms which have at one time or another fou d use and the full range of visual mar ing systems that scientists and artists have experimentally evolved since earlie t times. Excep for aberrant periods of radical change, the most successful forms of visible language took advantage of the technical capabilities of the day. Consider a fairly recent example: once Gutenberg's novel methods of typography chieved widespread accepta ce, the number of distinct alphabetical symbols dropped from approximately three hun red in his books to the more workable number of five dozen in the nineteenth century book.[3]

In the twentieth century the increasing use of video, computer gr phics, a d holography[4] requires a new perspective with respect to the implications of these me ia for graphic desi n and visible language in general. The term "graphic design," like "c ncrete p etry"[5] or "vi ible language may have several broad areas of meaning. Of particular importance in this discussion is informational (as opposed to persuasiv) communication through typography, photography, and illustration. This implies a greater uantity of long texts with complicated logical structures.

At the beginning of the profession of graphic design as a self-aware discipline in the twentieth cent ry there were percept ve critics like El Lissitzky[6] who anticipated the deve opments taking p ace in vision and in visual communication. Lissitzky foresaw "optical" as opposed to "acoustical" liter ture, i.e., typog aphic forms that more completely took advantage of their visual nature, that xplored a full two-dimensional space rather than the more limited linear form of conventional typographic arrangement. Others have since repeated or enlarged Lissitzky's point.

The basic dictum of the early polemical writings of this century as well as the subsequent achievements in the theory of graphic design an concret poetry is th t typography is becoming richer two- imensionally and is more intricately and inextricably bound to non-typographic elements such as photographs and illustrations. There has been a tendency, however, to understand this in terms of large, simple messages, i.e., the overall composition of book pages, newspapers, posters, or signage. The alteration of the heart of the text—the narrative, linear typographic statement of ideas—has been more resilient to change. Yet, even here, here are developments, if not in ubiquitous pocketbooks, t en in magazines and in some t xtbooks.

Typography, and with it visible language systems in general, appears to be moving toward a fragmented approach to composition. This is a natural and appropriate response to the innovation in message carriers: video, computer graphics, and holography. The essence of these new media is the incredibly rapid distribution of particles of light, not particles of ink (with the latter's attendant industrial-age companions of paper, presses, etc.). This dancing stream of light connotes the movement towards a quickly changing and complex diorama of symbols (Figure 1).

The term diagram well describes just such an array of symbols.[7] It is intended as a general term to denote an arrangement of alphanumeric symbols, points, lines, planes, colors, and other aspects (e.g., texture) which utilize a two- or three-dimensional space. The concept evokes images of charts, maps, models, schemata, and similar visual structures. Normally the intention of a diagram, as with conventional text forms, is to convey a specific body of information. The meaning of a diagram can be a very precise formulation upon which there is an objectively complete consensus, or it can be ambivalent, parallel to the variability of normal visible language texts.

In well-designed diagrams there is a symbiotic relationship of the alphanumeric symbols to the non-typographic elements, one which allows a completely visual approach to reading. These other elements may be photographic, illustrational, or pictographic. Additional parameters into which meaning may be injected are, among others, movement of symbols (or visual elements) across and into the visual field, layering of information in actual or implied depth (literal or phenomenal transparency or translucency), color, multiple entry and exit, and figure-field relationships.[8] It is this set of diagrammatic qualities which the new media offer for visible language.

Of special importance is the rapid display and efficient movement of symbols in a three-dimensional field. With video, computer graphics, and holography it becomes increasingly easy to portray simulated or literal three-dimensional spaces. In recent computer graphics publications there frequently appear images of multi-colored environments that are generated by the computer; they exist nowhere but in the computer. At the National Aeronautics and Administration headquarters in Houston, for example, it is possible to see and to manipulate a fairly realistic, but simulated, portrayal of a space-shuttle pilot's view of the descent to earth. These same headquarters house the Mission Control Center with its complicated arrangement of wall-sized display screens and video/computer graphics terminals.

The question that comes to mind is this: in what way can visible language systems appropriately match the potential for visual communication which these media afford? Is communication to be reduced solely to photographic images with voice-over? This is unlikely. The nature of a typography in a three-dimensional space becomes a matter of greater potential and concern.

During the millenia of written symbols, it has rarely occurred to anyone (until recently) to wonder what the back of a letter or symbol looks like.[9] The question is normally unanswerable, because two-dimensional statements, whether comic strips or elegant prose texts, conceptually have only a front face. Another typographic composition on the reverse side of a book page is also a front face. What happens between these faces is, in traditional terms, meaningless. Similarly, a letter printed backwards is easily flipped to a right-reading letter and is not understood as the rear-view of the backward letter.

In a computer graphics display, the answer to the question "what does a visible language composition look like from the back" may be the conventional answer that it looks like the rear of a video CRT display. However, recognizing the possibilities of video/computer graphics/holography images, the rear-view of a typographic composition may afford a prospect into new areas of a visible language space which were previously unobserved (Figure 2). This is the equivalent, in terms of visible language, of moving from a Renaissance single perspective view of typographic space to a multi-perspective view in which each direction reveals new insight into the total meaning of the work. The view of three-dimensional typographic space from the rear, for example, may <u>not</u> simply be its mirror inversion.[10]

The new media reflect modern mankind's greater mobility in space. The reading room has enlarged to environmental proportions as one travels literally by car and jet or phenomenally by electronic media to distant locations. One spends an ever greater proportion of time absorbing information from compositions in urban spaces while reading signs, posters, maps, etc. This form of reading, while it may now appear trivial, can serve as a model for multi-dimensional diagrammatic reading. As such it greatly changes notions about the traditional typographic connotations of legibility, comprehension, density, scale, readibility, etc. (Figure 3). Insofar as the new media appear to have replaced the "book" as a source of communication, the glass screen has replaced the printed paper page. There has been a tendency, however, to overlook the full implications of that change. The screen

of visible languages is being shattered, but the pieces have not necessarily been re-asse bled into a merely two-dimensional mosaic or constellation. Well-structured m lti-dimen ional diagrams of the con ents of vast quantities of information are the appropriate, efficient, and necessary visi le language form for the "post-mod rn" reader.

Who is the reader? It is the reader who would be overwhelmed by the amount of informa ion available in any area of thought or decision making. This task of ext acting signific nt conte t from an ever increa ing supply of information is gradually affecting all persons in their professional and private lives. Many dis iplines have combined forces to help solve the communications problems inherent in the increased flow of information. To cite one example: William Ewald, a communications consultant, review d the most adva ced au io-visual and computer-related display systems before developing a project to equip regional policy makers with the necessary visual displays to enable them to make relatively well-informed decisions about matters affecting large areas with potentially millions of inhabitants. The heart of his proposal is a "situation room" for decision making in which people meet to debate issues and to review relevant information. This predicament is a paradigm for most decision making in the real world. Here are the very circumstanc s deman ing a diagrammatic, environmental approach to visible language display.[11]

Figure I
Babel, computer-assisted poem-drawing, 1972

Using a phototypesetting machine connected to a digital computer, this image seeks to explore new possibilities for expression and to focus attention on the manifold nature of symbolic statement: as gesture of movement and material, as pictogram, as ideogram, as phonogram, as two- or three-dimensional object. Conceptual cross references are the turnpike at night, the starry sky, ritual charts, and typography dreaming. (Adapted from Marcus, Soft Where, Inc., p. 7.)

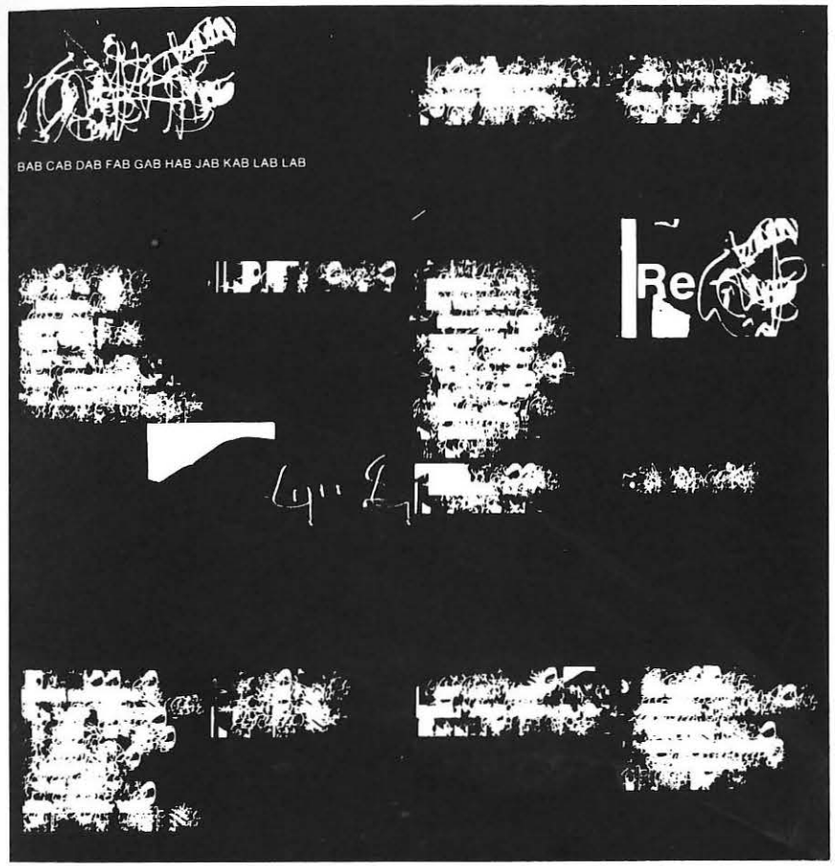
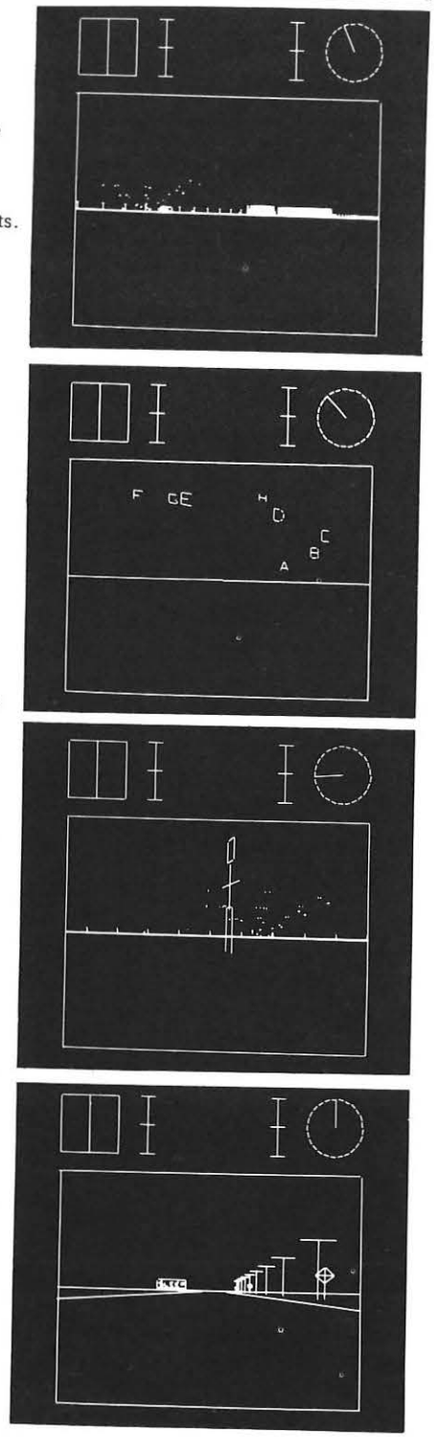


Figure 2
Cybernetic Landscape I, computer-assisted poem-drawing environment, 1971-3

The landscapes pictured here were created on an interactive computer graphics cathode ray tube display device. These landscapes in a simulated space provide a palpable spatial experience of abstract visual forms and conventional verbal and typographic elements. The symbols are transformed into glowing filaments of light. The viewer/reader/participant is no longer bound to the flat surfaces of the incised, written, or printed sheet. By using the interactive equipment, the viewer may look at and wander through this aesthetically composed visible language space at will.

The illustrations show various views of Cybernetic Landscape I. The small diagram at the top indicates location of the viewer on the groundplane (dot in the square) and direction of view along the groundplane (line in the circle). Bars indicate the height above the groundplane and a vertical viewing angle. Visual elements are to be found throughout the space, for instance, a kinetic object which is a whirlwind of letterforms rotating silently with a pulsating, varying rhythm independent of the viewer's position or movement. There is also a "person" who moves randomly along the groundplane. This creature is both a mirror of the viewer and an indicator that other viewers, other human beings, could be connected to this space, could "enter" it and could "meet" the present viewer "inside" this electronically created environment.

By means of this computer-assisted display, new relationships, new meanings, emerge that depend upon the position, movement, and viewing direction of the viewer/reader/participant. As objects of light, the elements in the space convey a distinct and forceful presence combining the mystery of dreams, the awesomeness of the night sky and the wonder of the modern man-made urban environment seen at night. Instead of the strict topology of the stele, codex, and later book forms, the linking of elements can be more rich and complex; yet it is achieved through visually simple elements: points, lines, and planes. These visual components of familiar forms have been transmuted into light and space. The reader travels through the text as context. (Adapted with permission from Marcus, Soft Where, Inc., pp. 12-14.)



In the presence of the new media, the diagram in its many historical and cultural forms becomes especially important for visible language. An awareness of diagrammatic typographic structures, especially environmental forms, guides one in recognizing the potential for visible language as it develops. It is this horizon of symbol forms, this "edge of meaning" which the present issue of Visible Language seeks to explore, and in doing so this special issue must depart at times from the mainstream of the journal's concerns.

Why not look at real signs, I thought. Why not in fact record on tape this most popular of cultures, this gigantic folk poem, this epic of a million store owners defining themselves?

Price/Katz

The subject of diagrammatic visible language is a difficult one to investigate because the awareness of diagrams as a distinct subject of study has made but quiet progress. Through the ranks of the appropriate academic and professional disciplines there has been a modicum of success in becoming aware of diagrammatic visible language and in developing a critical apparatus of concepts, terminology, and structure. Consequently, there is no widely used meta-language for discussing diagrams although the various approaches through semiotic and semiologie offer significant achievements.[12] Educational curricula rarely reflect this field of study, and it emerges only sporadically as a subject of inquiry in journals of psychology, semiotic, art history, and visible language. One must have more to look at than the beautiful but inevitably limited selection called Diagrams published recently by the editors of the magazine Graphis[13] or the analysis of Bertin in Semiologie Graphique.[14] As good as these two important references are, they are only a beginning. With time professional magazines and journals will present material in enough depth and with a coherent examination of the subject.

Basic design sufficiently isolates factors of visual perception so that they can be easily observed, analyzed, played with, controlled, learned, transposed, and applied.

Friedman

For the present this special issue has gathered materials from diverse sources as prolegomena to this emerging field of study. The selection of contributions is by no means definitive. The purpose of the issue is to develop an awareness of the subject and to suggest areas of future inquiry. There is a mixture of conventional discursive texts counterpointed by short visual formulations of experimenters whose work has a specific didactic value in the context of this issue. The illustrative materials may be viewed as visual footnotes to the larger discussions within the issue. The structure of the issue itself has a diagrammatic quality. Because of the propadeutic status of the study of two- and three-dimensional diagram languages the components of this issue may appear to relate to each other tangentially in a complex whole. Consequently, a few remarks upon their relation to the themes of the issue are in order.

It is a symbolically potent fact that expression seeks a transformational grammar. It is the task of art to transform.

Kenedy

The three broad areas of the issue are the following:

1
The new media offer potential for more diagrammatic use of visible language in situations more complex and prolonged than poster-like or rapid reading situations. What is the nature of this amalgam of forms?

2
Of special interest is the three-dimensional typographic composition as a diagram in the environment and a diagram of the environment. How can such forms be described and evaluated?

3
The discussion of diagrams requires meta-languages. Such an emphasis will encourage the entry of the subject of diagrams into the educational sphere and into graphic design and related professional disciplines. What is the nature of such a discussion?

Franke argues that linear discursive text formulations are not as informationally efficient as other possible arrangements of text and suggests considering two specific diagram types as models for future typography. In a sense he is discussing a direct future descendent of straightforward text settings (i.e., for the most part unornamented, prosaic modes). Howe's composition provides a visual fillip to Franke's proposals; it may be contrasted with the work of Ockerse which follows. Ockerse's projects are also

compositions based on an underlying grid, but the structure is much freer and corresponds to the flickering order of video, an order over time, as much as space. Knowlton and Harmon's article re-enters the discussion of video and computer graphics to indicate the potential inherent in these media. By adding informational content in an innovative, controlled measure to all elements of the marking/writing system, they achieve a new order of meaning. Finally, Kostelanetz shows the importance of giving attention to all symbols in a diagrammatic literature. This concrete poetic work harks back to the world of statistical tables and conventional numerically-oriented diagrams, but it alludes to other levels of meaning hidden among the ubiquitous and pedestrian numerals.

The results (of Documentracings) are much like impressions left within us by the fragmented signals from our environment.

Ockerse

In the second section of the issue Price and Katz adumbrate the concept of a three-dimensional diagram environment by regarding the urban environment as a gigantic diagram. They present an experimental reading of the graphics of the urban street. Others have examined individual elements of such graphics; they attempt a holistic view. Cumming's work includes an implicit reference to their approach by literally diagramming typography in the environment, and Sky's article formulates another mode of appreciating the function of environmental graphics. Finlay's sculptural concrete poem pictured in this issue offers a simple, eloquent typographical diagram-object, one that takes information from the environment (the position of the sun) to create a complete statement.

Interesting and artistic effects often result when the familiar dots of half-tone screening are replaced by deliberately more complete patterns or structures.

Knowlton/Harmon

The final contributions relate to education and the need for a meta-language for discourse about diagrammatic configurations. Baudin argues that an enlarged scope of "writing" must be introduced into the curriculum. It is in academia and the professions that a regularized diagrammatic writing is most likely to emerge due to the necessities of communication in these areas. Friedman's students' projects present, in a sense, a writing lesson for such an expanded vision of writing. While couched in specific terms, the value of their project is more universal. Finally, Kennedy's article demonstrates the use of a meta-language criticism which, in its mixture of art and language, is similar to criticism of visual works among the post-avant-garde critics. This approach is used to pierce the meaning of diagrammatic works of Marcel Duchamp. These works

Writing is the only way we know to prepare and to organize any complex human activity.

Baudin

contain specific ideas utilizing titles and verbal play. In Duchamp's oeuvre there is a conceptual word/image dialectic constantly at work whose sophistication can serve as a model for future writers of diagrammatic visible language.

This issue's sequence of musings about the direction of visible language must at this stage be kaleidoscopic and oblique. To peer at the horizon and to determine the form of approaching objects, implies first being satisfied with broad outlines. Half a century ago Lissitzky, observing similar changes in communication, proposed the following analogies to contrast visible language systems (the movement of thought) with transportation systems (the movement of people). These are shown below in an adaptation of Lissitzky's table of analogies:

Inventions in the field of thought communication	Inventions in the field of physical communication
symbolization	upright walking
writing	wheel
Gutenberg's letterpress	animal drawn vehicle
?	automobile
?	airplane

It is now possible to fill in the question marks above by opposing phototypography to the automobile and computer graphics (video/holography) to travel in the jet age. This issue of Visible Language addresses itself to resolving, if hesitantly, the normative forms of visible language in the era of electronic communication.

t o r a i s e

l a n g u a g e' s

t e m p e r a t u r e

w e n o t o n l y

r e m o v e s y n t a x;

w e g i v e e a c h

l e t t e r

u n d i v i d e d

a t t e n t i o n,

s e t t i n g i t i n

u n i q u e f a c e

a n d s i z e;

t o r e a d

b e c o m e s ...

t h e v e r b

t o s i n g.

John Cage, 1967-1972[17]

Notes

This introductory article and the contents of this issue are the result of an invitation by Merald Wrolstad, the editor of Visible Language, to assemble a special issue devoted to the theme, "At the Edge of Meaning." The author wishes to acknowledge with thanks his patience and valuable criticism during the creation of this issue.

1
Sophie Lissitzky-Kuppers, El Lissitzky. Greenwich: New York Graphic Society, 1968, p. 355.

2
The use of the word "net" parallels Ivins' use of the term "nets" or "networks" in his perceptive description of illustration reproduction systems for printed matter (or visual languages) and their effects on the transmission of knowledge. An example: "The nude was the particular fish for which the net of engraving had originally been devised" (page 179). William M. Ivins, Jr., Prints and Visual Communication. Cambridge: MIT Press, 1968.

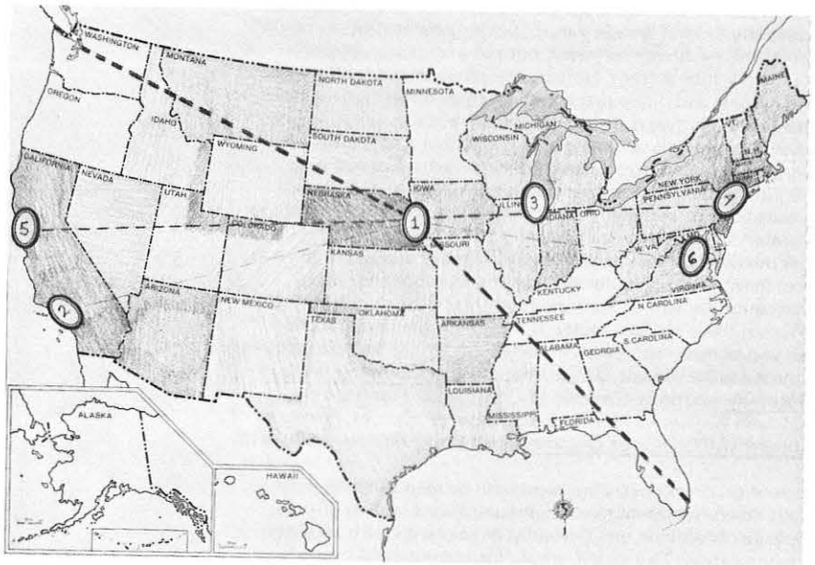
3
As is sometimes pointed out, Gutenberg's achievement is more a typographic/visible language system than a printing system, since his press merely adapted the well-known winemakers' technology. For a display of the alphabetical characters used in Gutenberg's books, consult the illustration shown in Emil Ruder, Typography. Teufen, Switzerland: Arthur Niggli, 1957, p. 25.

4
These terms are meant in a general sense. The video medium includes all forms of public broadcast as well as closed circuit, cable, facsimile, and Picturephone variants. Computer graphics implies any kind of imagery mediated or generated by computer control and most appropriately, but not exclusively, displayed on cathode ray tube screens. Holography refers to the recent methods for obtaining and displaying complete three-dimensional images from essentially two-dimensional display surfaces (usually using lasers). These media are being intertwined in complex ways in laboratories for research related to mass media. For example, computer-generated holograms have been constructed of non-existent objects, and methods of three-dimensional and computer-generated video are being investigated. For the sake of simplicity, these media should all be seen as variations of computer graphics, since, inevitably, computer control of these forms for mass communication will be appropriate. It is not the aim of this issue to discuss these media directly, but rather some implications of their widespread use. For an introduction to the technical aspects of these media, consult: James Martin, Future Developments in Telecommunications, Englewood Cliffs, N. J.: Prentice-Hall, 1971; and William M. Newman and Robert F. Sproul, Principles of Interactive Computer Graphics. New York: McGraw-Hill, 1973.

5
Much of concrete poetry's polemic can be seen to relate most clearly to conventional rapid communications such as posters, newspaper headlines, etc. Certainly its raison d'etre is aesthetic communication. This article argues for the potential changes conceivable for more prosaic, linear forms of text. Although images from the author's own work in concrete or visual poetry and from other works throughout these pages illuminate the issue, it has been the author's intention to rely upon sources other than concrete poetry as well as to emphasize the basis in and relevance for informational as opposed to aesthetic communication. The exact meaning of these last two terms (where informational= semantic) is discussed at length in Abraham Moles, Information Theory and Aesthetic Perception. Urbana: University of Illinois Press, 1968, pp. 129 ff.

Figure 3
An X on America, documentation showing alternatives for a conceptual environment poem-drawing, 1972

The work may be summarized as follows: A conference call was established on 7 November 1972, Election Day, at approximately 12:00 CST, connecting five cities in the United States: New York, Washington, San Francisco, Los Angeles, and Omaha. The end points of the call were public telephones located in downtown sections of the city. The call involved several people who had picked up the phones simply because each heard a nearby pay phone ringing. As the conference call was in progress, a monumental X three thousand miles wide was being created electronically. The work is a natural outgrowth of a desire to compose media of mass communication in the way in which one might use charcoal to create a drawing or pen and ink to write a poem. The environmental scale of the piece affects its content; its form in space and time has become dematerialized. (Adapted with permission from Marcus, Soft Where, Inc., pp. 15, 23.)



6
Lissitzky's pertinent remarks are found in the definitive monograph by Sophie Lissitzky-Kuppers, op. cit., pp. 355-359.

7
The Oxford English Dictionary includes the following among its definitions of diagram: "a set of lines, marks, or tracing which represent symbolically the course or results of any action or process, or the variations which characterize it." The complete definition omits any explicit reference to typographic elements; however, examination of two primary compendia of diagrams reveals that a significant number of conventional diagrams rely upon strategic use of alphanumeric elements to convey the diagram's meaning. See Jacques Bertin, Semiologie Graphique. Paris: Gauthier-Villars and Mouton, 1967; and Walter Herdeg (ed.), Graphis: Diagrams. Zurich: The Graphis Press, 1974. Other metaphors for this new set of symbol relationships have been used by various theoreticians, practitioners, and critics of visible language? in particular, the terms "constellation" and "mosaic" are often used. These terms are of some use in alluding to two important aspects of diagrammatic visible language: varied two-dimensional reading movements and the necessity for the reader to fill in visually the symbol arrangement in order to achieve a gestalt. However, to extract other implications from such terms, requires further guidance. Constellations and mosaics have, literally, a limited set of essential visual configurations: they are a set of point (or small plane) elements of a relatively simple topological, geometric, and visual order. (Another limitation, their two-dimensional character, is discussed separately in Footnote 10.) Consequently the alternate, more abstract term "diagram" is proposed. It is one that refers to a wealth of already existent forms which may be examined as paradigmatic. The actual examples of constellations and mosaics, on the other hand, would quickly exhaust themselves in displaying distinctive paradigms.

8
For a description of these parameters and a discussion of their use in typographic compositions, see Aaron Marcus, "An Introduction to the Visual Syntax of Concrete Poetry." Visible Language, VIII, 4, 1974, pp. 333-360.

9
One answer to this question was proposed in a recent article in which volumetric letters were designed. These were often simple volumes with high symmetry of the letters about the vertical axis. (See Herman Damen, "Excerpt: Towards a Three-Dimensional Pouitry." Visible Language, VIII, 4, 1974, pp. 361-368.) Another more intriguing reply to the question is suggested in a typographic sculptural piece of 1969 by the concrete poet-graphic designer Tom Ockerse. The back of a volumetric letter A is stated to be the letter Z. The piece is appropriately entitled A-Z. Part of its significance as a concrete poetic work is the spacial resolution to the previously unusual question about the nature of spacial texts. Ockerse's proposal suggests more of the unexpected relationships and sources of meaning which a three-dimensional diagrammatic typography would permit. See Tom Ockerse, T.O.P. Providence: Tom Ockerse Editions, 1970, unpaged.

10
This discussion points up another limitation of the metaphors constellation or mosaic beyond those discussed in Footnote 7. These images are essentially two-dimensional. The three-dimensional configuration of stars in a constellation is ignored in terms of its perceived image. Both forms of images, constellations and mosaics, make no sense, or are meaningless, when viewed from any viewpoint other than a previously fixed one. This is another example of a Rennaissance-like, absolutist view of order rather than a multi-perspective, relativistic view.

11
See William R. Ewald, Jr. Information, Perception and Regional Policy, Report prepared for the National Science Foundation. Washington: U.S. Government Printing Office, 1975.

12
The subject of diagrams as a special field of study offers the prospect of unusual and fortuitous confluences of the concerns and questions of pasigraphy (universal writing systems), art history, anthropology, and semiotic/semiologie. As yet there is no primary scholarly locus for such investigations. It is a curious quirk of intellectual history that the semiotic meta-languages which attempt to diagram linguistic structure were never focused upon diagrams themselves, the visual correlates of verbal meta-languages. It is quite likely that such a diagram-oriented meta-language would itself make use of diagrams.

13
See Walter Herdeg, op. cit.

14
See Jacques Bertin, op.cit.

15
Sophie Lissitzky-Kuppers, op. cit., p. 357.

16
John Cage. M: Writings 1967-72. Middleton: Wesleyan University Press, 1973, p. 107.

Visible Language, XI 2 (Spring 1977). © 1977, Visible Language, c/o The Cleveland Museum of Art, Cleveland, Ohio USA 44106. Author's address: Bezalel Academy of Art and Design, 10 Shmuel Hanagid St., Jerusalem, Israel.

Figure 4
Untitled, press-on lettering and ink on graph paper, 8½x11", 1971-2.

Observations Concerning Practical Visual Languages

Herbert W. Franke

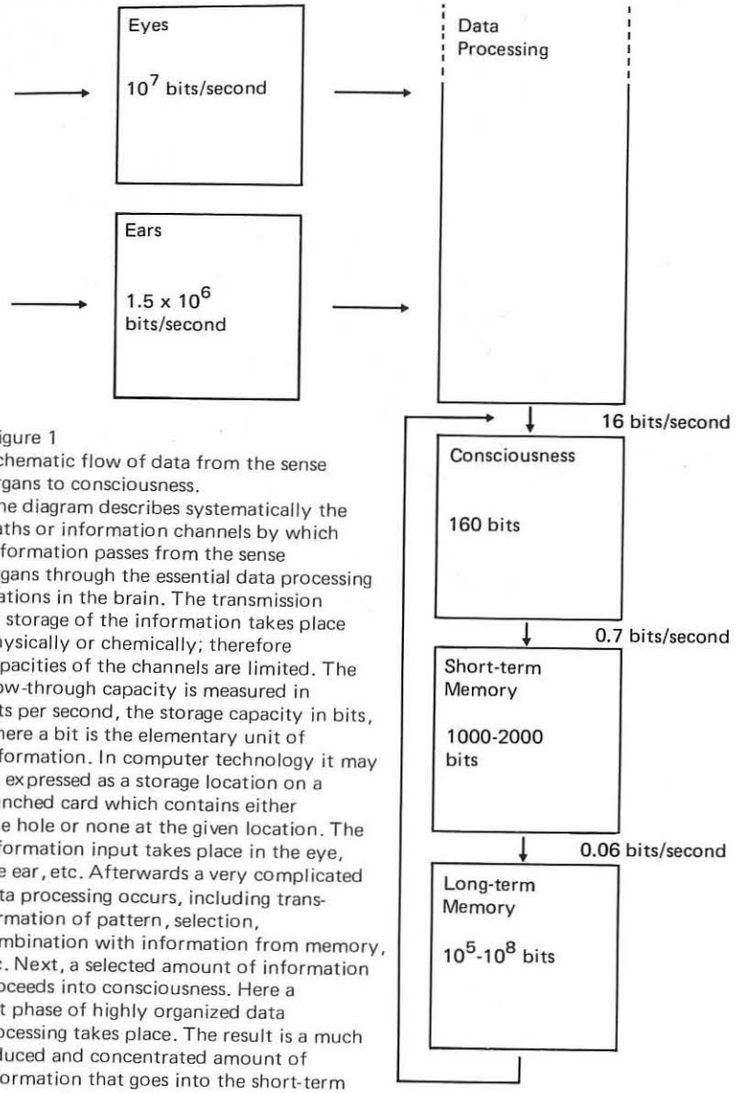


Figure 1
Schematic flow of data from the sense organs to consciousness.
The diagram describes systematically the paths or information channels by which information passes from the sense organs through the essential data processing stations in the brain. The transmission or storage of the information takes place physically or chemically; therefore capacities of the channels are limited. The flow-through capacity is measured in bits per second, the storage capacity in bits, where a bit is the elementary unit of information. In computer technology it may be expressed as a storage location on a punched card which contains either one hole or none at the given location. The information input takes place in the eye, the ear, etc. Afterwards a very complicated data processing occurs, including transformation of pattern, selection, combination with information from memory, etc. Next, a selected amount of information proceeds into consciousness. Here a last phase of highly organized data processing takes place. The result is a much reduced and concentrated amount of information that goes into the short-term memory. Part of this may eventually enter the long-term memory. (The figure is redrawn from the work of H. Frank, 1962).

Increasing insights into scientific and technical processes oblige us to contemplate highly complex relationships and to respond to them logically. Such a registration does not merely restrict itself to a more or less complete description; essential for the use of scientific materials is also its verbal-visual codification, i.e., an adaption to the organization of the human processes of perception and thinking (Franke, 1970). The basic rules for a visual language which can mirror the realities of such knowledge are provided by the principles of psychology oriented toward information theory.

Fundamental Rules of Information-Oriented Psychology

In every linguistic utterance lie semantic contents in a codified form. The addressee—the receiver of the news—is given the task of accepting and of deciphering the code-presentation which is put before him. Every practical linguistic system must be adapted to the addressee in order that he can deal easily with the reception as well as with the decoding of the message. One must here distinguish between the physical and psychological conditions (Franke, 1962). The physical requirements must be fulfilled by choosing favorable reproduction conditions adapted to the eye and to the ear: sound and light intensities, as well as frequencies, fluctuation-variances, contrasts, etc. The psychological suppositions, which have been investigated only recently, concern the information channel, the storage, and the input capacities of the brain. In the following study, these aspects of communication are examined as they relate to consciousness and to short- and long-term memory (Franke, 1975) (Figure 1).

For the decoding of linguistic communication, the information path from ear or eye to consciousness is decisive. The striking difference between the information received by the sense organs and by consciousness reveals that perception is a special kind of data processing. In this process it is essential to organize, to select, and to transform an excess of detailed information so that into consciousness arrive only the essential contents in an optimally coded form. This (unconscious) data processing takes place according to previous knowledge, i.e., to known conceptions, connections, evaluations, associations, etc.

Essential differences exist in the sequence of data processing, depending upon whether there is required a decoding of (linearly-coded) verbal texts, or two-dimensional representations, or of three-dimensional images. In particular many difficulties in the interpretation arise if the data processing requires that one reconstructs correctly in the imagination multi-dimensional relationships (for example, spatial connections) that are presented only in a verbally coded form. In such cases the question of visual language becomes especially important. For the situations just mentioned the conditions of information-oriented psychology are also valid, although in a correspondingly changed format. Visual languages should be drawn up and used in such a manner that they may be easily taken in and that the positions codified by them are optimally to be recognized. Of

Figure 2
Elements of graph theory are illustrated. Connections between elements are marked by arrows. The drawing represents the most important possible qualities of graphs.

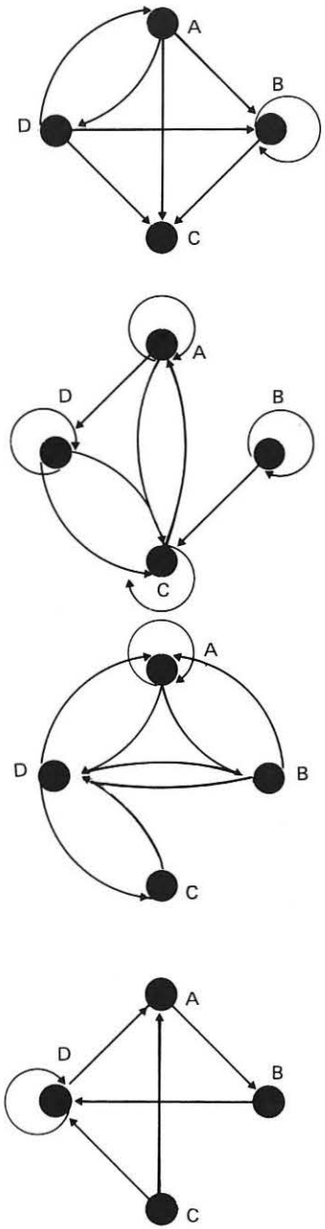
Transitivity (top): If (A,B) and (B,C) belong to the graph, then (A,C) belongs to the graph.

Reflexivity (top middle): The graph contains all pairs (A,A), (B,B), etc.

Symmetry (bottom middle): If (A,B) belongs to the graph, then (B,A) belongs to the graph.

Asymmetry (bottom): If (A,B) belongs to the graph, whereby A is different from B, then (B,A) does not belong to the graph. Symmetry and Asymmetry exclude one another.

(Redrawn from E.H. Graul and H.W. Franke. Die umbewaeltigte Zukunft. Munich: Kindler Verlag, 1970, p. 80.)



particular importance is the fundamental rule that all information must be structured into information parcels which do not exceed 160 bits of subjective information.[1]

The reason for that is simple: 160 bits is the maxim amount of information which can be simultaneously present in consciousness. If the complexity of a phenomenon or of a process demands a description of more than 160 bits, it is necessary to divide the description into several parts of smaller complexity. The complexity of certain statements is not the same for everyone. If one has a better information base or a better language, it is possible to describe the same facts with a smaller expenditure of symbols. Therefore the information content in this sense is not an absolute one, but a relative quantity proportional to qualities of the receiver. This quantity is measurable through testing methods, and one obtains the "subjective information" content which changes from person to person (Frank, 1962).

Consequences for Linguistic Expression

Many messages with which we must operate consciously greatly surpass the maximum information capacity of consciousness: 160 bits. However, man possesses routines for handling such overflows of complexity, and these are reflected in the structure of his language. In it the capability of abstraction, the concentration on certain classes of information, and the temporary neglect of others play a very important part. With the help of language it is possible to pick out partial aspects and to deal with them sequentially one after another.

The use of normal verbal language obliges one to perform another reorganization. Every information parcel must be transformed into a linear order conforming to the acoustic reproduction in chronological order or as printed in line-order. In principle, every order may be described with a sequence of linear signs, but some arrangements of such a description are more or less practical. Multi-dimensional concrete poetry is not considered here because it does not belong to the sphere of everyday communication. The predominance of linear verbal forms in everyday speech, in scientific descriptions, and in education introduces a natural preference for certain types of order, e.g., chronological, hierarchical, and causal rules. Because language is also biologically closely connected with our mode of thinking, our inclination for chronological and causal-oriented questions and descriptions is explicable as well as our propensity towards hierarchical organization structures.

Yet in our world there are also other basic relationships of importance, not the least of which are two- and three-dimensional topological relationships. It is well known that these are very difficult to grasp verbally. The most favorable manner of presenting such concepts is the picture. Therefore very different means of reproduction of information have developed, for example, the mapping of two-dimensional connections within a geographical area, the perspectival representation of spatial facts, and the sectional drawing of a coordinate space.

Reception with the eye has two considerable advantages. First, the eye is adapted to decode two- and three-dimensional environmental

structures as no other sense organ. Secondly, this sense organ is capable of taking in larger quantities of information than all other sense channels combined. These capabilities are by no means exhausted in reading the written script of linearly arranged text symbols.

Description through more or less schematized picture is the kind of applied visual representation which is primarily used in special fields of inquiry. In topology, geometry, stereo-chemistry, biology, and other disciplines of modern science and mathematics, non-linear conceptual systems gain much importance. To modern knowledge belong such imageable concepts as reciprocity effects, feedback, cyclical functions, and complicated network relationships. These are particularly fundamental to all activities of regulation and communication in the most general sense of the terms.

Our thinking, if limited to linear speech, tends to overlook or to neglect these relationships. Yet there is a need for new, more adequate means of expression to facilitate and strengthen our grasp of reality. One available means is the use of languages which are based on picture-symbols with which one may register two or more dimensional states. Contrary to descriptions of reality by photographs and other such pictures, one is not concerned in these cases with the problems of iconic signs. Much more abstract visual schemes are used which must be just as flexible in the description of network order as is speech in the description of linear order. An inventory in the realm of scientific symbolism shows that several visual description systems are already in use that offer possibilities for further application beyond their more narrow and special usages. Two systems are pre-eminent among these: graphs and Venn diagrams. By means of graph symbology, one describes one-directional or bi-directional connections between things, for example, the influence of A on B or of B on A (Figure 6). The Venn diagram is a symbol for a set; it describes the connections between sets, e.g., their unification or intersection (Figure 6). These symbol systems are often employed for the display of logical-mathematical system-oriented and practical-technical tasks.

There exist extensive examinations covering both symbol systems oriented toward their possibilities and limitations in the realm of complicated professional problems. However, there exist scarcely any works that are occupied with questions of the practical use of these symbol systems for purposes of general communication. The relationship described with their help may be so judicious and clear that they are likely to be as useful, if properly prepared as are the Cartesian coordinate charts and histograms that are already ubiquitous in daily life and in education. Initial signs of their increased use already exist.

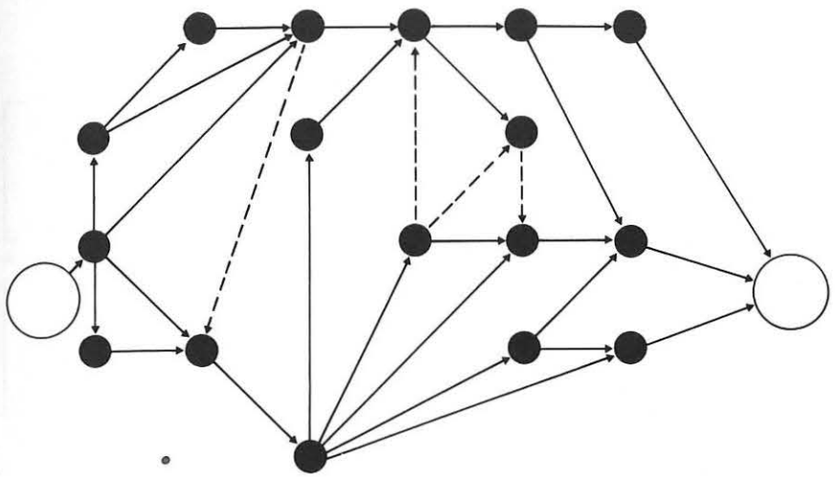
Aspects of Use

The examples shown in this article indicate how natural, generally understandable picture-symbols that follow the visual logic of graphs and Venn diagrams may be created for use in descriptive diagrams (see Figures 2–9).

The usefulness of visual languages can be measured according to the principles of psychology related to sensory apparatus and consciousness which were mentioned above. The choice of the symbols is dependent upon whether they are easily recognizable,

Figure 3
A sequence of discrete administrative steps leading to a merger according to principles of graphing. The operations are reproduced with arrows, interim aims by circles.

Figure 4
A cyclical process is presented in graph form.



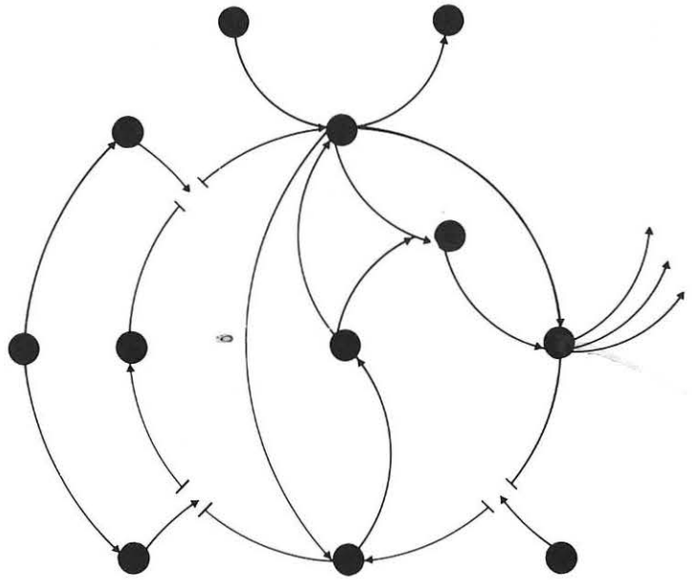
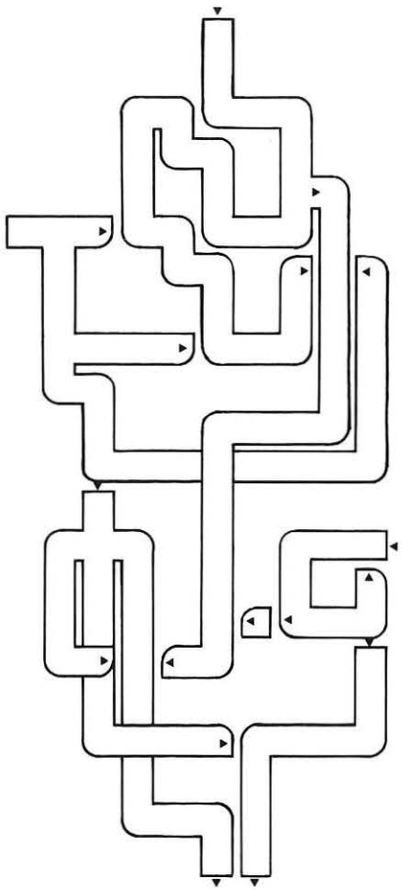


Figure 5
A production flow chart shows the use of graph presentation.



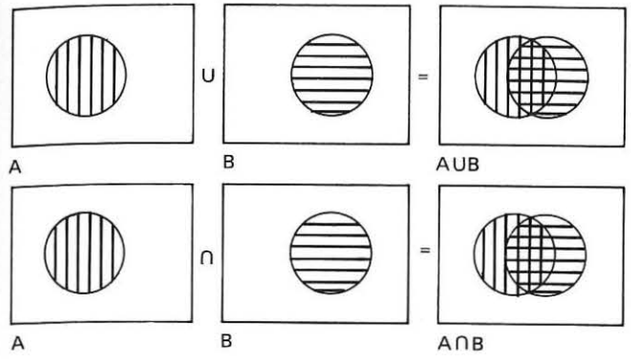
easily distinguished, sensible, and capable of taking on meaning. These are qualities that graphs and Venn diagrams readily exhibit. Graphs are based on the familiar arrow symbol, which is clear as a guiding element and as a means for suggesting attachment. In terms of Gestalt theory, Venn diagrams are excellently suited for presentation of boundary, inclusion, and content. As such they are fundamental for the logic of classes or set theory.

The visual means by which complex relationships are shown with the help of organized elements must be prepared according to the principles of maximum clarity. Among the requirements of the psychology of the senses one must above all respect those of information-oriented psychology: the subjective information and complexity of the individual symbol-configurations must not amount to more than 160 bits. As with verbal language exact measurements are scarcely necessary. An approximate examination of their apprehensibility is sufficient.

Considerations of the problem of visual languages have arisen recently as visually oriented communication media have gained importance. Only with these means are we able in practical terms to draw real consequences from insight to necessity. Film and television are not confined to reproduction of pictures; they may also be employed to convey content expressed with the help of visual languages. An essential element is the computer as a means of programmed assistance to the translation of ideas into graphic form via mechanical plotters and electronic displays. Just as the alphanumeric symbol can be combined into computer-controlled texts, so

Figure 6
The formation of combination and intersection is illustrated by Venn diagrams. (Redrawn from: Rolf Lohberger. Wir programmieren weiter LOGICUS - Zusatzset. Stuttgart: Franckh-Verlag, 1972, pp. 94-95)

Figure 7
The law of associativity for sets is presented by Venn diagrams. (Redrawn from Walter R. Fuchs. Eltern entdecken die neue Mathematik. Munich-Zuerich: Droemer Knaur Verlagsanstalt, 1970, p. 98.)



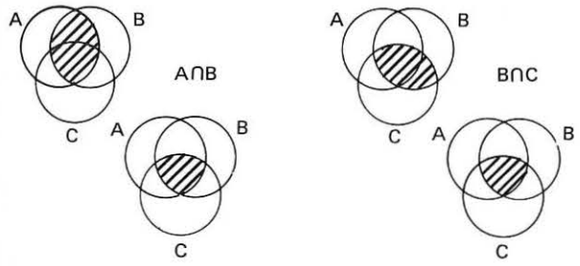


Figure 8
An attempt to illustrate a computer center uses a combination of graph and Venn diagram techniques. (Simplified and redrawn from Martin F. Wolters. Der Schluessel zum Computer. Duesseldorf und Wien: Econ-Verlag, 1969, p. 565.)

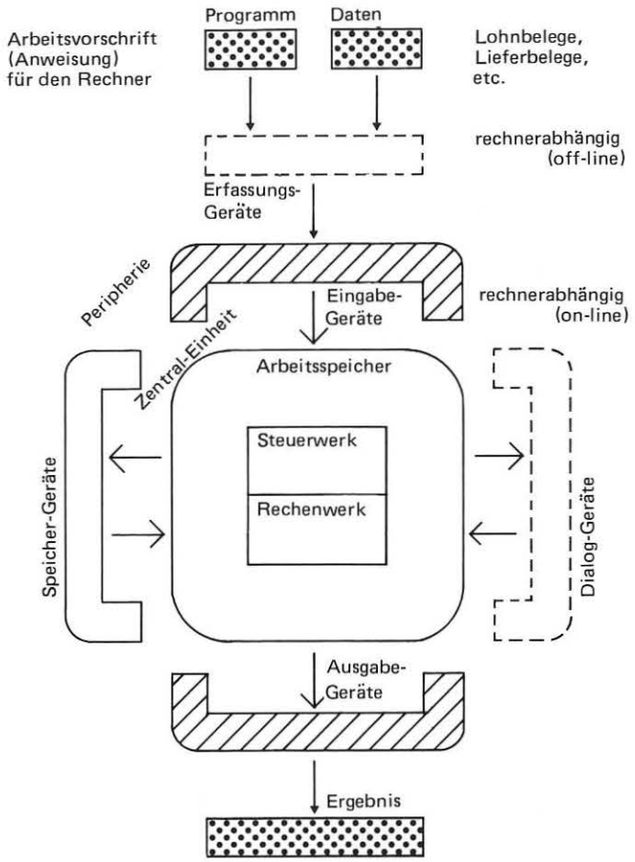
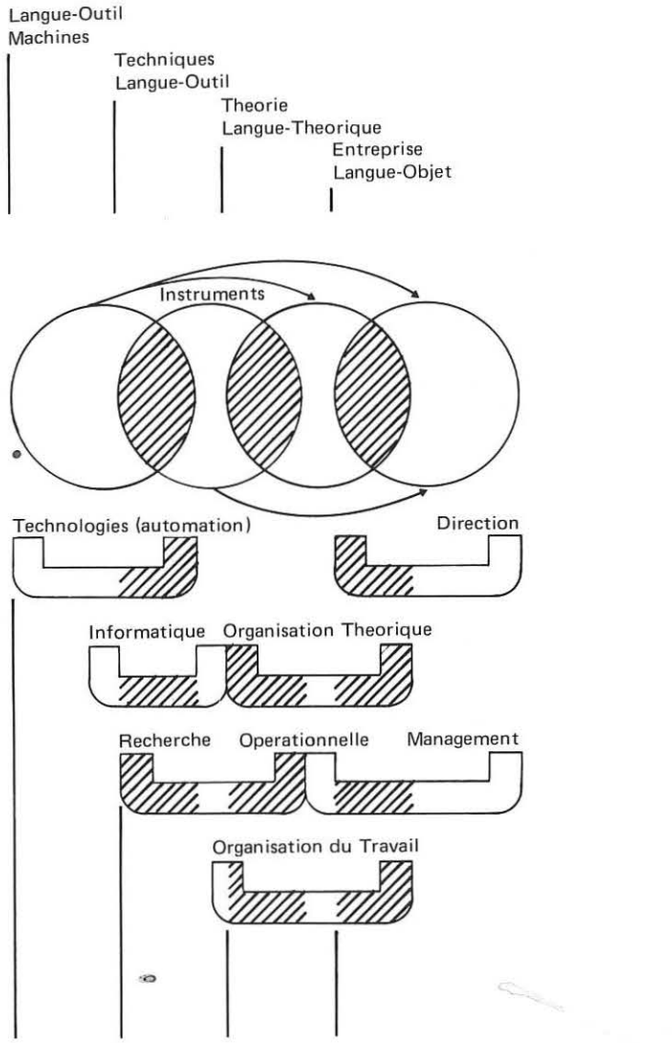


Figure 9
The process of science, technology, and application is shown by a combination of graph and Venn diagrams. (Redrawn from B. Lussato. Introduction critique aux theories d'organisation. Paris: Verlag Dunod, 1972.)



graph and Venn diagram symbols might easily be combined by programs to create totally new graphic texts.

Only a few years ago the author of a book on chemistry could still boast of having succeeded in writing his text without illustrations. Today the creation, through neglect, of such barriers to understanding and imagination would be no cause for pride. In the future audio-visual world an equality between text and image in information transmission will be a matter of course not only out of economic compulsion, but also in response to the current realms of thought and problem solving.

People are prepared for a new dimension of visible language by illustrated magazines, film, and television. Even in comic books one can find complex activities of visual communication which are by no means as simple as some theorists maintain. In a dozen grames of a cartoon series, occurrences are expressed whose narrative description might require a whole chapter of a novel. Even youngsters have little difficulty in understanding this form of information which often contains relatively complex action patterns, conflict situations, social interdependencies, etc. The use of quite general, easily understandable visual symbol languages should not be confined to comics.

Language, thought, and action are connected in a complex feedback system. Therefore, the step toward a more visual visible language will have an influence on thinking and acting. One may hope that this development in the direction of visual thinking will lead to a more beneficial, augmented clarity of thought and to a better understanding of the abstract connections of the modern, technical world.

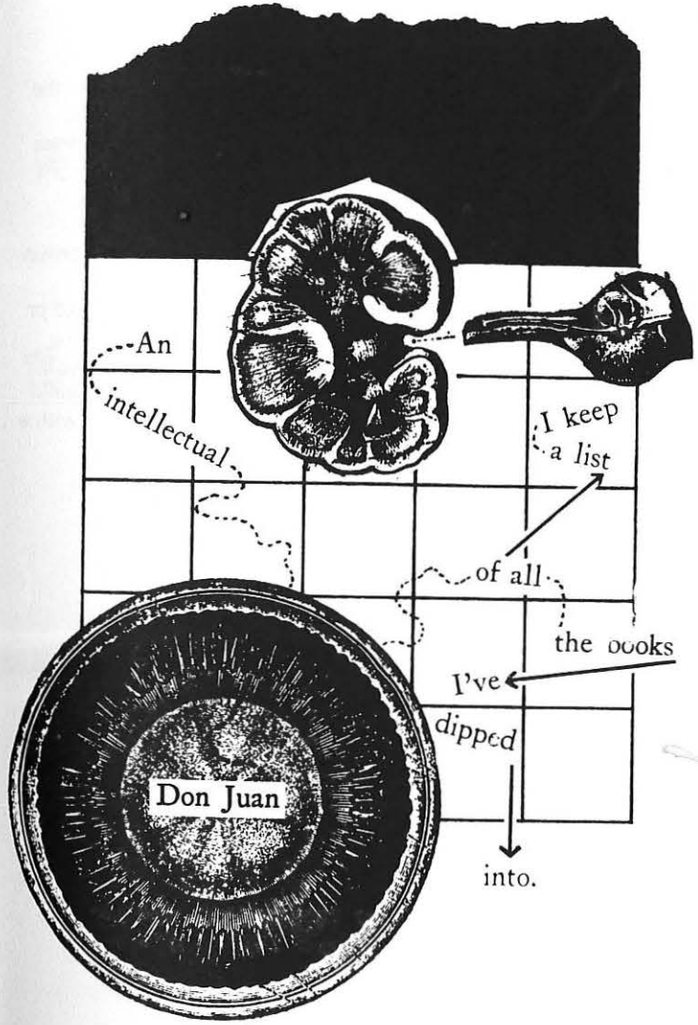
Notes

1
The most important element shown in Figure 1, a diagram of information channels from the sense organs through data processing stations in the brain, is that of the input capacity of consciousness. As determined by different measurements, its value lies approximately between 8 and 25 bits per second. A probable value adopted by H. Frank is 16 bits per second. Note that this input capacity accounts for the sum of the information flowing through all sensory channels as well as the information being brought from memory. Usually if one concentrates on an auditory process, the information flowing through the eye is restricted, or if one tries to quote material from memory less information is at one's disposal from the external world.

It is very difficult to state how much information consciousness is able to accept; there exist only estimates. For instance, one may rely on the so-called duration of present time, about 10 seconds (H. Frank, 1959). It is possible, for example, to remember the text of linguistic expressions or of a musical phrase if it does not date back more than 10 seconds. Also extremely instructive is the fact that one is able to count unobserved strokes of a clock after it has been removed, but only for approximately 10 seconds. Taking into account these and similar considerations, one may estimate the following value for the storage capacity of consciousness: if within 10 seconds 16 bits enters, then 160 bits are accepted. If more information enters, part of the storage capacity must be given up or extinguished. The sum of 160 bits is not precise but is sufficiently accurate to allow one to draw qualitative conclusions having importance for investigations of cognitive processes as well as the structure of human language.

To the Sincere Reader
Nelson Howe

One of fourteen diagrammatic images from To the Sincere Reader, a book created as a scored performance by Nelson Howe, with poetry by Keith Waldrop. The book is published by Wittenborn and Company (New York, 1969), and the reproduction appears with permission of the publisher.

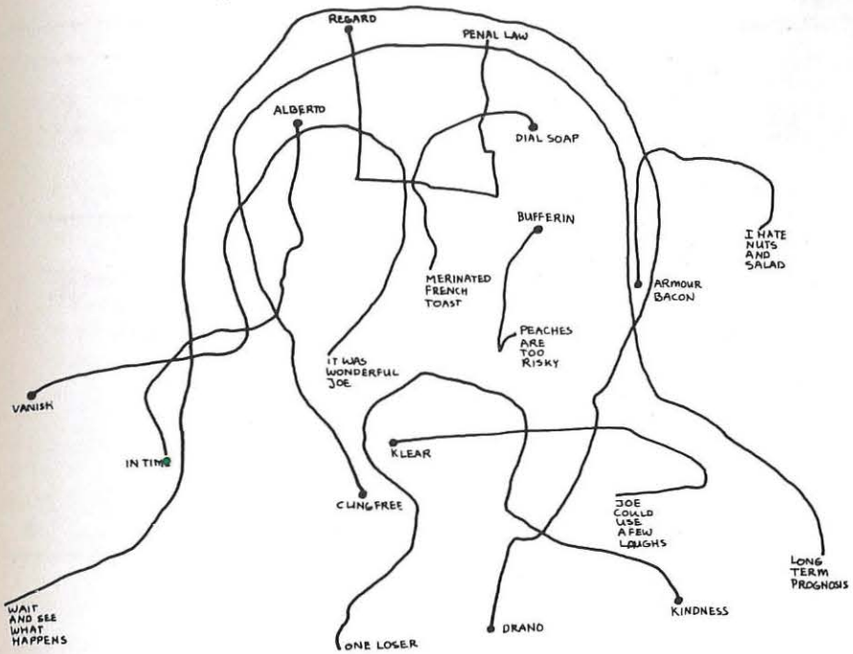


Documentracing concerns the documenting of a real time-space event or object (television, printed matter, etc.) through the collecting of fragments (tracings) in a programmed manner. The game-like process of confronting the program's constraints with the selection of images has a true life of its own in that it forces constant change in the chance juxtaposition of symbols. The traced words and images (as a semiotic) of a verbi-visual quality are brought together into a new, meaningful statement through the program's syntactical qualities. They leave an impression of the inherent character of the traced object/event/space. The results are much like the impressions left within us by the fragmented signals from our environment.

The TVdocumentracing in Figure 1 involves the documenting of television programs. Lines were traced directly from the (kinetic) screen, and words were selected programmatically from the audio portion. In the figure, the number of commercials for a 30-minute program determined the number of lines selected, with an additional "text" selected from the program following the selection of each line.

In Figure 2, the Documentracing: Printed Matter involves the documenting of a particular publication. Again, all objects were spontaneously approached within the constraints of an applied program. There were no predetermined themes and all pages were "read" from front to back (covers always included).

Single "units" (one symbol or a group of related symbols) were usually selected from each page and traced or cut out, always maintaining their original spacial position. In Figure 2 double-page spreads from the last issue of Life magazine are used, with a single symbol "unit" per page.



Visible Language, XI 2 (Spring 1977). Author's address: Rhode Island School of Design, Providence, RI 02903.

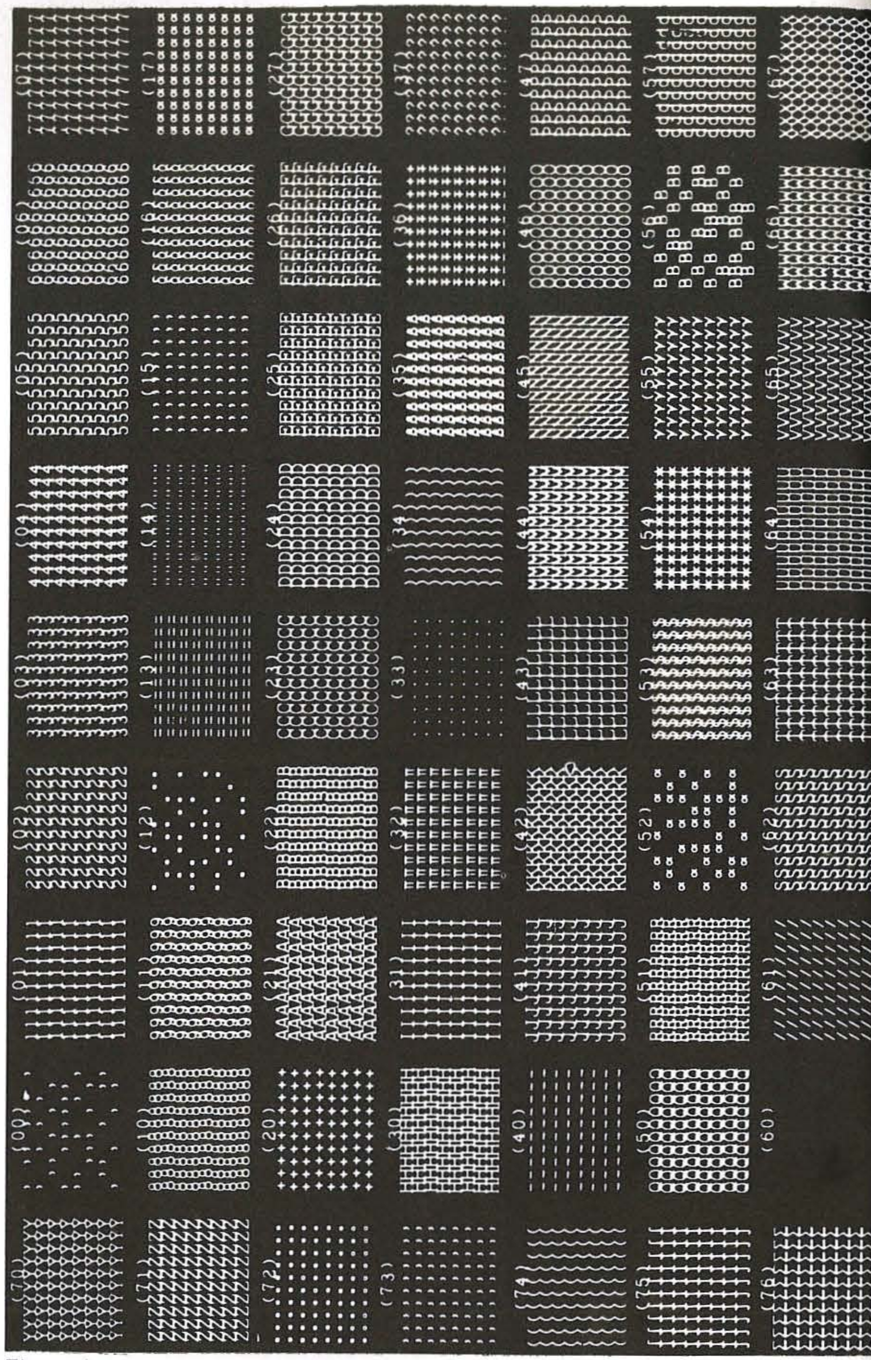


Figure 1

Computer-Produced Grey Scales
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Ken Knowlton and Leon Harmon

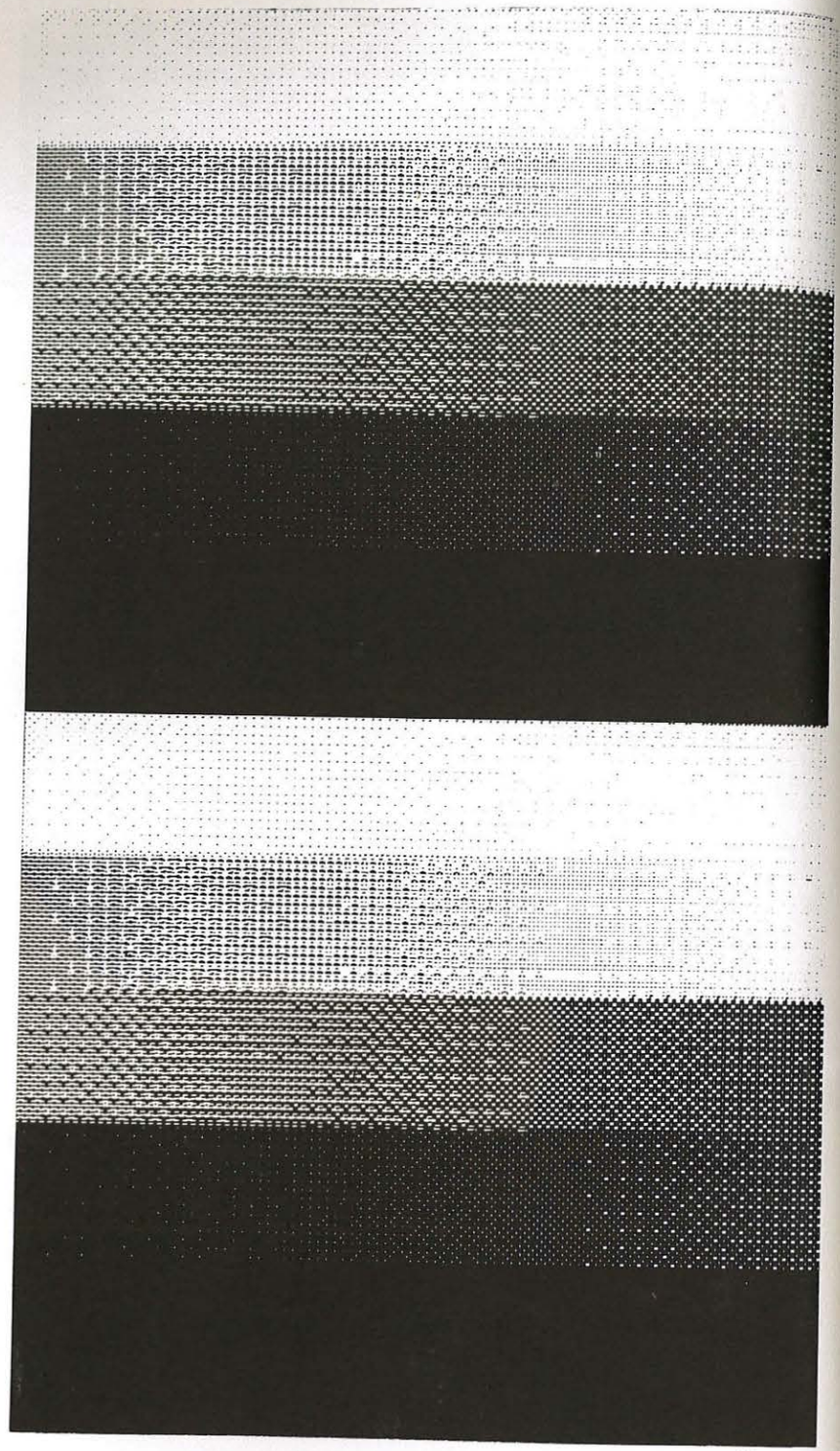


Figure 2

Introduction

- Black-and-white halftone or textured pictures are usually microscopically black or white at a point, owing to the physics, chemistry, or mechanics of the processes by which they are normally made or reproduced. Computer-produced pictures are also black or white at a point, largely because of the film and machinery used. Constraints of speed, resolution, cost and cathode-ray-tube technology have tended to make available mainly binary processes. Hence dots or stencil-extruded characters on microfilm are the most common output format.
- Various techniques have been devised to obtain multilevel presentations using two-level reproduction apparatus. One of the earliest of these uses the different sizes and shapes of alphanumeric characters to provide different grey levels when viewed distantly. When this technique is combined with overstrikes (super-imposed printing), many brightness values can be obtained [12].
- A single element—the dot—can be used in clusters defined by software-coded patterns to render halftone pictures, provided that an appropriate black-to-white ratio is obtained for every "unit area" of the picture [5,14]. We define unit area as that subarea of the picture plane within which no picture detail is required and sufficiently small such that, upon viewing, its average brightness is perceived.
- When relatively small numbers of brightness quantizing levels are used, objectionable contours often become apparent. The use of deliberately introduced noise to break up these contours was pioneered by W. M. Goodall about two decades ago [4]. It was later found that with suitable coding, pseudo-random noise can be used to break up quantizing contours to give results comparable to those obtained with three times as many levels [13]. In effect, deliberately introduced noise causes fragmentation of monotone areas locally while preserving the appropriate average grey level over a neighborhood. In this way the few densities available are feather-edged to make density transitions less sharp; this gives the illusion that the picture has a much larger number of quantum steps. When combined with an overstrike range of eight (i.e., allowing a character to be struck up to eight times), this procedure allows a conventional line printer to yield extremely smooth results [11]. Similar techniques have been applied with excellent effort to microfilm printers [14].
- This paper presents the results of some of our own efforts toward achieving grey values. Using the basic ideas of micro-pattern selection and interpolated noise, these techniques demonstrate several new ways to obtain smooth density scales with straightforward application of existing hardware and some novel software techniques.
- We limit our investigation to situations in which space is discretely quantized in two dimensions into cells; these are the unit areas mentioned above. We shall refer to the smaller structures filling cells as "elements." These elements in all instances are either dots or characters defined by the machinery used. The grey values that we have employed constitute in most cases a small set, usually eight or sixteen. Of course, here, as in all other procedures where final grey-scale representation is obtained by using clusters of picture elements, spatial resolution has been traded off for brightness resolution.
- The aims of these experiments have been to develop expertise in the computer processing of pictures and to experiment with novel and artistic effects. With such experiments, some intriguing questions about

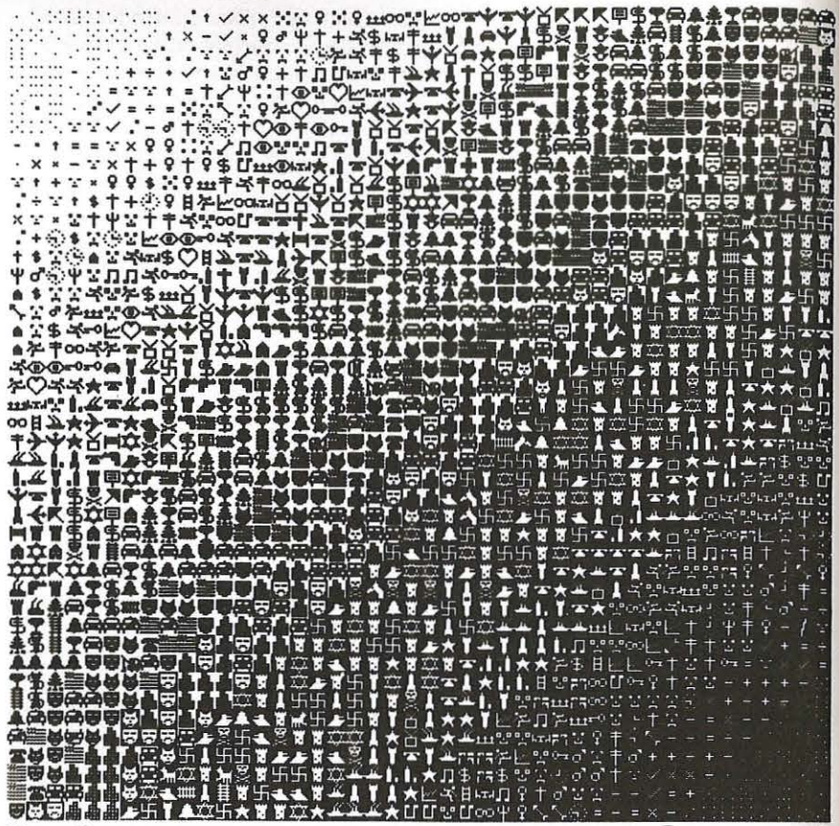


Figure 3a

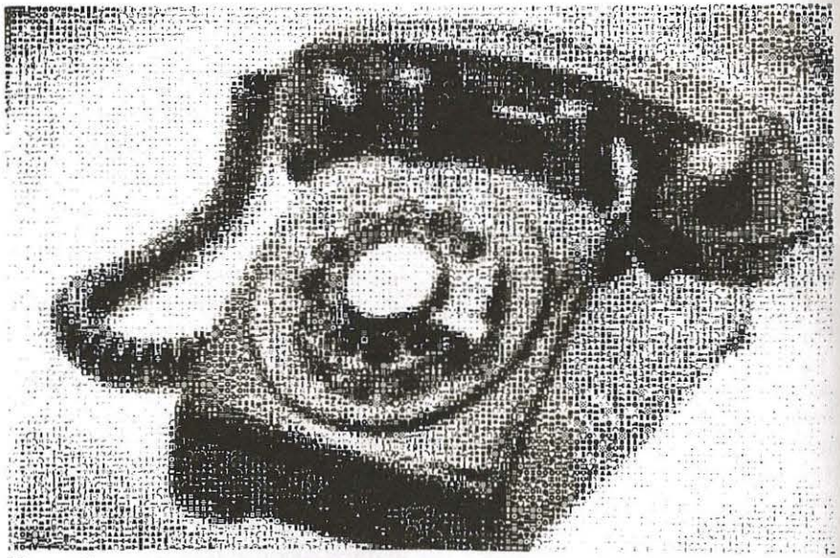


Figure 3b

human visual perception emerge, though no attempts to answer them are reported here.

- The hardware used for all the work described below has been either the Stromberg Datagraphic 4020 or 4060 microfilm printer. The software used was a language for making movies, the BEFLIX system [8] and its variants [9,10].

Textures and Grey Values From Hardware-Defined Elements

- A Charactron tube such as the one **used in an S-D 4060 provides a large number of distinguishable elements—the individual characters—which may be used to form pictures or textures. Figure 1 shows many of these characters and demonstrates both the textures (when viewed close up) and the different grey values (when viewed from afar) which may thus be achieved.**

The use of a few characters to achieve effectively many grey levels is extended by the technique demonstrated in figure 2 [6]. Here seven different characters (including blank) are used to achieve several dozen levels. The scheme is as follows: A photo or other initial display (in the demonstration, simply a folded grey wedge) is first divided into "supercells" of 4x4 cells each, and a regular "noise" pattern is added to the original brightness values, the peak value of the pattern being set equal to one brightness step. (The regular noise pattern is **better than random or pseudo-random noise because it avoids the large noticeable clumps which the latter introduces. One pays for this, of course, by the introduction of regular structure.)**

- **The result of this process is that high contrast detail (i.e., that which is defined by brightness differences of more than one level) is preserved at cell-size resolution, since cells are processed individually except for the small values added before** quantization. But areas distinguished from each other by less than a brightness level (but more than one-sixteenth of a level) can also be seen as different because, on the slightly brighter side of a subtle demarcation, one or more cells of a supercell are made to fall above a basic quantization threshold while the corresponding cells on the dimmer side remain below the threshold. In principle, one should therefore expect to be able to detect 96 grey values in figure 2 (six **fundamental transitions divided into sixteen steps each); whether this many distinct levels can actually be achieved is a question of hardware and photographic control.**
- **It should be emphasized that, in the above procedure, cells of a supercell are treated separately—the character printed in each position is determined by the original brightness of that cell, and also by its appropriately shifted threshold. Thus, a thin black line across the** picture would blank out only a few cells of each supercell that the line traverses. Likewise, a high-contrast step which cuts across supercells may be perceived with high spatial precision, as are in fact the horizontal divisions between the four parts of figure 2. Furthermore, the numbers added within a supercell are scattered so that the more pronounced the contrast is between two areas, the fewer are the cells over which the eye must ultimately "average" the **resulting brightness in order to detect the difference.**

Grey Values and Textures From Software-Defined Elements

- **In the above examples the various grey-scale manipulations depend principally on available hardware elements (dots or characters) arranged in rather simple, regular ways in cells. This section includes examples where more elaborate software manipulations are employed to obtain a richer variety**

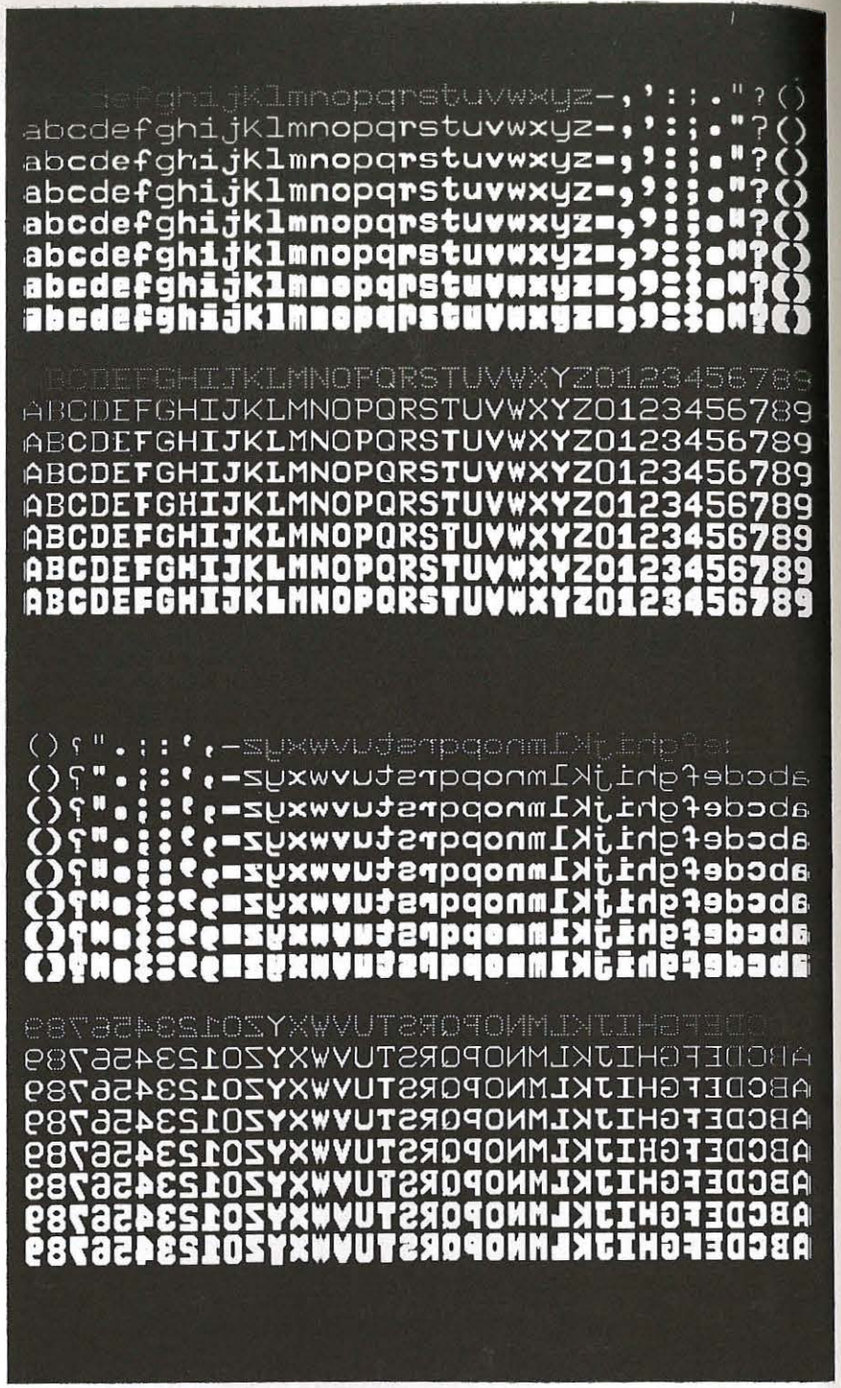


Figure 5a

of outputs. By exploiting the flexibility of programmed picture transformations, one can obtain results that are not so constrained by hardware limitations as are the earlier examples we considered. Not only is there an increase in the variety of the available character set, but new operations are made possible such as orientation change and complementation. With easily programmed manipulations like reflections and changes in connectivity, novel perceptual and artistic effects can be achieved. The following examples illustrate some of the variety obtained in grey-scale manipulations by using software-defined elements. •

• Figure 3a shows how a sixteen-level grey scale can be synthesized with appropriate numbers of dots used to form recognizable micro-patterns in minute (11 x 11 dot) matrices. Figure 3b came from a photo which, after processing to obtain such a grey scale, is represented by 11,616 (132 x 88) cells. The computer, after noting the required level for each cell, selected one pattern at random from the available patterns for that level (up to fourteen for some levels, as few as five for others) and drew it. For visual interest, a pattern was sometimes reflected or rotated 90° as determined by probabilities specified for that pattern [5]. In figure 3b the micro-patterns are formed by 15 x 15 dot matrices.

In each of these pictures, rather surprisingly complicated "Gestalt" images are obtained from small amounts of information. The 11 x 11 matrix has only a few times more resolution than is commonly accorded alphanumeric characters. Yet in figure 3a much more complex images can be plainly perceived.

Figure 4 is another photograph similarly spatially quantized, this time on a single frame of 35mm film by means of a high resolution version of BEFLIX capable of drawing black-and-white dot pictures up to **1024 x 1366 dots in size [9]. The very different appearance of this picture from figures 3a or 3b results from the nature of the 12 x 12 micro-patterns—they are small maze-like units, whose lines are two slots wide, designed to match up with their neighbors so as to form large combinatoric structures. This picture consists of 112 x 45 cells quantized into thirty grey levels.**

• A final example is presented in figure 5—a "picture story" which is a legible text when viewed from nearby and a high-quality photograph when seen from far away. This is similar to the text-picture produced by M. R. Schroeder

[14], but where that process used overprinting to obtain grey scale, this process uses dot occupancy and character shift, as follows:
The elements were taken from the seven-font grey-scale alphabet shown in its entirety in figure 5a. Here each letter is defined by dot occupancy in an 11 x 19 matrix, numbers for the seven levels having been set arbitrarily at 32, 50, 69, 89, 110, 132, and 155 dots. The text for this picture was prepared carefully to be exactly 64 lines of 73 characters each, not counting spaces (achieved by judiciously inserting or deleting commas, etc.) Then appropriate forms of the designated letters were positioned with an average horizontal spacing of three units and a vertical spacing of two (giving therefore a 14 x 21 unit area). Spacing between words was achieved by squeezing together the end letters of words as follows: single-letter words—no repositioning; two-letter words—each letter moved one unit toward the other; three-letter words—each letter moved two units; four-letter words—end letters moved in two, next-to-end letters in one.

- With only seven levels, straightforward quantizing leads to the unnatural steps and plateaus previously discussed. The effect of smoother-than-seven level quantization of figure 5b was achieved by a technique for graduated transition between levels similar to that illustrated in figure 2.

Summary

- There are many ways to achieve results which subjectively approximate continuous-tone photographs using binary output. In each case the processed picture must be viewed from far enough away for the eye to achieve sufficient spatial integration. Interesting and artistic effects often result when the familiar dots of halftone screening are replaced by deliberately more complete patterns or structures. A tabulation of computer-generated or processed pictures of this paper appears in Table I, together with the significant parameters that pertain to each.
- Intriguing questions still remain—how we perceive what we perceive is not clear. In figure 3b, for example, the dial holes are perceived as quite round at a distance. When these details are examined closely, however, they "disappear" or lose their character or identity almost mysteriously. Either of two (or perhaps both) possible mechanisms may be involved—low-pass filtering of spatial frequencies (sizes of details), or interpretation in accordance with prior experience. According to the first explanation, it would seem that at moderate distances the visual system filters out the fine details that are irrelevant for its purposes, whereas with close viewing, those details (which now subtend larger visual angles) somehow overwhelm this filtering capability (that is, high-contrast details of optimum size cannot be sufficiently ignored in order to recognize larger structure subtly presented).
- The second explanation for these phenomena is that we may recognize the overall object or setting and then process smaller structure largely in terms of our expectations—for example, we may first recognize the object as a telephone (figure 3b) and then "see the finger holes as round because of past experiences with actual telephones.
- One of the earliest to point out the power of the eye to "see" more than it ought was Selfridge [15, figure 8]. More formal essays to explore recognition of low-information spatially quantized patterns [2,3] also indicate that much lies in the eye of the beholder. Extensive discussion of similar considerations can be found in a recent monograph by Julesz [7]. This intriguing topic requires extensive investigation in order to achieve satisfactory elucidation. Given the presently strong and growing emphasis on graphical and pictorial displays, our technology could benefit considerably from that understanding.

- We acknowledge with appreciation the helpful critical comments on an early draft by M. E. Harmon, A. B. Lesk, and A. Rosenfelt.

Table I
Summary of computer-generated or computer-processed pictures described in this paper. All examples were produced by Stromberg Datagraphics microfilm printers.

Figure	No. of Characters*	Cell Size	Raster Size	Levels of grey scale
1	59	1 x 1	126 x 92	59
2	6	1 x 1	252 x 184	96
3a	1	11 x 11	504 x 504	16
3b	1	15 x 15	504 x 504	16
4	11	12 x 12	1024 x 1366	30
5b	1	14 x 21	1024 x 1366	7

*not including blank

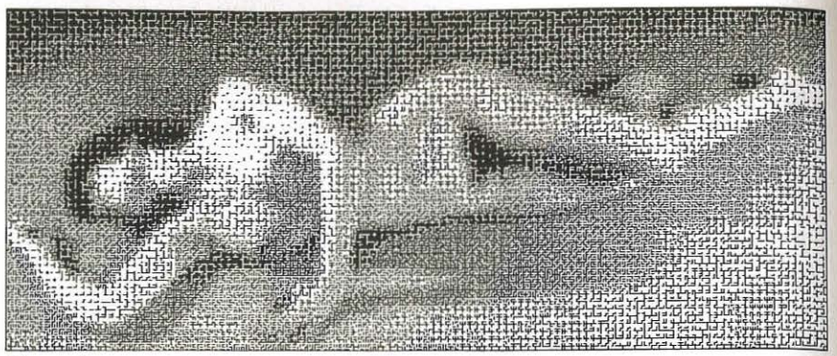


Figure 4

Figures

Figure 1
Some characters producible on S-D 4060, octal codes by which they are referenced, and textures which each produces when used to fill an area. These characters are used by the TARPS language in which four codes are used to designate 50/50 probabilistic selection between certain characters and blanks. (As with all succeeding illustrations, except figure 3b, the output is produced on a single frame of 35mm film.)

Figure 2
A folded grey wedge processed by the technique described in the text and ultimately produced by the characters blank, apostrophe, quote marks, =, ±, Σ, and B.

Figure 3a
A sixteen-level grey scale consisting of appropriately designed and classified miniature patterns. Each pattern defined by dot occupancy in an 11 x 11 raster.

Figure 3b
A photograph flying-spot scanned, divided spatially into 11,616 (132 x 88) squares, quantized in grey scale to sixteen levels, then rendered in terms of the small patterns of figure 3a by using a 15 x 15 matrix. In any given level, random selection was made from the appropriate set of patterns. Entire picture was originally produced on six frames of 35mm microfilm. (Copyright 1969 by the American Association for the Advancement of Science.)

Figure 4
Another processed photograph; it consists of 112 x 45 cells. Micro-patterns in this case were small (12 x 12) maze elements arranged so as to join up from cell to cell, producing large, combinatoric forms.

Figure 5a
A seven-font alphabet of thin-to-thick letters used for "picture stories" like figure 5b. Each character is defined by an appropriate number of dots in an 11 x 19 matrix; average numbers of dots for the seven levels are 32, 50, 69, 89, 110, 132, and 155 dots.

Figure 5b
A photograph quantized and rendered by means of the grey-scale alphabet of figure 5a. The smoother-than-seven-level effect was achieved by starting with a 25-level quantization and adding two to even-numbered columns, and one to even-numbered rows, and then requantizing by uniformly mapping four levels into one. (Text is abridged form of the U. N. Declaration of Human Rights; original photograph by Richard Swanson of Black Star.)

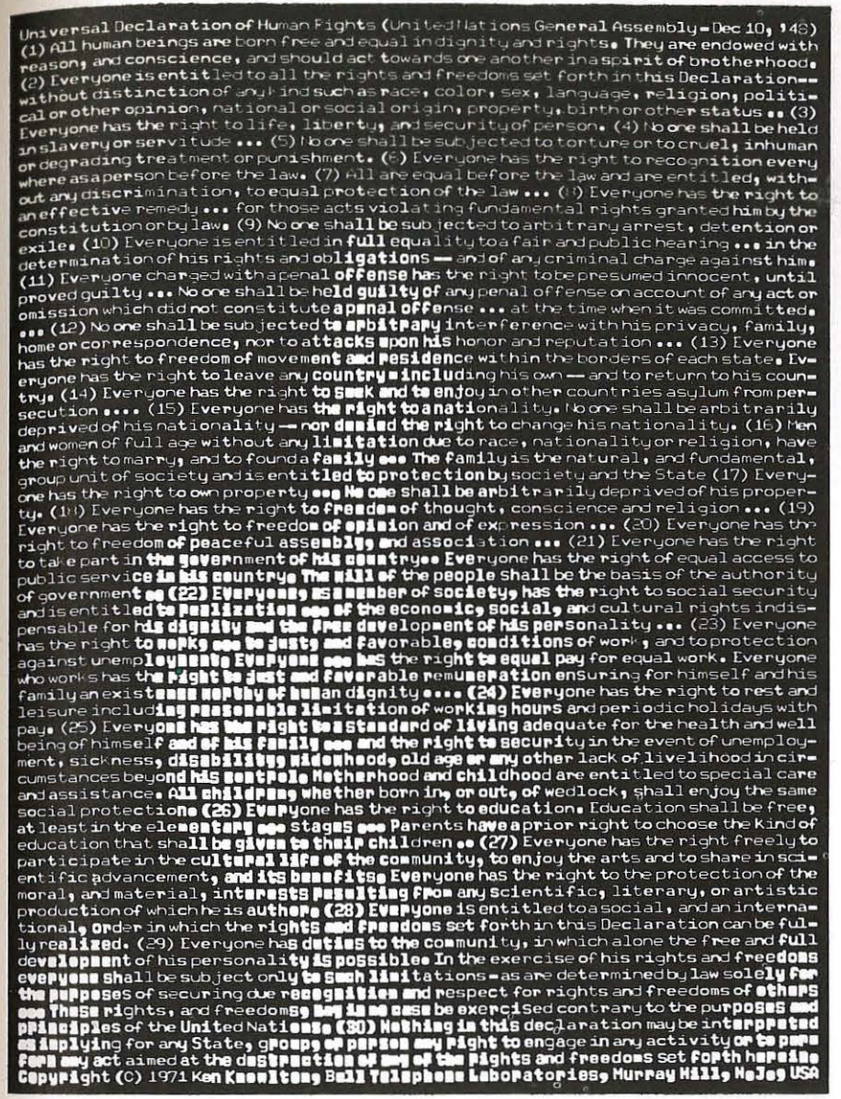


Figure 5b

Notes

1
This article is extracted from Computer Graphics and Image Processing, 2:1, 1972, pp. 1–20, and is reprinted with the permission of Academic Press, Inc.

2
In principle, one could determine 59 levels by actual measurement. They would not, however, be uniformly spaced nor would their order in brightness be reliably reproducible owing to slight changes in performance of the hardware.

Visible Language, XI 2 (Spring 1977). | © 1977, Visible Language, c/o The Cleveland Museum of Art, Cleveland, Ohio USA 44106. Author's address: Ken Knowlton, Mountain Ave., Murray Hill, New Jersey 07974, Leon Harmon, Case Western Reserve University, Cleveland, Ohio 44106.

On Numbers, a Series of Numerical Visual Poems

Richard Kostelanetz

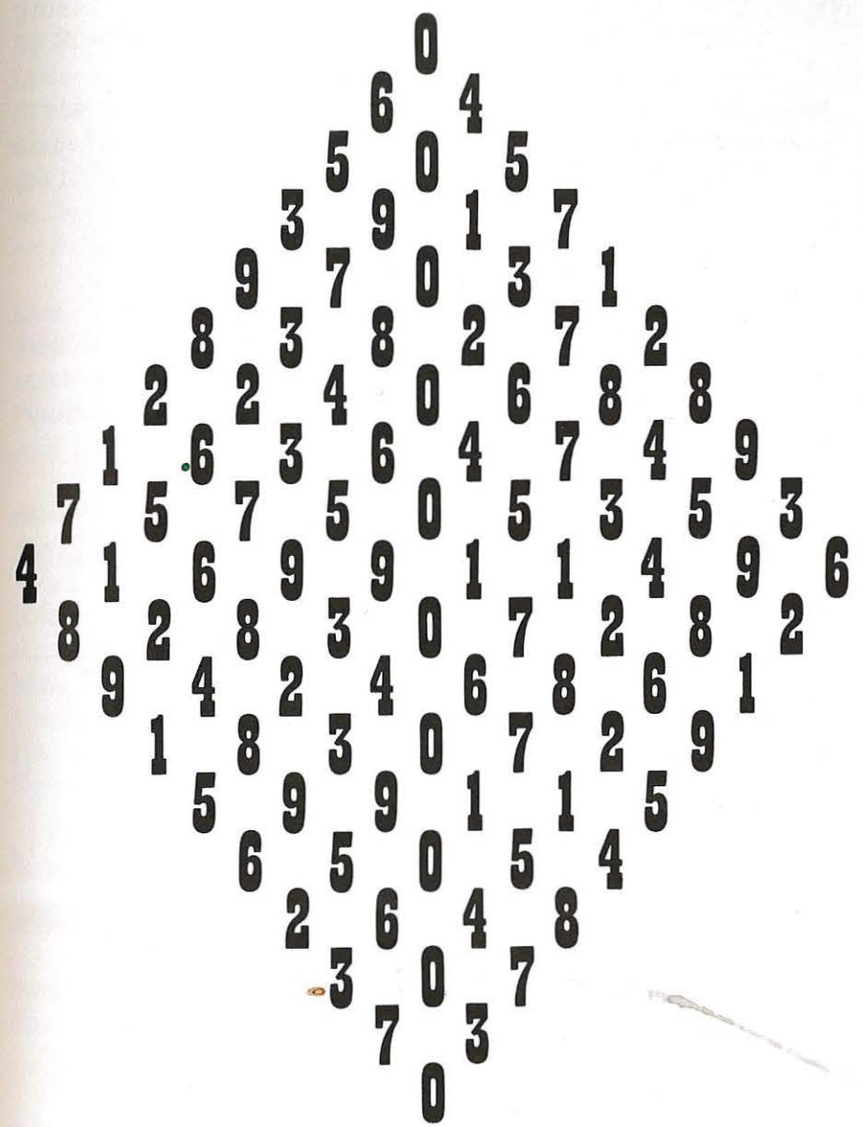
Life is full of numbers. Unless we learn how to read them--how to perceive order and meaning behind numerical relationships--we are, in certain respects, functionally illiterate. The Pythagoreans assumed that only through number and form could man grasp the nature of the universe.

The arithmetic of whole numbers includes six operations: addition, multiplication, and involution (or squaring); as well as their opposites: subtraction, division, and devolution (or extracting the square root). All of these are procedures available to numerical art. Every piece of my numerical works has both a visual form and a numerical form.

Numbers, unlike verbal language, can be read both vertically and horizontally. They are also internationally understood. Some numerical structures are simple and instantly grasped, while others can be quite complex and opaque. My own art tends to favor symmetrical and sequential kinds of order over more obscure forms; the numerical sets in my number works usually articulate an arithmetic pattern.

Numerical art requires numeracy to be understood, much as poetry depends on literacy; this is an art for people who are "numerate." Numbers is primarily a series of works about properties peculiar to numbers. Rarely do the individual works attempt to refer to anything outside of numbers. It was my intention to use nothing but numbers in all their purity.

Figure 1
"Parallel Intervals," by Richard Kostelanetz, 1974.



Visible Language, XI 2 (Spring 1977). Author's address: P.O. Box 73, Canal Street Station, New York, NY 10013.

Signs
Jonathan Price and Joel Katz

How American it is for writers to rejoice in the verbal inventiveness of ordinary people! How common to make up signs! Stephen Vincent Benet rhapsodized over lists of popularly invented place-names culled from the map; Thomas Wolfe drove his trains through every appetizing station from Asheville to Boston; Carl Sandburg hummed the hog centers, the streets, the bars, and ads of Chicago; and Walt Whitman set down the justification for us all, in arguing that the "I" is one with the "all," and appended a complete list of the names.

In fact, when the modern French writer Michel Butor came to America, he broke open the forms to encompass what he kept thinking of as "the American space." In Mobile (Paris, 1962) the pages are white fields into which the words sift down like snow; he includes the names of towns he thinks typical, repeated slogans, snatches of the books he was reading at the time, echoes of the radio, plus some standard French lyrical prose. His idea is to make a cyclopedia, a catalogue, to allow multiple entry to the work, to imitate the way one sees America from a car, to admit repetition the way it occurs when one approaches a major town: "New York 25 miles, New York 20 miles—the space is going to be made rhythmic with the names which come up over and over again." He conceived of a new rapport between writing and space, a miniature of the map, a selection of what he himself

Los Angeles: Indio Date Farm.
Before you see our displays see and hear the romance and sex life of the date—***Twenty Minutes Well Spent***—Continuous Showings 8 a.m. to 6 p.m., Free Admission, Shield's Dates, *119 Kinds*, ***Shield's Famous Date Crystals,*** Bags, Cans, ***Shield's New Discovery,*** *Date Crystal Milk Shakes,* ***Sold Only by Shield's, Refreshing*** *Orange Juice,* ***Thirst Quencher*** *Lemonade, Shield's Original Black Date Ice Cream,* Hand Packed, ***Fresh and Delightful*** *Tangerine Juice,* ***Delicious*** *Tree Ripened Grapefruit Juice,* Romance Theater, Free, Continuous, ***Romance and Sex Life of the Date,*** Valley Desert Trails, *a bit of old Arabia in modern California, a book for the library, where to go and how to get there,* ***9 maps, Roads to Romance.***

Shield's Gift Pack Dates, Rose Patio, ***One of the Largest in Southern California,*** *Unusual Three Variety,* ***Beauty, Jumbo, Luxury, Quality,*** *Bulk, Thrift,* ***Extra Special Assorted Three Pounds,*** *Chocolate Dates, Gift Peeled Dates, Sugar Dates, Medium Jool, Date Cake, Fancy Blonde, Quality Brunette, Date Cookies, Figs.*

Shield's Quality Desert Fruits, Sold Here for Nearly Half a Century, Never Sold In Stores, Sold Direct to You, Date Crystal Milk Shakes, Dates, Grapefruit, Date Crystals, Tangerines, Shield's, Don't Miss It, Open All Year, Thank You, Drive Carefully and Come Again, Did You Treat Yourself To a Shield's Date Crystal Milk Shake? Don't Forget your Dates and Grapefruit, *Mrs. Shield's Date Crystal Recipes,* ***We Ship All Over the World,*** Did You see and hear the Romance and Sex Life of the Date? ***Indio, California, So Proudly We Hail!***

Los Angeles: Rancho La Brea Tar Pits.
Captain G. Allen Hancock, Donor of Hancock Park to the People of Los Angeles County, 1916, Your Cooperation Is Requested in Observance of the Following **Hancock Park Regulations—Pets Must Be on Leash, Games or Sports of Any Kind Are Not Permitted in the Park, Benches Are Not to Be Moved,**

I began with a miniature tape-recorder and walked from north to south through New York's Times Square, muttering into the microphone every verbal item I could see: street names, giant ads, hand-written notices, warnings, placards, even graffiti.

considered most representative of the U.S.A. Here is a section called "Bienvenue au New York":

53 000 Norvegiens
410 000 Polonais
les Grecs qui lisent le "National Herald"
les Hongrois "American Magyar Nepszava"
les Italiens "Il Progresso"
SATURDAY EVENING POST
SATURDAY EVENING POST

Colombo's, steaks,
Quo Vadis, cuisine francaise,
East of Suez, indonesienne,

White Turkey, specialites americaines,
Schine's, irlandaises,
Grotto Azzura, italiennes.

Les avions qui vont a Munich,
a Léopoldville,
qui viennent de Beyrouth,
d'Athènes.

WBNX, émissions ukrainiennes,
WEVD, émissions norvegiennes,
WFUV-FM, émissions polonaises.

Butor has not gone far enough; like a proponent of the pre-Nouvelle-Vague, he insists on choosing, distilling, and organizing. The result is a poetic collage, a somewhat denatured pastiche. Allen Ginsberg does better. In The Fall of America (New York, 1965) he takes as his form a trip across country and enters in his notebook his own thoughts as he goes. He keeps the spelling as abrupt as in the original, making a diary of his own internal musings, his glimpses out of the car, signs seen, and the blips of the radio. Ginsberg makes much more effort than Butor to seem as if he is including everything that passes through his conscious scan. As a result some lines are totally private; even his asides do not explicate them to strangers. Yet the

Wading or Playing in the Stream Are Not Permitted, Alcoholic Beverages Not Permitted, Do Not Pick Flowers or Break or Deface Plants, Deposit All Trash in the Receptacles Provided.

The Observation Pit Building is open 10 a.m. to 5 p.m. except Mondays, Excavations Will Be Conducted, Beware! Premises Protected by an Aachen German Shepherd, ***'World's Largest Shepherds,'*** *To the La Brea Dig Visitors, Welcome to the La Brea Ranch Project: Since this is the first time in history that a major paleontological and archeological dig of this magnitude has been conducted in the heart of a large metropolis we have felt a strong obligation to show you as much as possible of the processes being used. Unfortunately we are now too deep in the excavation for you to observe the fossils being removed. Regulations will not permit visitors inside the fence. But thanks to your response to my last letter, we now have on loan a closed-circuit television, which has solved this problem.* Sincerely, George J. Miller, Rancho La Brea Co-ordinator.

•

Skulls of four Adult Saber-Tooth Cats and one Juvenile have been discovered and are now being excavated. Other Specimens Currently Being Removed include: A Giant Ground Sloth, and a Juvenile Bison; a Skull of the Giant California Lion has just been Removed and is now being Cleaned and Restored. Three

I discovered quickly how much of this material one normally censors out. The flow was overwhelming.

public environment, the visible, the audible, comes through as a gritty backdrop.

Afternoon Light
Children in back of a car
with Bubblegum
a flight of birds out of a dry field
like mosquitoes

"...several battalions of U.S. troops in a search and destroy operation in the Coastal plain near Bong Son, 300 miles Northeast of Saigon. Thus far the fighting has been a series of small clashes. In a related action 25 miles to the South, Korean troops killed 35 Vietcong near Coastal Highway Number One."

"For he's oh so good
and he's oh so fine
and he's oh so healthy
in his body and his mind."

Yet none of these writers found a way to let the mass of the ordinary people speak on their own, in their own way, without some poet's interference. I asked myself, what verbal material is created by the broadest section of the population: not by professionals, not by institutions, but by the widest range of individuals? The writing of the cultural anthropologist Roland Barthes suggested the answer in its stress on words as signs. Why not look at real signs, I thought. Why not, in fact, record on tape this most popular of cultures, this gigantic folk poem, this epic of a million store-owners defining themselves, this inadvertent conglomeration of words that labels one street, or one block, or even one airport?

I began with a miniature tape-recorder and walked from north to south through New York's Times Square, muttering into the microphone every verbal item I could see: street names, giant ads, hand-written notices,

Primitive Stone Tools have been Found and are on Display in our Exhibit Case to your Left—Other Possible Artifacts are now being excavated, Help Feed the Kitty, Support the Dig, Funds are Needed, This Scientific Project Sponsored by the Los Angeles County Museum of Natural History Foundation, Thank You.

Humerus of Bird, Phalanx of Bird, Metapodial of Coyote, Canus Latrans Occudu Merriam, Pathologic Diseased Tibia of Smilodon, the Saber-Toothed Cat, *Note the Fusion of the Two Bones,* Metapodials of Dire Wolf, Microfossils, Insect Parts, Identifiable Bones, Bone Fragments, Seed Pods, Minerals, Shell Fragments, Plant Material, Tooth and Jaw Fragments.

Pelvis of Giant Ground Sloth, Wingbone of Giant Bird, Miscellaneous Bird Bones, Rib Bones of Western Horse, Skull of Dire Wolf, Lower Jaw of Camel, Foreleg Bone of Mastodon, Foot Bone of Bison, Lower Jaw of Young Mastodon, Hind Leg Bone of Dire Wolf, Pelvis of Coyote, Lower Jaw of Great American Lion, Hind Leg Bones of Giant Ground Sloth, Skull of Mastodon.

La Brea Animals: Imperial Mammoth, Peccary, Platygonus, Prehistoric Horse, Extinct Humpless Camel, Ursus Horribilis, California Grizzly Bear, Short-Faced Bear, Dire Wolf, La Brea Tar Pits Trash Collection, Los Angeles County Art Museum Permanent Collections, Mr. and Mrs. Norton Simon Sculpture Plaza, Mutual Benefit Life Insurance, Spaulding Drive, Financial Indemnity Co., Cadillac, ***The Standard of the World,*** Prudential Life Insurance.

Los Angeles: Restaurant Row.
Circus Maximus—*Massage, Sauna, Physiotherapy*—Fountainview West, **The Ultimate in Air Conditioned Gracious Living,**

Electro Sex,
Pokerino,
Shirt King,
Manhattan Cake,
Donut Express,
Wild Wooly
Beaver,
Four Queens
Wiglets,
Corn Stalk
Fence Hotel,
Pan Pourrie
Gumbo Shop,
Cullie's Clutch
Service Co.,
Pygmy Drive In,
Salvation
Divine
Healers...

warnings, placards, even graffiti. I discovered quickly how much of this material one normally censors out. The flow was overwhelming.

When I transcribed my first experiment I found it sorted itself naturally into block-long paragraphs and that it constituted a vast "sounding" of the population, a content analysis of the desires, lusts, economies, and lies that ensnare us each day.

Surveying the ninety-odd pages of typed transcript resulting from my cross-country walks through New York, Los Angeles, Las Vegas, El Paso, New Orleans, and Atlanta, I am struck by the amazing variety and vitality of names. Unlike France, which has a law against inventing new names for children, America has a positive lust for new spellings and combinations: Electro Sex, Pokerino, Shirt King, Manhattan Cake, Pourrie Gumbo Shop, and Salvation Divine Healers, Inc. There are so many kinds of businesses that I kept encountering things I didn't realize or recall were sold: one-man life rafts, bankrupt grocery stock, and rail freight disaster sales. You can send home a living cactus, or a slot-machine whiskey dispenser. You can purchase a hand-carved Indian, life-sized, fully clothed. There is always a better mousetrap; in Los Angeles I found a fly killer: "Kills but does not crush fly." Startling juxtapositions seem our stock in trade: "See Jelly Roll, the first jazz man at the Wax Museum." The Wishing Well Wedding Chapel is next door to the strip fight of the week. And everywhere are the crass jokes of the people in illuminated flashers: "She died with her boots on—and not much else"; in the stickers: "Pa's boss as everyone knows, but what ma says always goes"; and in the philosophical

Penthouse Apartments, Sixteen Floors, Three High Speed Elevators, 24 Hour Doorman, ***Spacious Pool Deck,*** *Sauna Bath, Putting Green,* McFadden Streisand, Irwin, Incorporated, ***A Groovy Bowling Alley,*** *Finnish Rock Stream Bath and Massage,* Vacancy, Drive In, Knoll Motel, If You Would be Offended by Nude Entertainment, Don't Come In, Russo Men's Hairstyling, Regina Liquors, *Deli and Sundries,* Barbeque Shack, *Hickory-Smoked,* Dine In, Take Out.

Eastern Fish Market, Le Coque, Bob Adler's 940 Club—*Cocktails, Dining, Dancing, Lobster, Chicken, Prime Steaks, Ribs, Eddie Canto Quartet,* Fry Plastics International, Clear Thoughts Building, Clear Thoughts Publishing, ***Famous Boutique,*** Buff and Hensman, *Architects,* Kenneth Lind, *Architect,* Pacific Business Exchange, Kadem Galleries, *Israeli Artists,* ***Native Elegance,*** *Brancusi Marble Tables,* Canyon Cleaners, The Antiquarian, Georges M. George *French Antiques, Puppies Always Available, Trained German Shepherds,* ***Bred to be the World's Largest for TV and Motion Pictures, Exclusive On-Premises Training for Film Stars and VIPs,*** *Tracking Dogs for Lost People.*

Lane Antiques, ***Live Nude Erotic Review,*** *Loser of the Week, San Diego Mayor,* The Blue Boar, *Steaks 'N Prime Rib, Olde English Prime Ribs from the Cart, Steaks, Lobsters, Wild Game and Fowl,* Oscar Mayer *Antique Works of Art,* Teheran Galleries, *Oriental Rugs for Sale and Auction,* McCaffery Gallery, Headline Hairdressers, Patrone's Scampi Restaurant, The Lobster Barrel and Steak House, *Live Maine Lobsters,* Mayfair House Antiques, UDA Interior Design

When I transcribed my first experiment I found it sorted itself naturally into block-long paragraphs and that it constituted a vast sounding of the population, a content analysis of the desires, lusts, economies, and lies that ensnare us each day.

hand-lettered sign: "What you buy is glorified, what you leave is junk—Mat's Junk Shop."

The style of the people is punchy and non-syntactical, full of imperatives and labels, but short on complete sentences, making the occasional stone-engraved sententia seem as soporific as the municipal magnates who erected them. Even repetition is energetic. One store will repeat its self-identity over and over: organic this, that, and the other; fifty percent off guns, cameras, tvs, and old gold.

I was as regular as the signmakers; if they advertised ten items in the window I included all ten with their numerals. The raw transcript therefore develops a listing tone. Western Wig Mart's giant W is ranked alongside the paper strip saying "Stay Soft Super Stretch Bras Stay Beautiful Forever" which appears in the same flow as Hollywood High's stone slogans, or the hand-painted sign in a fish store across the street announcing the Second Annual Inland Empire Guppy Championships. I was the great equalizer.

Having launched "Signs," I began to cast about for a heritage. "Found Poetry" is the art of serendipity: spotting unconsciously expressive language in the context of an insurance policy, a newspaper ad, or airplane safety instructions.

and Space Planning, Zeitlin and Verbrugge Booksellers *Old and Rare Books, Rare Prints and Drawings,* Irving Bloom Works of Art, Pluf Antique Mart, David Stuart Galleries, Thomas Ingersoll Antiques, *Fine China, Interiors,* Peggy Christian Bookseller, Alpine Importers, Garden District Lunch and Dinner, Steps Antiques, Jacqueline Anheld Gallery, Rex Evans Gallery, Al Hammerman Gallery, Julie Dohann Gallery, Feingarten Gallery, Richard Tobey Fine Frames, French Antique Shoppe, Walter Laemmle Antiques, Grace Ellis Antiques, Martha Ellis Interiors, American Masters Gallery, Heritage Gallery, Gourmet Galerie.

Ferdinand Pontier Boeken, Incorporated, Established 1930, *Dealer in Fine Antiques, Old Masters Paintings, Sculpture, Continental and Oriental,* **Please do not Park in Driveway,** Delta Gallery, Giacomo Tribalga Design Tailor, Margot Flataud Antiques, Fabrics Unlimited, The Courtyard Shops, *Antiques, Decorative Accessories, New Shipment,* Comera Gallery, Mark Nelson AID, Penthouse Galleries, Londell Gallery, The Ryder Gallery, Esther Robles Gallery, Ancrum Gallery, Circle Gallery, The International Gallery for Graphics, Larry Winters Hair Design Studio for Men, *Manicurist,* Artis Lane Portraits, Galerie Juarez, Palm Beach, Palm Springs, *Contemporary French Paintings,* Molly Barnes Galleries, ***Joe Ochs Presents Outdoor Art.***

Italian Gourmet Deli, Rick Byron Originals, *Custom and Casual Wear for Men,* The Red Room *Open Faced Sandwiches,* Wooden Shoes Sold Here, David George, *Fine Cleaning, Floor Pillows, Decorator*

Found poetry is the art of serendipity: spotting unconsciously expressive language in the context of an insurance policy, a newspaper ad, or airplane safety instructions.

Hannah Weiner, for example, has excerpted the expected talk between ships from the 1851 edition of The International Code of Signals for the Use of all Nations:

EDQ Any chance of war?
ODV Good chance.
IKF No chance of peace.
YU Has war commenced?
YX War has commenced.
YW War has commenced between ___and ___.
KDX How is the crop?
KDW Crops have suffered severely.
KDV Crops destroyed.
TN Are you in want of provisions?
LUE Distressed for want of food.
YU Want food immediately.
NV Want food, starving.

Here was continuous tragedy on the high seas, all spelled out. Part of found poetry's point is its very insistence on the fact that this is not merely fiction, not a personally made-up set of words, but some real thing, snatched out of life and put into a museum over the label "poem." Calling a text found out on the streets a poem, distances one from it, allows the aesthetic sense to take over while the practical nervousness falls away. When the words of "Signs" are on a page, one does not have to decide whether to turn left or right. One can reflect on what they mean as a group, as a poem.

Fabrics, Draperies, Bedspreads, Decorator Slipcovers, Reupholstering, Carpeting, Custom Furniture, Fake Furs Custom Made, **The All-American Burger,** Smokey Joe's Hickory Wood Barbecue, *Barbecued Ribs and Chicken,* ***Big, Big Barbecued Sandwiches,*** **Big as a Saddle Hamburgers, Rip Snortinest Western Style Chili,** *Birthday Parties,* Beverley Park Carnival, Rent this Amusement Park, *Barbecue Chicken Plates,* Eat Out Often.

Los Angeles: Main Street.
One Hour Free Parking with Validation from Dr. Campbell, Credit Dentist, Casa Blanca Restaurant, *Mexican American Food, Money to Loan, Hot Donuts,* Pat's Donuts, Hotel Cecil, *From Five Dollars,* Weekly Rates, Vacancy, Buy Modern Nudes, Toro Loans, *Girlie Movies and Films,* Jack's Bookshop, Early Bird Pawn Shop, State Loan and Jewelry Co., Volunteers for America, ***Bargains Galore for the Entire Family,*** Come in and Browse Around, ***Your Family Thrift Store,*** *Out of Pawn Sale, All Items Reduced, Restaurant Sandwiches,* For Rent, Office Space at Fifty Dollars a Month, G&L Speed Laundry, *Shoe Shine 35 cents, Safety Park 35 cents Each Half Hour, Utility Bills, Checks Cashed, Money Orders,* Greyhound Bus Ticket Office, *Tickets to all Points,* Stagecoach Coffee Shop, Continental Trailways Bus, Donut Express, Thrift Drug and Discount, *All Prescriptions Files and Film Work Left for Processing are at your nearest Thrifty, 202 East Sixth Street,* Bill's Southern Fried Chicken, Take Some Home, *Cocktails,* Please *Genuine Blue* White Diamond, Unredeemed Pledge, Money to Loan, Credit Jewellers , ***Internationally Famous*** *Cameras and Binoculars as low as $5.95, Special Watches as Low as $5.95,* Two Year Guarantee, ***Diamond Specialists,*** *We Buy Old Gold, Magic Dice, Tops and Bottoms, Burbank Films* **Best in Town, Wild Wooly Beaver, Adults Only,** *New Show Today,* Complete Change Tuesday, Friday, *Live Burlesque,* Continuous, **Beaverama Theater**—*Curious Yellow, Hair, Fanny Hill,* Go See Them—Then Come See the Boldest of them All—Man

My intention was never to recreate visually the physical environment, to put back the very things that Johnathan left out in order to place the emphasis quite properly on the words themselves.

Joel Katz Comments

When I first saw Jonathan Price's earliest transcriptions of the nation's self-documentation, I became preoccupied with them both as reader and designer. I had a rough idea of the possibilities for a typographic reconstruction of the worlds from which Jonathan had extracted the verbal component. Coincidentally, I learned of the computer-assisted phototypesetting equipment available through Yale University's School of Art. Jonathan entered for data processing his transcriptions from the Los Angeles area. We identified eight categories of word/phrase/sentence classifications: labels; routine notices and lists; explanatory messages and descriptive narrative; names of places, particularly business establishments; goods and services for sale; messages in the form of direct address; prohibitory notices and warnings; advertising and boasts; strident blandishments and incredible boasts, including coined words.

The hardware consisted of Digital Equipment Corporation PDP-10 and PDP-11/45 computers and peripheral input apparatus, access to the Yale Computer Center's IBM 360/72, and a Mergenthaler Superquick phototypesetting machine for output. It is not coincidental that there are eight text categories, the Superquick's capacity; nor that I used only four type fonts (the Superquick handles up to four glass matrices, each of which contains light and bold, or roman and italic, of the same face); nor that the range of sizes is extremely narrow (each typesetting matrix is in a certain point size, and the machine can display from it only the same size, twice, or four times magnifications).

and Wife, The Most Important Husband and Wife Film of our Time, **Adults or Marriage License,** *A New Theater for Adults Only,* **Nudarama, The Most Action,** Coming Soon in Town, ***Skin Color,*** Now Playing.

Howell Hotel, *Tacos,* HG News, Roxy Arcade, Dreamland Dancing, Girls, Dancing Partners, Girls, ***Girls, Girls,*** *Closed Tonight but see our Girls at The Restaurant Roof,* Rick's Food Fair, *Two Pork Chops, Two Eggs, Nude Models Upstairs,* American Barber College, Learn Barbering, Army and Navy Department Store, **the West's Largest Tent and Trailer Display,** Shack Southern Ribs and Shrimp, Nero's Nooky Theater, Paris Arcade Games, *529 Movies,* ***No One Under 21 Allowed,*** *Hollywood Models,* Silver Hotel, All Refunds Must be Obtained from Manager, **No One Allowed in Lobby or Upstairs for Any Reason, Don't Even Ask,** Please Leave Keys in Door Before Leaving Hotel, Thank You, Weekly Rates Available, One Hour Free Parking.

SOS Club, *Overexposed, Three Way Split,* Eagle Music Exchange, Eagle Loan Office, Royal Cafe, Servicemen Welcome, *Lucky Draft,* World Series on TV, Captain Jim, ***Master Tatoo Artist,*** *Assisted by L'il Al,* **Beaverama Sex Style,** *All Colors, Eight MM Movies, Santa Anita Selections Sold Here,* The Double M, *Twenty Years Handicapping on all Tracks,* Smitty's News, *Color Photos, Adult Art,* Roslyn Jewelry and Loan, *Out of Pawn Suits and Topcoats, Shotguns,*

I was interested in exploring the connotative potential of typographic characteristics to convey some of the aspects of the experience that are missing from Jonathan's transcription, not because he edited them out but because he had no way of retaining them.

I created four variations of the Los Angeles section of "Signs"; a portion of the fourth output is reproduced here.

My intention was never to recreate visually the physical environment, to put back the very things that Jonathan left out in order to place the emphasis quite properly on the words themselves. Rather, I was interested in exploring the connotative potential of typographic characteristics to convey some of the aspects of the experience that are missing from Jonathan's transcription, aspects such as rhythm and interval, semantic scale, and space-time relationships (e.g., verbal density vs. aridity, verbal excitement vs. calm). I was interested in developing with this text an allusionistic vocabulary rather than an illusionistic one, figurative and loose rather than literal and rigid. Even in its present form, every paragraph of Jonathan's harvest from the verbi-visual landscape functions as a genuine American poem.

Money to Loan on Everything, Star Pants Manufacturers, United Shoe, Call Me Sol, Depot Candy.

Main Street Tacos, *Photostats While You Wait, Follies, Live Nude Burlesque Plus Nude Film,* **Presenting Los Angeles' Biggest Bottomless Show, *Starring Brenda Starr, Stormy, Stacy, Melody West,*** Ladies Invited, Servicemen Discount, Liberty Cafe, Main Gym, Olympia Haircutting, Barber Wanted, Ten Pins Clothing Store, ***Wholesale Prices,*** *Texas Burgers,* El Progreso, *Dancing Every Night,* **Sorry, No T Shirts after 6 p.m.,** *Filipino Films,* Smoking in Balcony, Victory Service Club, Union Rescue Mission, ***Jesus Saves,*** Cooper Donuts, Pioneer Bail Bondsmen, *Founded 1921,* ***The Most Trusted Name in the Bail Bond Business.***

Los Angeles: Hollywood High.
The Hollywood Reporter, Squire's Permanent Hair for Men, Hollywood Center Motel, *Economy Units, Forty Three Kitchens, TV Motel Theater,* Official Pollution Control Device Installation Inspection Station, *Any Size Tire Recap Exchange,* New Tire Guarantee, *Auto Alarm System Installed,* Official Lamp Adjustment Station, *Stereo Car Tape,* Rent a Mink Co., *Tropical Fish,* ***Second Annual Inland Empire Guppy Championship, Fifty—Three Classes, Fifty— Six Trophies,*** IFGA Sanctioned Show, Inland Shopping Center, Stan's Fried Chicken Sandwiches, *Fountain, Pit Barbecue,* Sunset Highland Recording Studios, *Complete Sound Recordings and Duplicating Services for Film, Disc, and Tape,* General Design Services, *Consultants, Architects, Engineers, Designers,* Mail Resumes: Worldwide Positions Now Open, Giant Plane, 1000 Openings.

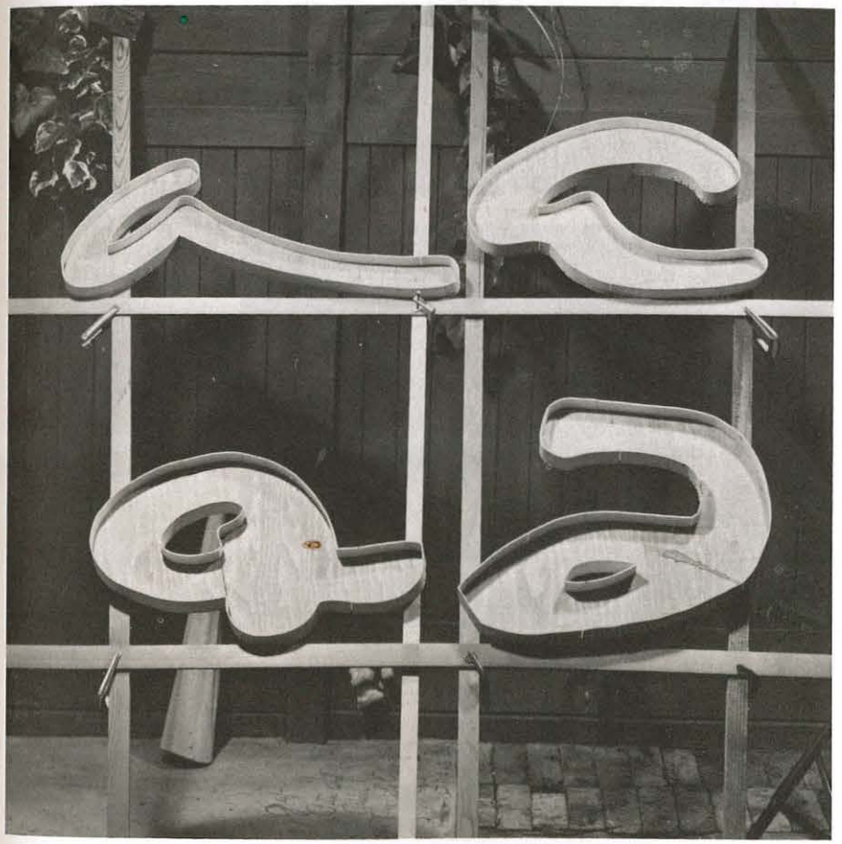
Visible Language, XI 2 (Spring 1977) | © 1977, Visible Language, c/o The Cleveland Museum of Art, Cleveland, Ohio USA 44106. Author's address: Jonathan Price, 125 Prince St., New York, NY 10012. Joel Katz, 18 Tenmore Road, Haverford, PA 19041.

"Sentence Structures" and "A Structure"
Robert Cumming

"Sentence Structures" is an outdoor work situated on a vacant lot in St. Paul, Minnesota, and was commissioned by the Walker Art Center. It consists of about twenty sentences in 1,200 foot-high letters on supporting scaffolding which reaches a maximum height of twenty feet. The sentences are diagrammed as I used to do in high school: subject, object, object of the preposition, etc. The sentences themselves were from letters written to Richard Koshalek at the Walker Art Center discussing the project in its formative stages. A person walking among the structures could piece together the evolution of the idea whose final form surrounds him.

Figure 1
"Sentence Structures," 1973. The work was constructed with the cooperation of Richard Koshalek on a vacant lot in St. Paul, Minnesota. Photograph: Eric Southarland, Walker Art Center.

Figure 2
"A Structure," 1973. The work shows scultural enlargements from the handwriting of four fellow artists, (clockwise from the upper left) Dana Atchley, Ken Friedman, William T. Wiley, and Douglas Huebler.



 Author's address: UCLA, Los Angeles, CA 90024.

"Sundial"
Ian Hamilton Finlay

"Sundial" by Ian Hamilton Finlay and cut by Michael Harvey. Slate and cast concrete. The work is located at the University of Kent, Canterbury, England.

Visible Language, XI 2 (Spring 1977). © 1977, Visible Language, c/o The Cleveland Museum of Art, Cleveland, Ohio USA 44106.] Author's address: Stonypath, Dunsyre, Lanark, Scotland.

The Public Word
Alison Sky

. . .Walls which speak and

Prior to the last hundred years, poetry functioned as a catalyst between language and environment. As Archibald MacLeish observed in Poetry and Experience,[3] "There was no difference between public world and private world so far as the meanings of poetry were concerned down to the time we live in... By the end of the last century all this had changed." The change MacLeish acknowledges is one of literary content, rather than fundamental concept. The issue that I shall address is concerned with the role of poetry as part of the iconography of the public domain.

Within conventional definitions, poetry has "tried everything." It has evolved from legend, passed through generations by word of mouth, developed a complex and formalized written discipline which (particularly in this century) has been transformed into visual imagery, and dematerialized into sound and silence. It has been constructed, re-constructed, integrated, and disintegrated--yet always as part of a recognizable continuum. If it has ever ventured outside the written or spoken page, it has usually not been considered poetry.

The evolutionary process of this development has been an issue of urgent public concern. Even its disintegration has met with intense reaction (as the rioting audiences at Dada events of sound poetry illustrate). Yet at some point in the increasing "privatization" of poetry, it receded from our vocabulary as well. As MacLeish continues, "Poets and politicians both agree, though for opposite reasons, that poetry has no place in the public world... It is a curious situation for many reasons and not the least because the public street is precisely where we live our lives in this century... Our dreams are public. Even our terrors are public, and nevertheless we won't have our poetry out-of-doors."

In the decision to abandon the "public domain" to a totally pragmatic development of our environment, a certain urgency was lost in poetry--a combination of avoiding gut concerns and a failure to deal with those concerns in a way that communicated emotional response. A case in point is demonstrated by the many fine but ineffectual poems pertaining to Vietnam when contrasted with the emotional intensity of one graphic poster illustrating the Mi Lai massacre.

We have now lived with our totally utilitarian cities and have come to find them somewhat deficient. Pragmatism has proven to be like a question with only one answer, and it is always the same no matter how the question is rephrased. This is not the only confusing revelation we have been forced to face. We have come to realize the only infinite aspect of earth is the imagination of man, and it is this imagination which has been abandoned.

Woodrow Wilson once said, "Business underlies everything in our national life." Christopher Tunnard[6] has added to this, "And nowhere is it more true than in these cities where American business has created its own work of art, the skyscraper."

blow bubbles, balloons carrying words into the sky

Figure 1
Our public language is comprised mainly of commands and inducements aimed at consumption.

The "public language" of our streets has been left to the business enterprises--and they have, predictably, formulated a public language of consumption. To deliver their messages, the most advanced technologies are employed, guaranteeing total obscurity to any poetic infringement of this domain.

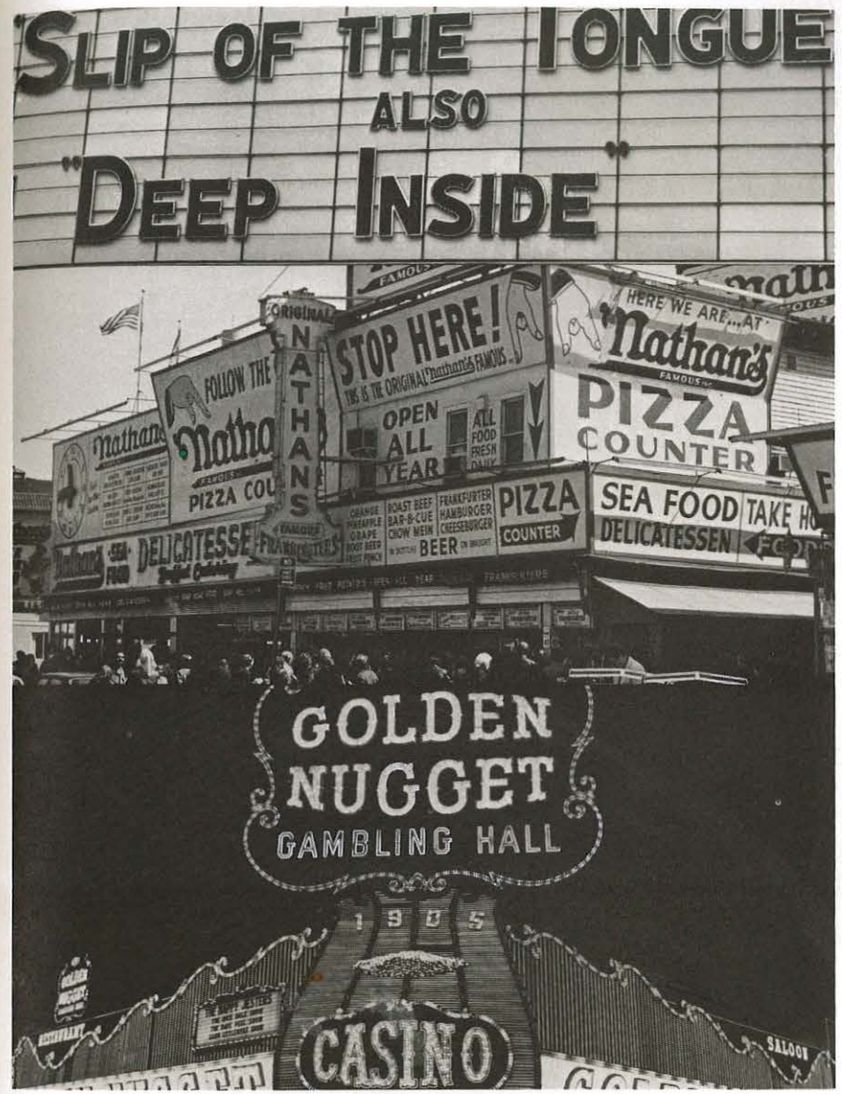
In Letter and Image, Massin [4] writes, "New York's great artery, Broadway--and its epicenter, Times Square--have the greatest typographical density in the world... An average American can see as many as 1,500 signs a day... walls which speak and blow bubbles, balloons carrying words into the sky where capricious aeroplanes trace their messages."

The message conveyed by this technological expertise is, however, totally objective. The content of the sign still does not go beyond a well conceived command. It certainly does not challenge our assumptions in any way, or provoke questions of any subjective nature. As Charles Jencks[1] has indicated, "We live with plural interpretations of a pluriverse rather than a unified theory of a universe." The sign, on the other hand, is predicated upon simply what and where we eat and drink. The subjective level of a public language is yet to be developed and this, rather than technical effect, should become the new province of poetry.

A slightly varied utilization of language is illustrated by the movie marquee. Advertising is concerned with words as graphic objects. The movie marquee goes one step further,

where capricious aeroplanes trace their messages. . .

Figures 2, 3 and 4
The movie marquee employs the language of our environment to trigger a dialogue in the imagination of the viewer. The building as a sign or sign as a building--Nathan's, Coney Island and Las Vegas, Nevada. Two spectacular examples of the high pressure message at its best. A multiplicity of inducements and commands merge to form a total word/image.



In a total merging of sign, symbol, color, light and

Figure 5
Graffiti subverts the intention of the command creating a language inversion. It replaces control with a fragment for further fantasy.

Figure 6
An anonymous and rare example in Barcelona, Spain, of word/image in our environment not in the employ of the dollar.

employing the elements of the language of our environment to trigger a subjective dialogue in the imagination of the viewer. In contrast to the objective content of billboards, marquee words are generally used as a direct extension of our role-playing fantasies. It is still, however, the same message/command which is being expressed.

There are certain moments where the direct assault of advertising transcends itself, providing spectacular examples of urban aesthetic. Occasionally, and quite by accident, these commands may be transformed into a different level of experience, though this is never the intent. These are rare instances when a multiplicity of commands lose their individual identities and become a total visual entity--the most splendid example represented by Las Vegas.

The development of a Las Vegas is an end in itself. In a total merging of sign, symbol, color, light, and architecture, language and space become one statement. The risk of following this example too closely is certain superficial repetition, or doing the same thing but not nearly as well. At best, a second Las Vegas would be created; at worst, merely a self-conscious and superficial replica.

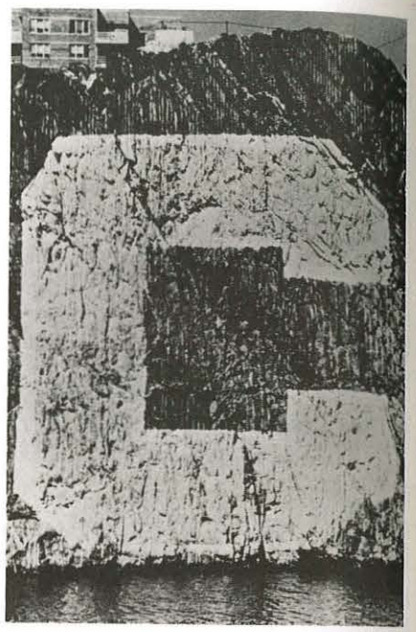
Marcel Duchamp, for example, when confronted with the Mona Lisa had the wry humor to paint her a moustache. Rather than marvel at or attempt to duplicate what already existed as a masterpiece, he created an inversion which commented on the "condition of masterpiece."

architecture—language and space become one statement.

Figure 7
"There was no difference between public world and private world so far as the meanings of poetry were concerned down to the time we live in" (Archibald MacLeish). Column in Delphi, Greece.

. . .the graffitists represented an infringement of

Figure 8
"Totale Poesie," Tims Ulrichs, New York, 1964. Photograph: Karl Ulrichs.



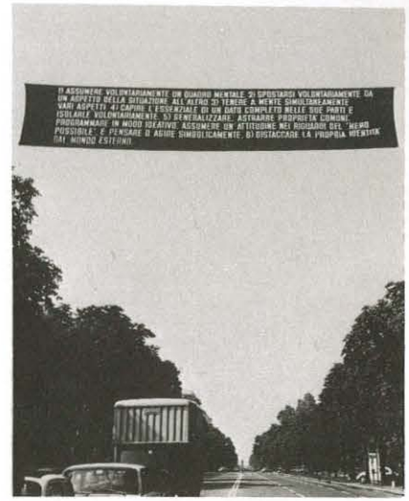
Similarly, the most interesting use of language in approaching a new sensibility in public poetry is suggested by urban graffiti. It is, in a sense, the original moustache on our urban landscape. It is curious that it should have evolved out of a totally hybrid circumstance. Graffiti has resulted as the effect of the objective command/ message fusing with the subjective imagination.

In graffiti the intent of the command is subverted, creating a language inversion. Money is replaced with identity; control is replaced with a fragment for further fantasy. It is no wonder that a tremendous amount of hostility has been vented on the graffitists. A publicity campaign, staggering in the amount of time and money involved, has been spent in arousing public passion to condemn people who merely write on oppressive walls. When all else failed, the graffitists were ultimately bought out by the very financial structure they threatened. It becomes very clear that the graffitists represented a far more ominous implication to the good business sense of America. They represented an infringement of something other than a commercial message upon our public domain. They represented a chance for public poetry.

These examples of a successful use of language in the streets offer a point of departure. The inherent danger, other than in not trying at all, is that the result will become merely a facsimile of what it intends to learn from. The distinction is definitely one of message or content.

something other than a commercial message upon our

Figure 9
"The Seventh Investigation, Proposition 1," Joseph Kosuth, Banner in Turin, Italy, 1970. Photograph: Paolo Mussat Sartor.

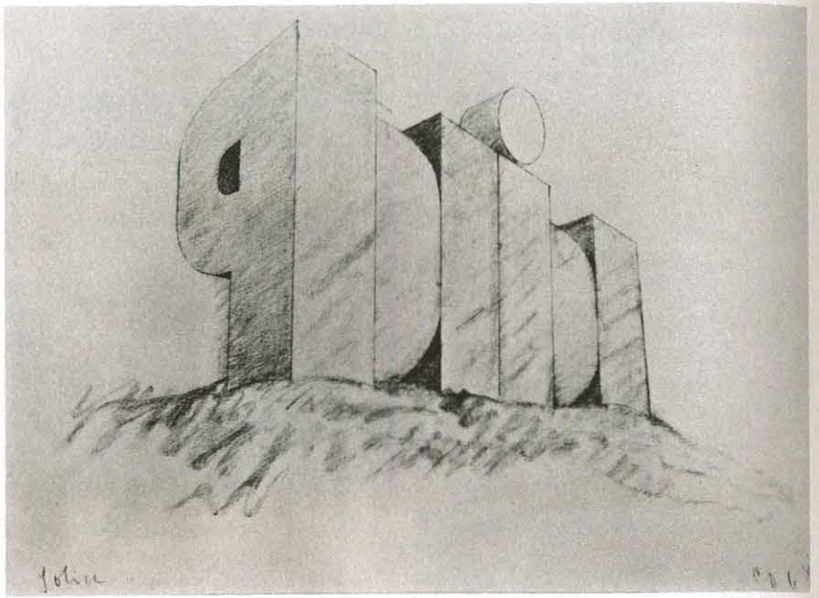


There do exist other eccentric and isolated examples, totally anonymous, where words and symbols have been successfully used in the public domain, not in the employ of the dollar. Many visual poets and artists have also begun to experiment in this direction; e.g., John Giorno's stencilled street poems, Dial-a-Poem Poets series and Consumer Product Poetry in which "words appear on all the things you buy and most things are covered with words," Joseph Kosuth's "The Seventh Investigation" which appeared in various urban contexts, Tim Ulrichs's "Totale Poesie" which covers an entire cliff, and Claes Oldenburg's Design for a Police Building Using the Word Police.

Archibald MacLeish was correct in his assessment that "You will find no generation of mankind which has lived as publicly in the world as we do." I would qualify that statement by adding to it a change in sensibility which makes us very different in a public sense than the ancient Greeks or Romans. László Moholy-Nagy [2] wrote, "We have through a hundred years of photography and two decades of film been enormously enriched in this respect. We may say that we see the world with entirely different eyes." We see the world with TV vision. Our house becomes a public plaza through a tube. We view the rise and fall of governments and nations while reclining on our Posture-Pedics in the intimacy of our bedrooms.

public domain. They represented a chance for public

Figure 10
Design for a Police Building Using the Word Police, Claes Oldenburg, 1968. Collection John and Kimiko Powers, Aspen, Colorado.



The public dimension of poetry (or new public language) if we are to develop one, must express in both message and form this changed imagery. It cannot integrate relevant public issues effectively while presenting them within a sensibility of the past. What seems indicated is a use of language formulated out of the symbology and iconology of our era. Perhaps not even a "poetry" as we are now familiar with, but some hybrid merging of language, space, and architecture.

"In a future perhaps remote (we shall see) the end of art as a thing separated from our surrounding environment, which is the actual plastic reality. But this end is at the same time a new beginning" (Piet Mondrian[5]).

poetry. . .

Figure 11
"Fading Fur," Alison Sky, 1974. First prototype developed for a random street poetry project. A different word is cut into the fur of each cat and they are released. Each can be considered a poem in itself or in any combination--to be read as they are passed by pedestrians.

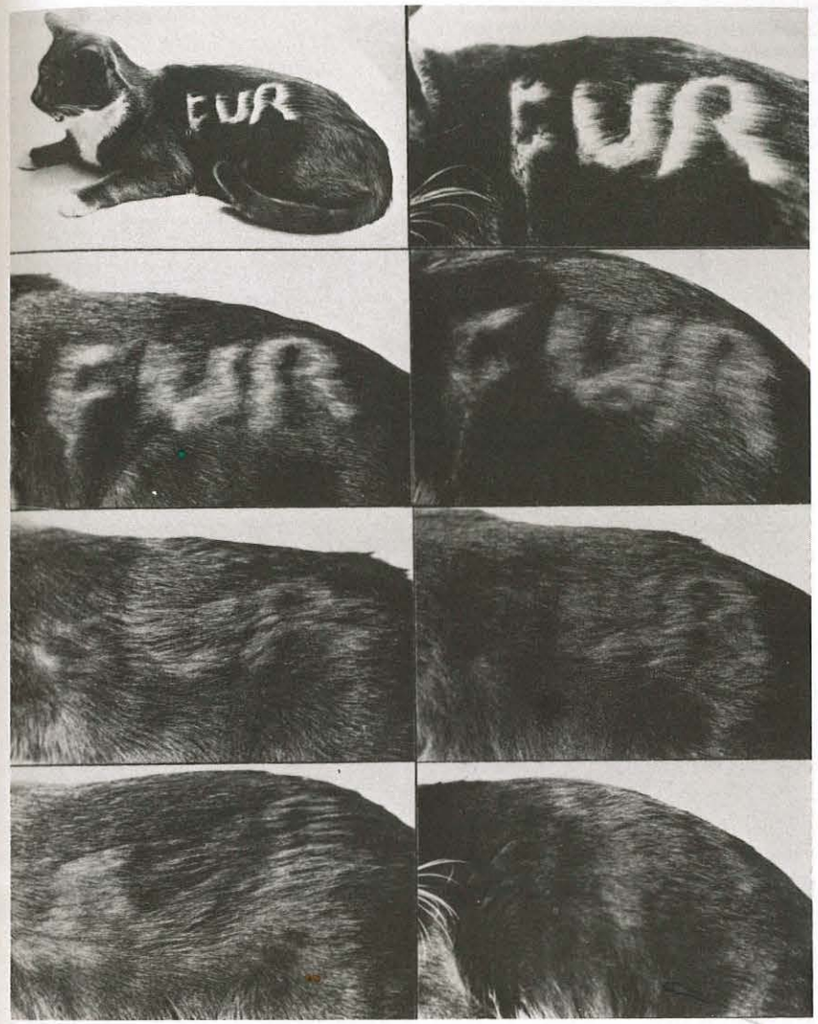
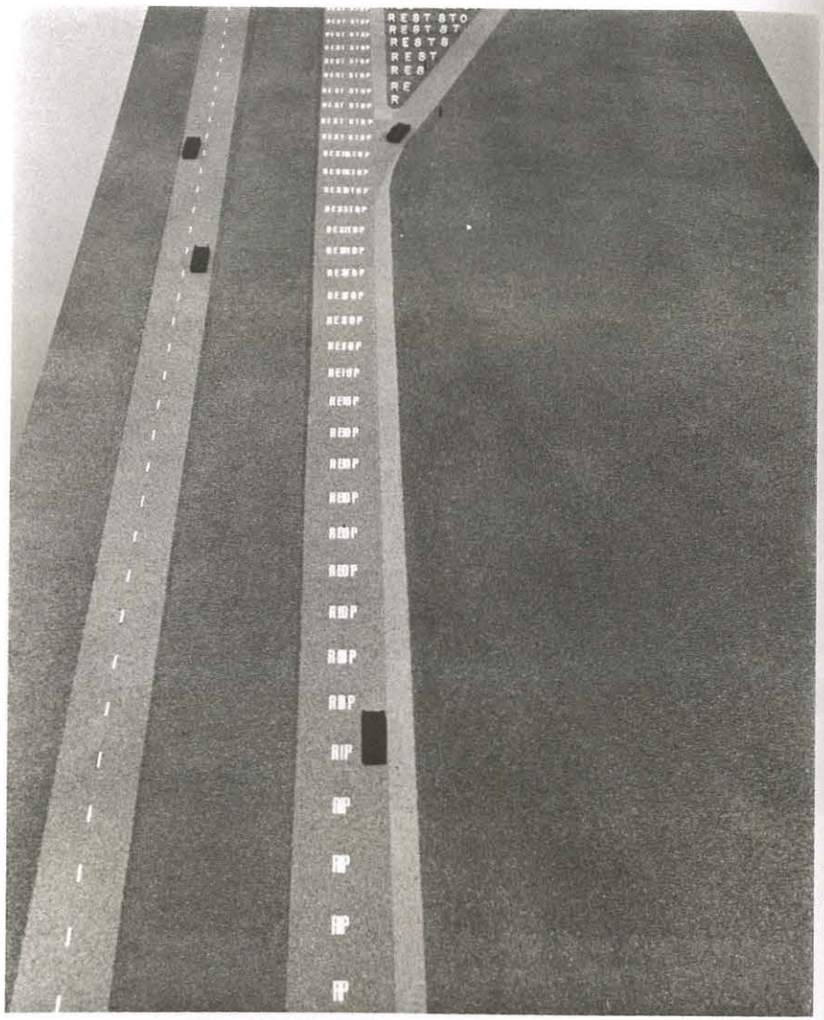


Figure 12
"Prototype Rest Stop" developed for the Nebraska Bicentennial Interstate 80 Sculpture Project, Alison Sky, 1975. The stencilled words REST STOP begin to appear on the roadway approximately one mile before the actual rest stop site. The letters begin to grow slowly out of the dotted highway line–moving outwards until the words are completely formed–approximately one quarter mile from the actual site. REST STOP continues to repeat itself. Upon reaching the grass strip the letters begin to build on the strip in three-dimensional form starting with the letter R until the words are repeated in both two and three-dimensional form. At the center of the rest area, the three-dimensional letters begin to drop away until they finally disappear at the exit tip. At this point the stencilled letters reverse themselves and slowly return into the pavement until they finally disappear. The reversed letters can be read through the mirror of the ongoing automoblie, indicating that the rest area has been passed.



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Reflections on the Theme: At the Edge of Meaning
Fernand Baudin

As a book designer
I am concerned with the Latin alphabet
and with literate communication.
In this context new technologies do not add new meaning to any particular copy;
yet, in the last quarter century
there has been such a change in the reproduction of texts alone
that one may call it a revolution—or an evolution,
depending on the point of view adopted.
The essential fact is, of course, the passage from lead to film,
from mechanical to photocomposition,
with all the consequent technological, industrial, social, and artistic developments.

In any changing situation, as well as in a changing world,
we naturally look for a point of permanence,
a constant.
What is the one constant among the changing technologies?
Writing.
That is what the symbols and their layout have always been about,
no matter if the materials are hot metal, film,
pens, pencils, brushes, chisels, punches, paper, papyrus, or parchment.
However, it is not a matter of one particular material,
or one particular form of physical virtuosity.
By writing I mean the systematic ordering and recording of thought.
This is what made the difference between prehistory and history:
the ordering, editing, recording, and publishing of intelligent, rational thought.
Past symbols and past symbol systems
may or may not have been better than Latin script.
Whatever the case, I can not see why and how we should or could possibly
return to Sumerian or any other previous system of symbols.
Here and now we are essentially concerned with the roman alphabet
and its future.
There are, of course, a number of other living systems of symbols;
however, unless Asia suddenly overturns the present political balance of the planet,
we may assume that the future of the roman alphabet
spells the future of writing.

In the course of two or three millenia
alphabets have been written with all kinds of tools and many kinds of materials.
Why should we now suddenly become partial to one particular tool,
or sentimental about one particular material or technology—
to the exclusion of the rest?
On the other hand, governments and teachers
no longer feel any concern about the proper teaching of handwriting in the schools.
On the other hand, the cooperation (such as it was)
between typefounders and printer-compositors
which kept the tradition of competent writing alive in the typographic era,
is disappearing fast.
Additionally, there are people who believe
that the emotional, associative, audiovisual means of participation
could and should replace written language and rational communication—
and, apparently, the sooner the better.

This leads sooner or later to a most "undemocratic" situation
where all the expert software and the expensive hardware
necessary for the competent mass production of written (i.e. rational) communication
would be in a very few hands.
Most people would be able to read but would be unable to write,
i.e., to formulate and to communicate a personal thought.
The situation would not be any better, or more democratic
if written communication became the preserve of the people in power.
Writing is the only way we know
to prepare and to organize any complex human activity.
Writing is equivalent to power.

Writing, in the broadest sense, is so complex
and so intimately interwoven with every aspect of individual and collective life
that not one aspect of it can be neglected—not everyone needs calligraphy;
but legibility (i.e., layout as well as letterforms) is of the essence.
The layout (i.e., the planning) is far more important than letterforms.
Too much attention given to letterforms
distracts from the planning which is the heart of writing.
The responsibility for the design of letterforms is
the business of a very small minority of experts.
The planning of any piece of writing
should be the concern of a majority of competent authors
assisting their editors and publishers.
In the future, universities—even more than art and design schools—
should be extremely interested in writing courses.

Everyone agrees that you have to thresh out your own ideas
down to the smallest detail in order to know exactly what to write,
in what order to write it, and how to organize it.
Far more students should be made to realize
that the choice of material, color, size, format—in short,
the planning of every material aspect of a piece of writing
(whatever the production method)—is part of the demonstration.
The effect is immediate; subliminal perhaps, but final.
If anything goes wrong,

readers may lay a piece of writing aside after a mere glance.
Typists cannot be expected to assume by themselves
the burden of the full tradition of writing;
nor can engineers, technologists, art schools, or design schools.

Writing is far more indeed than handwriting or calligraphy.
A piece of writing should be clearly understood to include
in varying degrees literary and intellectual connotation
(that is why the practical study of letterforms is equivalent to an art course).
That its material aspects are part of the demonstration
is known to archaeologists and codicologists
as well as to the commercial artists and copywriters.
Why then should intelligent students be less involved with the format—
with the meaning of the physical appearance of their writings—than an
archaeologist or a commerical artist or copywriter?
Why should authors be left incompetent, helpless,
utterly unable to assist their publisher
or to have control over the appearance of their work?
Why should readers accept any scientific publication that looks like a mess?
In short, why should people acquiesce in being only the "originators"
of their writings instead of creators in the fullest sense possible.

The new typefaces
which design schools, art schools, industries, and technologies are
producing for the new technologies
are merely reproductions or distortions of past letterforms.
Probably the best way to introduce a change in the right direction
would be to involve the people and the places where the typographic tradition began:
the students and the universities.
I do not suggest any exclusion or any return to a particular aspect of the past;
I do suggest projecting an old tradition of writing in a new direction,
in new technologies, in an ever changing world.

At any period the initiative and competence
in various uses and stages of writing is distributed
over any number of categories of people.
Today not one category should be excluded from handwriting,
not because it leads towards any particular art form,
but because this very simple ability
is the key to individual and collective power—as well as to independent thought.
Today, with all letterforms past and present available,
when even handwriting can be cheaply mass reproduced
our educational institutions should assume a new responsibility
in the teaching of writing in the fullest, creative sense.

On the Theme:
At the Edge of Meaning

Ferdinand Baudin

As a book designer, I am concerned with the Latin alphabet & with literate communication. In this context new technologies as such do not add new meaning to any particular copy; yet in the last quarter of a century there has been such change in the reproduction of texts alone that one may call it a revolution or an evolution depending on the point of view adopted. Whatever the point of view, the essential fact is, of course, the passage from lead to film, from ~~typography~~ mechanical to photocomposition, with all the consequent technological, industrial, social & artistic developments.

change

In any changing situation, as well as in a changing world, we naturally look for a point of permanence, a constant. What is the one constant among the changing technologies? Writing. That is what the symbols & their layout have always been about, no matter if the materials are hot metal, film, pens, pencils, brushes, chisels, punches, paper, papyrus, & parchment. However, it is not a matter of one particular material, or one particular form of physical virtuosity. By writing, I mean the systematic ordering & recording of thought. This is what made the difference between prehistory & history: the ordering, editing, recording & publishing of intelligent, rational thought. ~~With the help of any number of symbols & systems~~ Past symbols & past

a constant

systems may have been better than Latin script. Whatever the case, I cannot see why & how we should or could return to Sumerian or any other previous system of symbols. Here & now we are concerned with the Roman alphabet & its future. There are, of course, a number of other living systems of symbols; however unless Asia suddenly overturns the present political balance of the planet, we may assume that the future of the Roman alphabet spells the future of writing.

Roman alphabet

In the course of two or three millenia alphabets have been written with all kinds of tools and many kinds of materials. Why should we now suddenly become partial to one particular tool or sentimental about one particular material or technology to the exclusion of the rest? ~~I can see little or no interest in any discussion that comes down to that.~~ It seems to me far more

Writing

important to consider and to overcome the lack of interest in the teaching of writing. On the one hand, governments & teachers no longer feel any concern about the proper teaching of handwriting in the schools. On the other hand, the cooperation (such as it was) between typefounders and printer-compositors which kept the tradition of competent writing alive in the typographic era, is dissapearing fast. Additionally, there are people who believe that the emotional, associative, audiovisual means of participation should & could replace written language and rational communication--and, apparently, the sooner the better. This leads sonner or later to a most "undemocratic" situation where all the expert software and the extensive hardware necessary for the competent mass production of written (i.e. rational) communication would be in very few hands. Most people would be able to read but would be unable to write, i.e., to formulate and to communicate personal thought. The situation would not be any better, or more democratic if written communication became the preserve of the people in power. Writing is the only way we know to prepare and to organize any complex human activity. Writing is equivalent to power.

typographic tradition

power

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letterforms

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Everyone agrees that you have to thresh out your own ideas down to the smallest detail in order to know exactly what to write, in what order to write it, and how to organize it. Far more students should be made to realize that the choice of material, color, size, format--in short, the planning of every material aspect of a piece of writing (whatever the production method) is part of the demonstration. The effect is immediate; subliminal perhaps, but final. If anything goes wrong, readers will lay a piece of writing aside after a mere glance. Typists cannot be expected to assume by themselves the burden of the full tradition of writing; nor can engineers, technologists, art schools, or design schools.

Writing is far more indeed than handwriting or calligraphy.

A piece of writing should be clearly understood to include in varying degrees literary and intellectual connotations (that is why the practical study of letterforms is equivalent to an art course). That its material aspects are part of the demonstration is known to archaeologists and codicologists as well as to commercial artists and copy copywriters. Why then should intelligent students be less involved with the format--with the meaning of the physical appearance of their writings than an archaeologist or a commercial artist or copywriter? Why should the author be left incompetent, helpless, utterly unable to assist his publisher or to have control over the

format

appearance of his work? Why should readers accept any scientific publication that looks like a mess? In short, why should people acquiesce in being only the "originators" of their writings instead of creators in the fullest possible sense?

The new typefaces which design schools, art schools, industries, and technologies are producing for the new technologies are merely reproductions or distortions of past letterforms. Probably the best way to introduce a change would be to involve the people and the places where the typographic tradition began: the students and the universities. I do not suggest any exclusion or any return to a particular aspect of the past; I do suggest projecting an old tradition of writing in a new direction, in new technologies, in an ever changing world.

At any period the initiative and competence in various uses and stages of writing is distributed over any number of categories of people. Today not one category should be excluded from handwriting, not because it leads towards any particular art form, but because this very simple ability is the key to individual and collective power as well as to independent thought. Today, with all letterforms past and present available, when even handwriting can be cheaply mass produced, our educational institutions should assume a new responsibility in the teaching of writing in the fullest, creative sense.

independent thought

Visible Language, XI 2 (Spring 1977). © 1977, Visible Language, c/o The Cleveland Museum of Art, Cleveland, Ohio USA 44106. Author's address: 64 rue du Village, 5983 Bonlez, Belgium.

Reflections on the Theme: At the Edge of Meaning

Fernand Baudin

As a book designer I am concerned with the Latin alphabet and with literate communication. In this context new technologies do not add new meaning to any particular copy; yet, in the last quarter century there has been such a change in the reproduction of texts alone that one may call it a revolution—or an evolution, depending on the point of view adopted.
The essential fact is, of course, the passage from lead to film, from mechanical to photocomposition, with all the consequent technological, industrial, social, and artistic developments.

In any changing situation, as well as in a changing world, we naturally look **for a point of permanence, a constant.**

What is the one constant among the changing technologies?
Writing.
That is what the symbols and their layout have always been about, no matter if the materials are hot metal, film, pens, pencils, brushes, chisels, punches, paper, papyrus, or parchment.
However, it is not a matter of one particular material, or one particular form of physical virtuosity.
By writing, I mean the **systematic ordering and recording of thought.**
This is what made the difference between prehistory and history: the ordering, editing, recording, and publishing of intelligent, rational thought.
Past symbols and past systems may or may not have been better than Latin script.
Whatever the case, I can not see why and how we should or could possibly return to Sumerian or any other previous system of symbols.
Here and now we are essentially concerned with the roman alphabet and its future.
There are, of course, a number of other living systems of symbols; however, unless Asia suddenly overturns the present political balance of the planet, we may assume that the future of **the roman alphabet spells the future of writing.**

In the course of two or three millenia alphabets have been written with all kinds of tools and many kinds of materials.
Why should we now suddenly become partial to one particular tool, or sentimental about one particular material or technology—to the exclusion of the rest?
It seems to me far more important to consider and to overcome the lack of interest in the teaching of writing.
On the one hand, governments and teachers no longer feel any concern about the proper teaching of handwriting in the schools.
On the other hand, the cooperation (such as it was) between typefounders and printer-compositors which kept the tradition of competent writing alive in the typographic era, is disappearing fast.

Additionally, there are people who believe **that the emotional, associative, audiovisual means of participation** could and should **replace written language and rational communication**—and, apparently, the sooner the better.
This leads sooner or later to a most **"undemocratic" situation** where all the expert software and the expensive hardware necessary for the competent mass production of written (i.e. rational) communication would be in a very few hands.
Most people would be able to read but would be unable to write, i.e., to formulate and to communicate a personal thought.
The situation would not be any better, or more democratic if written communication became the preserve of the people in power.
Writing is the only way we know to prepare and to organize any complex human activity.

Writing is equivalent to power.

Writing, in the broadest sense, is so complex and so intimately interwoven with every aspect of individual and collective life that not one aspect of it can be neglected.
Not everyone needs calligraphy; **but legibility** (i.e., layout as well as letterforms) **is of the essence.**
The layout (i.e., the planning) is far more important than letterforms.

Too much attention given to letterforms distracts from **the planning which is the heart of writing.**
The responsibility for the design of letterforms is the business of a very small minority of experts.
The planning of any piece of writing should be the concern of a majority of competent authors assisting their editors and publishers. In the future, universities—even more than art and design schools—should be extremely interested in writing courses.

Everyone agrees that you have to thresh out your own ideas down to the smallest detail in order to know exactly what to write, in what order to write it, and how to organize it.

Far more students should be made to realize that the choice of material, color, size, format—in short, the planning of every material aspect of a piece of writing (whatever the production method)—is part of the demonstration.
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Today, with all letterforms past and present available, when even handwriting can be cheaply mass reproduced, our educational institutions should assume a new responsibility in the teaching of writing in the fullest, creative sense.

A Study in Basic Design and Meaning
Daniel Friedman

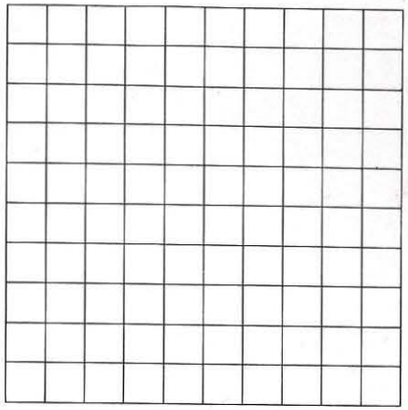


Figure 1
The first essential aspect is to accommodate or accept a given system (the line grid). The neutral grid is the first step in each sequence.

Basic design is the advanced study of fundamentals. It is a humanistic study whose process involves the reduction of visual ideas to universals, universals which transcend pure aesthetics. It can be an analog for more complex design processes or a study of visual metaphors for aspects of urban life. Basic design isolates factors of visual perception so that they can be easily observed, analyzed, played with, controlled, learned, transposed, and applied.

The designs shown here are selected from a book which contains exercises in basic design performed upon a simple line grid. The exercises have been performed by graduate students in graphic design at Yale University.
The line grid was predetermined; it is a neutral field upon which a wide range of design operations can be played.
Each student designed a sequence of images. Each sequence is based on four essential aspects but the total number of images in each sequence may vary.

Figure 2

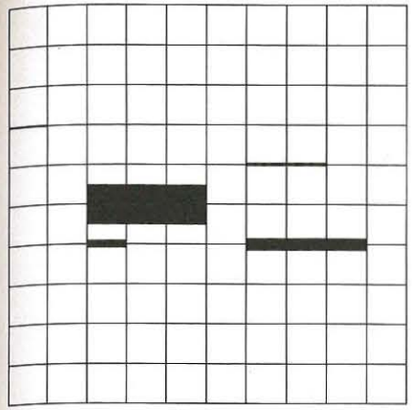
The second image in each group defines a simple design operation, an operation reduced to its most generic state. It defines what can be described as a symbol of an intrinsic idea out of the large inventory of visual "syntax."

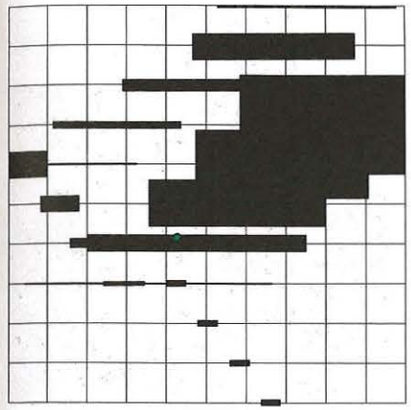
Figure 3

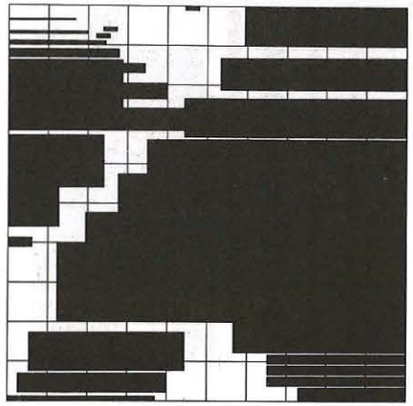
Once a generic operation has been defined, it is used as a point of departure in the remainder of the sequence. It is brought through a process of evolution, destruction or transformation. It is developed into a kind of syntactical visual language which either works with or plays against the given (grid) system. Each image must be individually resolved (internally coherent) and also must be compatible with its neighbors (environmentally coherent).

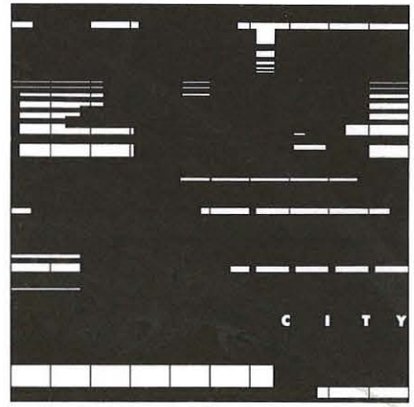
Figure 4

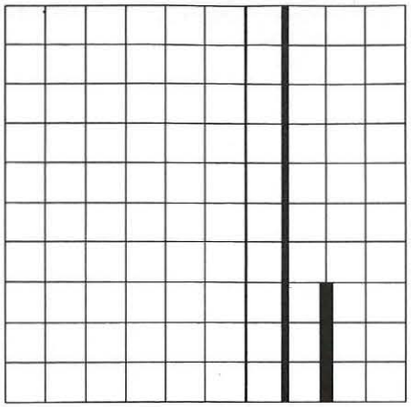
Each sequence ends with a composition which includes the word "city". The input of this element into the exercise adds a semantic dimension. Each student must, in this situation, transcend the purely formal by applying a visual language to a specific meaning. The city images are therefore extensions of each sequence; in some cases, they bring the initial operation to an extreme. In each case, the given line grid is in some way reaffirmed. In every case, the images become symbols for processes of urban organization, planning, renewal or change.

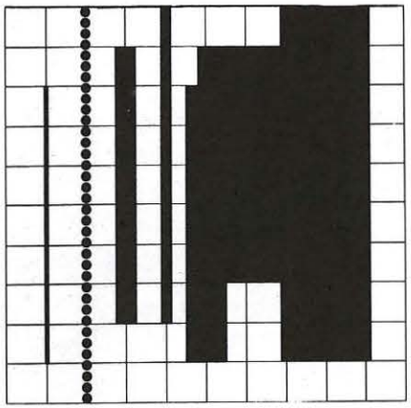


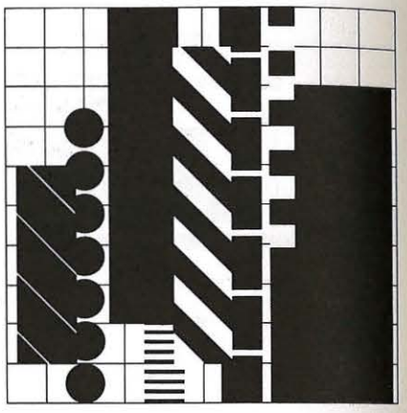


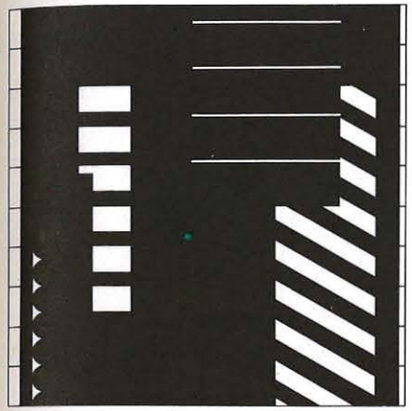












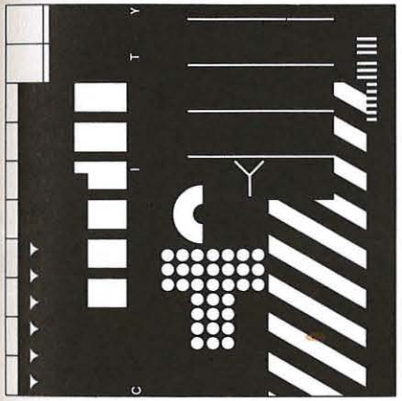
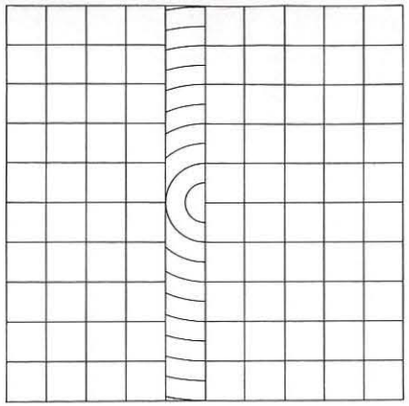
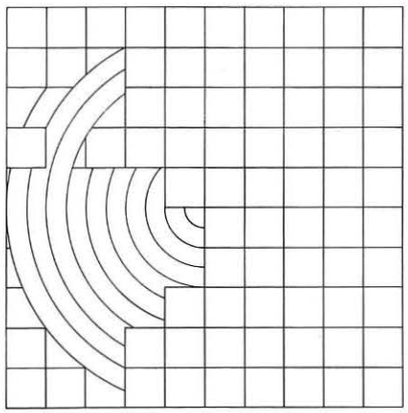


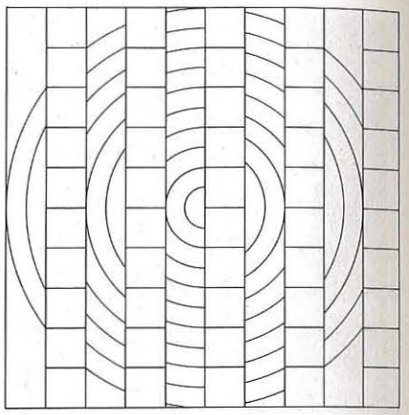
Figure 2

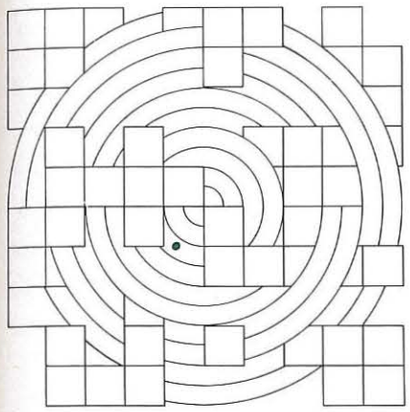
Figure 3

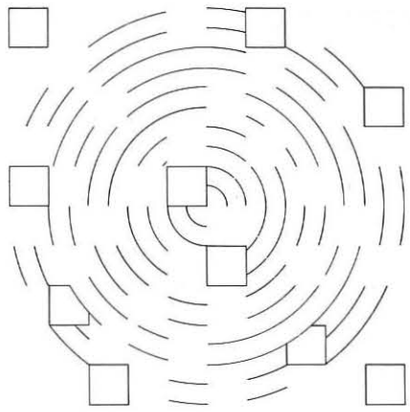
Figure 4

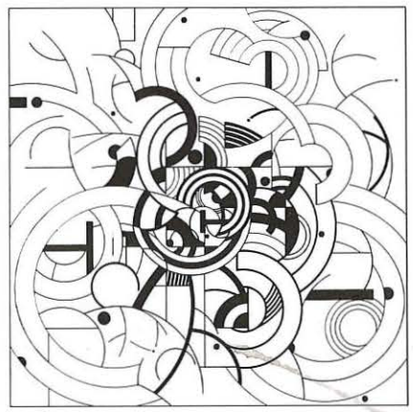


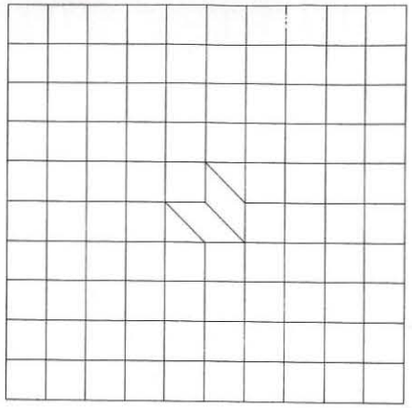


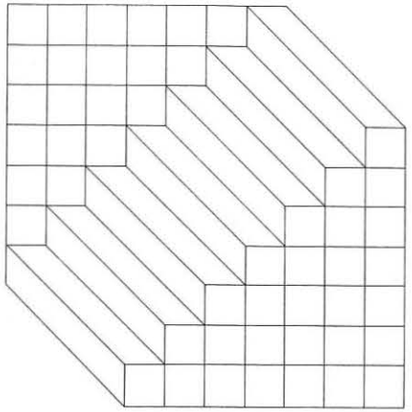


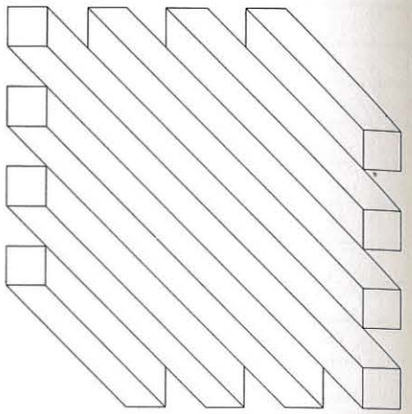


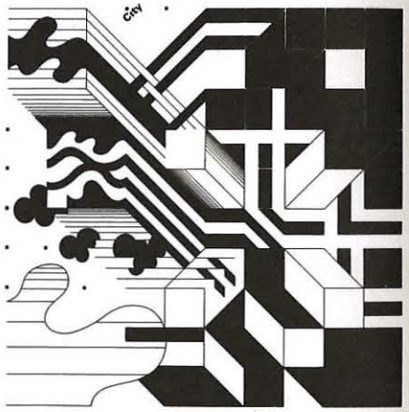












The figures show
student work by:
A Richard Felton
B Kerin Keating
C Donald Moyer
D Douglas Scott

Figure 2

Figure 3

Figure 4

Visible Language, XI 2 (Spring 1977). Author's address: Apt. 2a, 720 Greenwich St., New York, NY 10014.

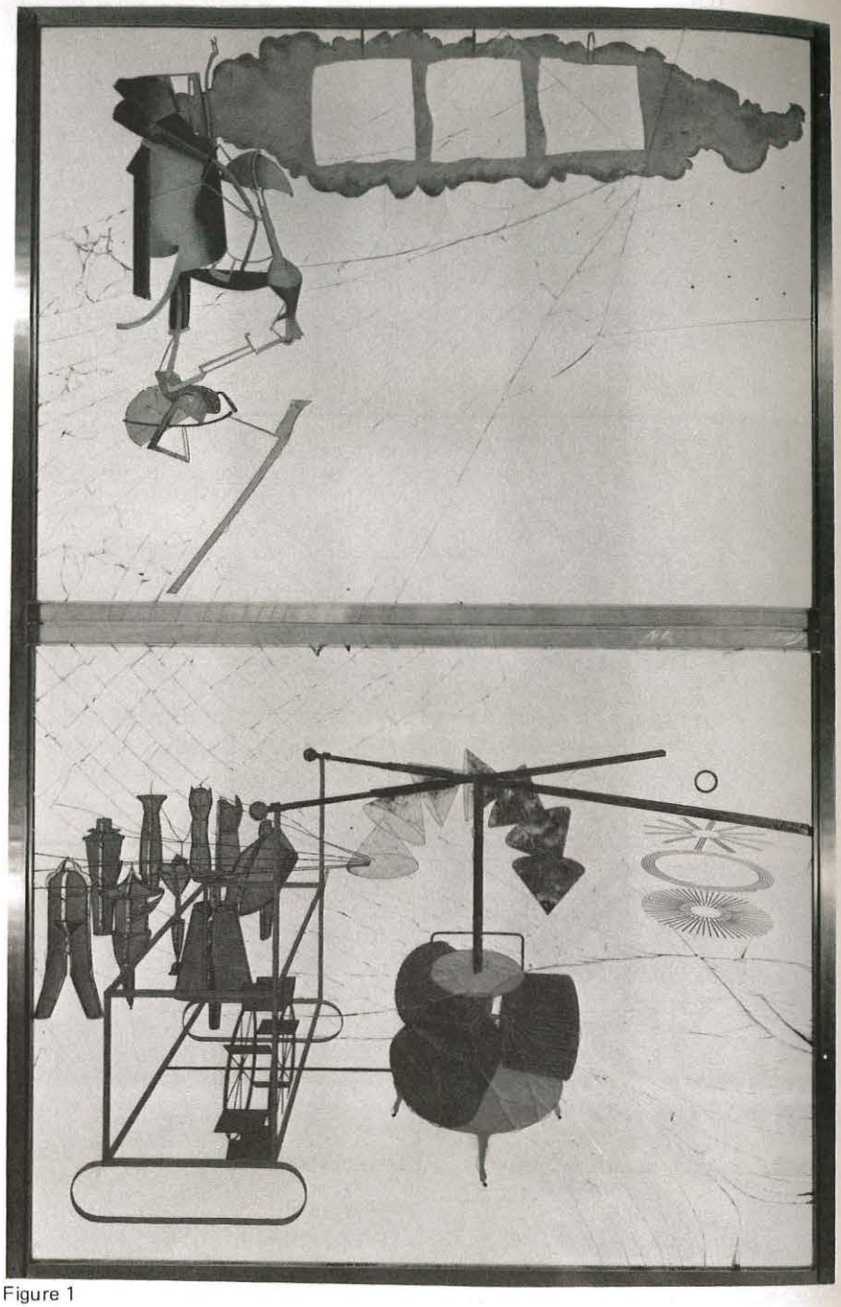


Figure 1

Wortgebilde durch Spiel und Kombinatorik:
Or, Why Duchamp Loved Words

R. C. Kenedy

Due to the needs of a peculiar historical moment, Marcel Duchamp has become the legendary originator of the present; perhaps not the whole of it, but the best part of what passes for experimentation. Nothing can diminish his stature in this respect. His work has survived to supply the stimuli sought by a later generation of rebels when the more acceptable means of opposition were found to be either ineffective or exhausted. In this context it is largely irrelevant whether there is still room for protest by battling against the arts or for trying to undo societies by whatever faith they may have in their creative impulse. Bertold Brecht, for one, sought alternative traditions instead of destruction and he was a no less practised revolutionary than the artist Joseph Beuys; it could also be argued that Brecht was more urgently motivated than Beuys and that his ethical fervor pushed him towards sympathies with the morality play as a logical result of commitment. In the circumstances it seems strange that Duchamp's fame has reached its apogee through the influence which he exerts. Strange and possibly unjust as well, because Duchamp's work is antitraditional, and it is certainly not inspired by pragmatic considerations or by ethical imperatives.

No man can be utterly exonerated from responsibility for the meaning read into his work, and it is certainly true that in Duchamp's case his posthumous

legacy must be considered as an essential part of his contribution. His heritage is an ineluctable part of his myth, but the confusion which comes about when causes and effects are intermingled is far from helpful, and accurate historiography does demand that one should make an attempt to separate the initial evidence from the interpretations derived from it. Nor is it difficult to envisage such a clearcut distinction. It is simple to return to rudiments and to use them illustratively. The basic facts reveal fundamental requirements, and their purposes may not coincide with the demands made upon them by successive moments of exegesis. Accretions of an involuntary kind intervene between the observer and the observation when the so-called insight records an event in the past which acquires new meanings by being dragged into the alien coordinates of a different moment. These additional connotations often obscure the objective substance of an objective statement. It is, in fact, very strange why movements cannot do without these retroactive judgments (reappraisals?) and with alleged discoveries which happen to have little or no connection with the original facts. Their use in a subsequent context and their unplanned exploitation seem a matter of fortuitous accident often enough. The prophetic qualities which we attribute to the resurrected instance are too frequently aspects of seeking approval for ventures of dubious validity, and the arguments are often addressed to the self rather than to the public at large. The public at large has no interest in the professional's soul-searching quibbles. Nevertheless, in Duchamp's case, there may well be grounds for trying to locate the machinery of his dominating impact in his own contribution. The connections are direct, even if most of them have paradoxical, ironical, and wilfully unforeseen implications. There are, in fact, good reasons to suppose that too much effort has been spent on the campaign to display the propaganda values of the direct connections which do exist. However, apologies of this kind are at the expense of serious investigations which must stress the component forces of paradox and irony; it is equally impossible to explore these without a confrontation with the uncorrupted evidence. Mercifully and at long last the documentation is almost complete. We have the record of Richard Hamilton's Almost Complete Works of Marcel Duchamp, partly superseded by Anne d'Harnoncourt's and Kynaston McShine's Marcel Duchamp.

It is extraordinarily useful to have the second publication for it presents a symposium of conflicting studies and tributes by a large number of hands. Hamilton's exemplary study-catalogue of the oeuvre can only be faulted for what happens to be its outstanding merit; it is too authoritative and it imbues its subject

It is certainly no accident that Arturo Schwarz finds it possible to compile a magnificently entertaining and scholarly study of some length which lists the alchemical parallels supposedly built into The Large Glass (1915-1923, Figure 1) while Hamilton asserts with impunity that "Ulf Linde first observed that the drawing bears a resemblance to an illustration in a treatise by Solidonius—an insight which proliferated into the fashionable notion that alchemy provides a key to the iconography of the Glass. Ingenious and amusing as the later cross-referencing with esoteric texts and images may be, it must be said that Duchamp gave this no credence." All of this occurs within the covers of the same publication.[2] Nor is this an isolated example of disagreement. Duchamp's art caters to diametrically opposed interpretations, and it becomes uninteresting if it is divested of controversy. Almost every later opus has evoked similar patterns of dispute, although a great many of them may not be fitted into a simple scheme of positive assertion and negative disclaimer. Fortunately, however, The Large Glass occupies a central position in Duchamp's career, and therefore it is doubly auspicious that it provokes this symbolically direct opposition of mutually exclusive readings. The unresolved doubts are working components of the oeuvre, and they maintain the potency of it. The deliberately introduced uncertainty is the motive

with an aura that conveys unchallenged and unquestionable conclusions. This happens to be a disservice in Duchamp's case because his triumph rests on the controversial nature of his bequest, and the vitality of it is lost to a very great extent if it is deprived of the more or less calculated mysteries which cling to his deliberately constructed riddles. This is not to say that every one of Duchamp's gesturally conceived compositions was primarily intended to present a conundrum, but it can be safely asserted that the preponderant majority of them do, in fact, wear the enigma's uniform. It is part of their deliberate strategem to vaunt the artificial contrivances of the puzzle.

energy of Duchamp's rhetorically constructed works, and it is certainly not in vain to dissect the component elements of this structural ambiguity if we are to have valid conclusions. The anti-aesthetic inspiration of Duchamp's activity is too well documented to need repetition. Hence the terms of another discipline must be substituted for the traditional artist's aesthetic preoccupations when one begins to look for unities in Duchamp's oeuvre. In his case it can be safely asserted that he elected to replace conventions with the formal framework of rhetorical principles. His memorable works are declarations, and they adhere to the principle of declamatory statements. In their own right they are exclamation marks disguised under pretexts of seeming variety.

His works appear on a stage-like platform,[3] to recite a monologue allotted to them by the artist. It is worth stressing the point that almost every one of Duchamp's compositions is given a speaking part in addition to the costume-like conception of its substance. There is an initial ambiguity. Both the found and the made object are pushed into a dramatically conceived context which ignores their original identity; but it does not simply overlook self-evident discrepancies. Bicycle Wheel (1913) and Fountain (a urinal, 1917)[4] reproduce the operatic primadonna's predicament when they perform a part written for them; they represent without surrendering their own initial identity. The measure of their triumph depends to a very large extent on their capacity to excel in a dramatic performance: the performance of what is their anti-aesthetic assignment. In this sense, and in this sense only, Duchamp's role may be compared with the playwright's. He has created character-like concepts, and it was not his duty to substantiate the springs of their eloquence(some actors are, after all, better than others). Nevertheless, he could put words within their reach much like any other author who writes words for a character, and he was thus in a position to present conceptually complete dramatic propositions. His success combines the coordinated result of three interrelated factors. First, the object is subdivided between being itself and not itself. Second, the dichotomy speaks in the fashion of an actor (who is an independent being as well as a part). Third, Duchamp's written messages on the object complement and reunite the disparate ingredients in terms of the three categorical dramatic unities of a half-forgotten tradition. For example, there is Snow Shovel (1915) which says "In advance of the broken arm" or Comb (1916) which satirizes a latter-day Hamlet: "3 ou 4 gouttes de hauteur n'ont rien a faire avec la sauvagerie." Characteristically the speeches grow in complexity as Duchamp begins to master the comic possibilities of his medium.

Obviously, Duchamp did not reach this terminal phase without a long history of experimentation. A responsiveness to the calling of an innate bent produced

the stance, but no account of it can be meaningful unless it is clearly intended to demonstrate why the verbal commitment is an essential component in Duchamp's make-up. Only a much longer study could prove the hypothesis of this essay, and a great deal of these preliminaries must be taken on trust. However, it may not be necessary to trace the course of Duchamp's dualizing thought throughout the entire oeuvre. It may be taken for granted that the quasi-schizophrenic separation is present in the latent ambiguities of the earlier work without examining every stage of it. A phenomenological enquiry can be circumvented by a quasi-philological approach to the iconographical problems of the fine arts. It is self-evident that the fine arts are involved in attempting to specify their own semantics once one is ready to admit that recognition is implicated in any encounter between the artist's work and his public (which happens to take place around the art object). Communication of a kind does

occur and the artist's intent is declared in a work in order to be transmitted. The processes of interchange are ineluctably quasi-linguistic. In this light it is irrelevant whether the aesthetic content is narrative, descriptive, or simply auto-indicative. Duchamp's use of the icon's own semantics is very special, and in any discussion of his oeuvre the act of examining the basic ideas admitted by iconic communication is no less revealing than the cataloguer's running commentary on the individual product's peculiarities. Something unprecedented happened at the beginning of this century, and Duchamp's part in it conformed to the historical pattern for a very long while.

After Cézanne, exact correspondences between visual observations and their pictorial record were replaced by the graphic signals of pictorial programs. The simplest way to talk about the original naturalistic correspondences invokes the concept of translation. No translation is possible without a grammar of one kind or another. There is no pictorial or sculptural realism which does not accept the basic ingredients of a visual grammar, and every realist design transmits its messages which can be reformulated in structurally meaningful words. Needless to say, the translation is bound to show a contemptuous lack of regard for aesthetic values. However, for the time being aesthetic values are not

at issue in this argument. The grammar of the statement is the gist, without which no pictorial thesis could be formulated, without which pictorial argument would be impossible, without which no pictorial belief could be stated. It is of paramount importance that the image arranges its constituent forces in accordance with the rules of its own grammar. Perspective, color, and graphic forms are only the rudimentary manifestations of these rules and others may supplant them in different cultures or in changed cultural climates. The Persian miniature employs a set of formulae which seems, at first sight, incompatible with the structural principles of the High Renaissance, but it is no less successful in presenting a communicatively valid record of a communicable statement: a story, to put it succinctly.

In Cézanne's wake the twentieth-century revolutions moved along a path which advocated a progressively reductive use of visual language. It is possible to maintain that the ideals of a purer painterliness inspired the attitude and that they justified it. From the linguist's point of view, a metaphorical one in this case, it would seem that working components of the imagist's grammatical machinery were abandoned either for the sake of giving greater emphasis to the remaining apparatus or for the sake of superimposing an artificial system on the left-overs. The Cubists, for instance, removed not only complete optic perspectives; they did away with curvatures and their associative correspondences as well. Their action was by no means negative. They admitted and exploited non-referential rhythmic quantities which replaced loss with a measurable gain, although the newly acquired impulse came from a different discipline. Musical concepts and, in their wake, quasi-musical structures combined with the

remaining set of pictorial technology to create an artificially renewed context for pictorial communication. Kandinsky's obsessive search for analogies between aural and visual harmonies was a logical extension of advancing along predetermined lines that have never been intended to quarrel with the notion of a grand, symbolic, all-embracing syntactic superstructure. A magnificent semantic hypothesis haunts every creative impulse, because only an unconscious assumption of this kind can bridge the gap between the statement the artist makes and his audience receives. Certain basic formal relations cannot be denied. Structural coordination conveys informatively potent signals.

It would certainly be possible to study these structural details of communication in elaborate detail, but for the purposes of this essay it is sufficient to establish the relevance of a few basic concepts. Languages burst into meaning in two ways. Both the syntactic rules of the statement and the metasyntactic apparatus of (for example) metaphor and allegory are capable of conveying semantic values. In this sense rhythmic and chromatic echoes are quite obviously metasyntactic features of communication.[7] It is more convenient to regard these surface phenomena as the physical and the metaphysical properties of a given medium. Imagery conveys physical and metaphysical properties, and they correspond with the verbal statement's verifiable patterns exactly enough to be of practical use. It is not essential to dwell on metaphysical constituents; there is very little room for them in Duchamp's oeuvre in the conventional sense. Symbolic or quasi-symbolic modes did not appeal to his imagination; nor, indeed, are there many examples of the indirect mode in his oeuvre: no allegory, no metaphor, no allusive use of a medium.[8]

There remains the physical side of the problem, and a similar division is evident in every syntactic sign. In every coherent statement syntactic signs occupy a structurally allotted situation in order to fix meaning. Meaning is derived from the combined forces of verbal or quasi-verbal content and "activation," and "activation" is achieved by the structural forces indicated by context.

Two extremes characterize the attitudes one can assume towards these concepts. In Saussure's view the two extremes are governed by common principles manifested by the terms "lexical" and "arbitrary," on the one hand and "grammar" and "relative motivation" on the other. "The two extremes are like poles between which the whole system moves, two opposing currents which share the movement of language: the tendency to use the lexicological instrument (the unmotivated sign) and the preference given to the grammatical instrument (structural rules)."[9, 10] Throughout the history of the fine arts in Western Europe the attitude of "relative motivation" takes precedence over "arbitrary" decisions. There are very good grounds for this hierarchy during settled periods since creation takes place within given modes whenever traditions provide for a firm framework. This observation remains generally true even during periods of unrest. The grammatical stance is evident in Cubism no less than Abstract Expressionism. The syntactic machinery of an expressionist tendency is highly reductive. In the case of Constructivism, however, we have a total experiment which attempts to engineer the pictorial equivalent of a new language like Esperanto. In both instances the notion of interrelated quantities predominates without obstruction from externally conceived forces.

Looked at with Saussure's principles in mind, the Constructivist attitude is of special interest; for the declared aim of every constructivist trend is a new notation which is significantly indebted to the ancient magical script of geometry and mathematics. It is certainly no accident that the great Russian Constructivists attempted to base the vocables of their iconography on Pythagoresque principles just when modern theories of syntax have begun to succeed in evolving mathematical formulae which represent the formal dynamics of significant language. Tentative interpretations are beginning to disentangle the workings of the superstructural and symbolic processes which unite the communicative processes of human groups. These recent theories tend to suggest that the apparent gulf which separates these seemingly separate disciplinary processes is merely a haircrack. The Constructivist's goal is a script of universal validity, accessible

to the masses and embracing the distinct functions of painting, architecture, and sculpture. Inevitably their program employs a sign-language which expresses the communicative code of a foregone conclusion.

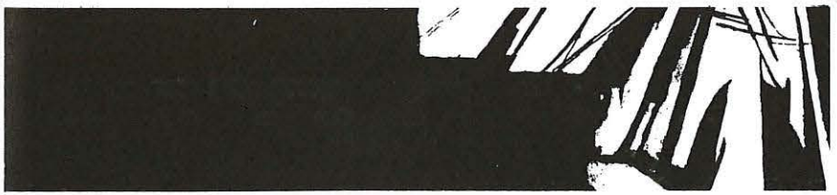
That is not to say that exceptions cannot be found to show examples of an "arbitrary" stance. Every mannerist inclination is, to a certain extent, tainted with arbitrary solutions. For example, Arcimboldo's paintings from the sixteenth century demonstrate how far this tendency could go during periods of seemingly settled tradition. Arcimboldo created portraits in which the image was created out of carefully juxtaposed objects such as fruits and vegetables. As his work suggests, the arbitrary is superimposed on a framework of accepted references in mannerist objects, and it performs the role of a highly esoteric metaphor in them, a metaphor which happens to be deliberately meaningless in many cases. Nevertheless, this arbitrary (metaphorical) discrepancy specifies the precise circumstances of a shock. It specifies it in spite of, or because of, the inbuilt semantic incompatibilities of an arbitrary opposition. The raw material of the shock has a relative motivation once again, as in Arcimboldo.

Duchamp's characteristic contribution explores the extreme case exclusively. Indeed, it is so uncompromising in its "reactionary radicalism" that his use of every verbal value is emphatically lexicological. There was to be no meaning in his oeuvre over which he did not exercise control. The abstract sentence was his ideal, and nothing could deter him from reaching its self-designated precincts, ones within which individual meanings were exposed to the symbolic equivalent of genocide. The mass murder of significance was obviously designed to indicate the absolute power the artist exercised over subordinate subject matter. In the artist's case these harsh realities do, of course, undergo some modification, for the accidents exposed to his whims submit only to gesturally motivated vanities, and they tend to be without lethal consequences.[11]

The arbitrary and the lexical aspects of Duchamp's program require further clarification. The distinction between the Found Object and the Readymade is best fitted to illustrate the syntactic distinction between the two attitudes implied by this antithesis. Picasso's Bicycle Saddle, which represents a bull's skull, is an ideal instance of the grammatical meaning through which the found object establishes points of contact with a communal reservoir of knowledge and recognition. Duchamp's Fresh Widow (1920, Figure 3) on the other hand, presents a categorical denial of relative motivation in accordance with the Readymade's auto-mythopoetic principles. It is a miniature "French window"

in a painted wood frame with eight panes of glass covered in black leather. The title of this work perpetrates a very weak pun, but the undergraduate humor of it is rescued by the first appearance of the artist's alterego in the pseudonymous signature. This compensates for the low dig in the ribs with the pen-name's double-entendre.[12] Pun is heaped upon pun at the verbal instigation of a representatively meaningless object and every indicative connection stresses only the dictionary's fortuitous coordinates, the alphabetically determined correspondences which relate incompatibles in order to cancel out the emotive, the logical, the narrative, and the intuitive clues that prompt recognition. Only the vocabulary's quantities survive, and their survival is subordinated to the signification of the lexicographer's meta-empiric game with imaginary figures (merely figures of speech, as often as not).[13]

Every phenomenal representation of the disconnected instance serves this type of lexicalism in Duchamp's oeuvre. The objects serve an illustrative purpose, and in this context it is neither here nor there that they portray the analytical presence of the artist instead of specifying cognitively valid and satisfactory realities. Duchamp's aesthetics invoke the arbitrary in order to claim that it is the artist's right to define art and in order to deny the communally determined



factors of judgment. One does not have to be a Marxist to entertain gnawing questions of doubt faced with this proposition. Art shares the predicament of every productive occupation and cannot do without a need for art. This need must come from the communal area of the market place, however specialized the merchandise may be. The ethics of interchange stipulate recognizable terms for transactions between partners in a contract. The contract between the artist and his audience may well be unwritten, but its reality, even if it is a changing reality, cannot be dismissed for all that. Duchamp represented anti-aesthetics consciously enough, but the distinction between conservative aesthetics and his own brand of anti-aesthetics is admirably designed to fit into the unifying coordinates of Saussure's oppositive scheme.[14]

Max Bill was probably the first to understand the linguistic nature of Duchamp's oeuvre: "A verbal imagery inspired by games and the theory of combinations"[15] (Or, maybe "coined"—a more exact translation than "inspired"). Bill does not follow up the truth of his axiomatic observation with an enquiry which could clarify the nature of such an imagery, although his use of the word "Kombinatorik" emphasizes his awareness of the fact that Duchamp represents quasi-mathematical, schematic abstractions and that realities are rigorously excluded from this oeuvre. The realities excluded embrace, of course, every verifiable constituent of the universe, color-shape-form-and-force included. With these remarks in mind it is striking to observe that the major pictorial example of Duchamp's maturity depicts its icons on glass. The Large Glass provides a transparent stage for its cast, and this ensures for it the independence of dialogue that takes place in an equivocal environment, one through which and within which unpredictable, uncontrolled forces

operate without let or hindrance. Imagery on glass operates like words in the objective environment. Duchamp fixed the absurdity of verbal coincidences, and the French window's fortuitous echo of Fresh Widowhood typifies his objectivation of callous accidents. He abhorred the poetic force of metaphor. There is no example in his work of, say, Bats in the the Belfry or The Grapevine, which could have supplied him with similar puns, puns whose content might have seemed no less concrete in a literal translation. However, the secondary and emblematic potency of a proverbial phrase was certainly not to his liking. It would have admitted the shades of poetic allusion, and connections of any kind would have adduced the otherness of a reality which his work forswore. E.M. Forster's motto "Only connect" was replaced by its opposite in his contribution, "Make sure there are no connections."

Unfortunately, Richard Hamilton's very comprehensive notes in the Tate Gallery catalogue were not meant to probe intellectual implications. They were designed to evidence the rather academic presence of aesthetic values in works meant to deny them.[16] He has tried to discover in Duchamp's Readymades "a hallowed aspect that welds them into a vision of implausible unity," and the sacred requirements of Hamilton's ideals kept him from recognizing

a unity which was neither implausible, nor indeed related to the faculty of vision.

Thus, the task to demonstrate the verbal nature of Duchamp's highly mixed techniques was left in abeyance until it was attacked, at long last, by David Antin. Antin's essay "Duchamp and Language" [18] is a masterpiece of its kind and it is likely to remain one of the cardinal texts of modern criticism. It documents a legitimate conception of language which shows very welcome signs that it was compiled after Wittgenstein's and Rudolf Carnap's findings have gained a degree of currency. It illustrates the application of linguistic principles to the practical problems of everyday psychology. With premises such as these he sets out to apply the theoretical concepts to Duchamp's puns. He dissects and demonstrates their features after the fashion of the anatomy lesson. At this point he stops short. Indeed, Antin's study is in many ways the equivalent of a doctoral thesis on a new disease. He lists symptoms without relating his account of them to a general, quasi-biological context. His observations are beautifully accurage; "I would say that what Duchamp does as an artist is to create a series of kinetic art works in which a language field defines the action of something that's put in the middle.... Why do I say 'linguistic significance'? Because there is no other kind of significance....Duchamp manipulates language structure, and he manipulates it mechanically...; he intended to create a kind of syntactical unit that has no clearly anticipated semantic consequences."

Antin achieves in a brilliant series of diagnostic insights what criticism has significantly failed to provide, but his revelations survey the surface, and this obscures his interest in the precise questions of the historian. He has no use for parallels and oppositions. Nor can he be blamed for the omission; for the new in Duchamp is new, and Antin sets out to specify its particular characteristics. Inebriated with the discovery of unknown facts, he enumerates accurate observations which display the precision of the gem's facets. His approach is disciplined

by principles of description, and these imply the need to forgo value judgments. Every note of approval or disapproval is consequently absent from this account. While science must remain tied to the so-called rock of impartiality, history cannot be recorded without references to the stage upon which it is enacted, and its boards evoke their own ethical principles.[20]

Bill's and Antin's observations must, therefore, be transposed into a contextual framework.[21] The fact that Duchamp's contribution is based on a special use of language would be of no practical interest if artists refused to admit that art is a special kind of language.[22] Only the generally assumed validity of this axiom gives the remark a degree of truth. It follows from this hypothesis that the language-like nature of the arts has

kept them alive over the centuries. Every aspiring painter and sculptor conforms to a visual syntax when confronted by the problems of practice. Michelangelo was schooled to acquire a fluency in a traditional script, and so were nearly all his predecessors and successors. The practice of art requires structurally designed processes of learning because they are intended to reveal means of communication which must take place within the fixed

coordinates of conscious or unconscious instruction. There is always a model and its didactic nature survives in every valid experiment.[23] The aspiring painter learns his craft from a conceptual ideal much as a child learns to speak from the adults around him, although there is a difference of some significance. The child is an uncritical subject of the environment that teaches him the rudiments of speech. No artist is uncritical. Even the student

approaches his task in the academies critically. It could be maintained that mature art cannot help reviewing the evidence of the model before it. The artist is a mature being, and his analytical preoccupations may be measured on a scale which embraces the entire spectrum of attitudes between wholesale acceptance and censoriousness. Duchamp represented the latter extreme uncompromisingly, but in every other respect he remained typical.

The artist brings a schizophrenic duality to the task of enlarging the sphere of his profession. He is an adult who exposes himself to the discipline of the nursery whenever he attempts to acquire new knowledge which fits into a traditional scheme and whenever he has the means of superimposing the poet's arbitrary schemes on a pre-existent outline. He can come up with personal rhythmic specifications and harmonies in order to obscure the hidden content or the latent traditions in his own work; and, of course, he is free to indulge in discourse. It is not surprising that childishness is a temptation when the nursery's ways of advancement are consciously reenacted. The superficially infantile graphics of a Mirò or a Dubuffet are ineluctably connected with memories of learning and relearning. (Duchamp's iconoclasm is also not wholly unrelated to the spirit of juvenilia....) In Noam Chomsky's terms "the structure of particular languages may very well be largely determined by factors over which the individual has no conscious control and concerning which society may have little choice or freedom." [24] The artist's control over them is also strictly limited. It cannot go beyond the limits of a James Joyce without exposing itself to incomprehensibility.

With such considerations in mind, the interest this study shows in structural features will seem self-explanatory. The contention that language is the concept that embraces the arts seems to be axiomatic. It follows from this premise that personal predilections are revealed by preferences for certain kinds of syntactic features. In a pictorial script characteristics of this sort are much more sharply polarized than in speech which is easily corrupted by unconsciously employed allegory, metaphor, or loose colloquialism. Iconographies tend to represent the deliberate phenomena of diction. It is therefore reasonable to suppose that oppositions reveal basic cultural sympathies. Subsequent analytical parallels establish a scale of values. Values of this type are emotively charged, but within their own passionately determined coordinates they are exact.

They are not meant to settle the question of hierarchies; they enable one to take sides. From a practical point of view, the horizon's earthy and lateral distinction between left and right does seem to be more exciting than the vertical's absurd calibration, for the measures of height and depth are arbitrary in isolation. It is just possible that the technical information of linguistics may turn out to provide the best tools for fixing the situations of this plane opposition. It so happens that nothing could be further removed from Antin's point of departure than such a method-based approach

and the coincidence of his conclusions with the present enquiry's seem all the more striking. [25]

There is an additional reason for invoking the spectre of language-learning. There is a need for stressing the communal resources of the artist's language, and it is best served by adducing evidence to show that the artificiality of art reflects a model which is imprinted in the unconscious structures of the social group or grouping. The machinery of making statements can only be explained with the help of this supra-individual concept. "On the basis of the best information now available, it seems reasonable to suppose that a child cannot help constructing a particular sort of transformational grammar to account for the data presented to him, any more than he can control his perception of solid objects or his attention to line and angle. Thus it may well be that the general features of language structure reflect not so much the course of one's experience, but the general character of one's capacity to acquire knowledge." [27] The emphatic allusion in Chomsky's remarks to solid objects, line, and angle help to underline

the obvious, that recent findings do not distinguish between art-perception and language-learning. On the other hand, matters remain in a state of suspension even in such a much-simplified arrangement. Language carries forms as well as content, and the "arbitrary" stance towards forms does not go beyond implying authoritarian inclinations.

It certainly does not implicate the message's content in totalitarian ideologies. Only in the extreme case, where form replaces content altogether, is there some

justification for expressing a degree of dislike. Duchamp's mature work, with its insistence on ignoring meaningful content, does in fact belong to the province of such formalist experimentation; hence the grounds for dwelling on classificatory principles. Certainties are scarce in deliberately meaningless statements. As for conclusions, only one axiomatic inference can be asserted with a degree of reasonable confidence. It is a symbolically potent fact that expression seeks a transformational grammar. It is the task of art to transform. If it replaces grammar with lexical principles, it implies the negation of

one's capacity to acquire correlative knowledge. The arbitrary autism of a work such as Duchamp's posits an egotistical sublime which must perforce lead to the absurd. Knowledge is acquired and disseminated through points of contact, confrontation, and conflict. The absence of such points fosters an autonomy which proposes the authoritarian values of mere self-esteem— the person's cult of the personality whose radicalism is wholly reactionary.

Figures

1
The Bride Stripped Bare by Her Bachelors, Even (The Large Glass), 1915-23. Oil, varnish, lead foil, lead wire, and dust on two glass panels (cracked), each mounted between two glass panels, with five glass strips, aluminum foil, and a wood and steel frame, 109¼ x 69¼ inches (277.5 x 175.9 cm). Philadelphia Museum of Art, Katherine S. Dreier Bequest. Reproduced with permission of the Philadelphia Museum of Art.

2
Nu Descendant un Escalier (Nude Descending a Staircase [No. 2]), 1912. Oil on canvas, 57½ x 35 1/16 inches (146 x 89 cm). Philadelphia Museum of Art, The Louise and Walter Arensberg Collection. Reproduced with permission of the Philadelphia Museum of Art.

3
Fresh Widow, 1920. Miniature French window, painted wood frame and eight panels of glass covered with black leather, 30½ x 17 5/8 inches (77.5 x 45 cm) on wooden sill ¾ x 21 x 4 inches (1.9 x 53.3 x 10.2 cm). Inscribed across the sill, applied in black paper tape letters: FRESH WIDOW COPYRIGHT ROSE SELAVY 1920. The Museum of Modern Art, New York, Katherine S. Dreier Bequest. Reproduced with permission of The Museum of Modern Art.

Notes

1
Richard Hamilton, Almost Complete Works of Marcel Duchamp. London: Tate Gallery, 1966 [hereafter "Tate"]. Marcel Duchamp (eds. Anne d'Harnoncourt and Kynaston McShine). New York: Museum of Modern Art, 1973 [hereafter "MOMA"].

2
MOMA, pp. 58 and 81-98.

3
Exhibitions of any kind are platforms. The showcase is a miniature stage.

4
Significantly, the bicycle wheel and the urinal/fountain are turned upside down in being presented as art-objects. The inversion is intended to help them not to be themselves. The moustache on the Mona Lisa in L.H.O.O.Q. (1919) is a similarly theatrical prop which is shown up by the ease of its removal in 1965. The rather smutty humor of the coded letters beneath the Mona Lisa is exceptional, on the other hand, for it replaces the more usual monologue with words from Duchamp's own mouth. Even Duchamp has failed to find a motto appropriate for a Leonardo's lips. The masterpiece does tend to have sufficient power to exact unconscious reverence.

5
It is an open question whether Duchamp's textual contributions can compete with Shakespeare's or Racine's, and it is equally uncertain whether a speaking shovel or contemplative comb is ideally suited to replace a Garrick or a Caruso however imaginary the stage one provides for them.

6
According to Richard Hamilton, Duchamp's "roots" are "in the bohemian art of Montmartre. We are thrown almost immediately into a group of paintings of brilliant assurance. The canvases of 1911 must be rated amongst the greatest products of a period that will be marked as one of the most distinguished in the history of French Art." (Tate, page 5). The superlative, as applied to Duchamp's canvases, strikes one as slightly exaggerated, especially in view of Duchamp's contemporaries, but Hamilton is well-qualified, as well as correct, to recognize the central merit of these compositions.

7
In Duchamp's Nu descendant un escalier (1912, Figure 2) the rhythm is an allegorical substitution for time. His later dissatisfaction with his own traditional resolution of a linguistic problem is highly characteristic. (It is odd to observe that the Nude Descending a Staircase reproduces a great many rhythmic features which seem to have inspired Wyndham Lewis during his Vorticist period. These stress-patterns seem to be reinforced by echoes of Lewis's preference for buffs and browns. Lewis became a later-Lewis as Duchamp became a later-Duchamp, and it is just possibly not too far-fetched to argue that their divergent paths were motivated by a similar dissatisfaction with similar beginnings. If so, the similarity of the dissatisfaction could be used as an additional piece of evidence to suggest related intellectual attitudes.)

8
The Large Glass or The Bride Stripped Bare by Her Bachelors, Even (1915-1923, Figure 1) is, admittedly, replete with iconic symbols, allegories, and metaphor. In The Bridal Domain the bride herself appears as a mixture of cloud and caterpillar and the Milky Way is part of her dubious appeal. Nine Malic Moulds represent her suitors and their silhouettes are about to be ground down into anonymous malehood by the torture instruments (of desire?) before them. In this context The Water Mill's outline is less ironic than The Chocolate Grinder's. Nevertheless the pattern of these allegories is mapped out. Their poetry is unsatisfactory; only their aesthetics work. The imagery has the elegance of transposition, but it is without the magic which works on a semantic level. The use of the word "malic" may help to illustrate the prosodic failure. It is worth demonstrating because, as far as I know, it has not yet been pointed out that the term denotes an acid obtained from the apple "and other fruits" (Brande). In English as well as in French it means nothing else. Duchamp's use of it in a key position, in order to refer to Eve's apple and to the male, is forced as well as imprecise. The exploitation of the direct allegory which characterizes this work is unique in Duchamp's oeuvre. The difficulties he encounters in its application speak for themselves, and the sweat of many years hangs uneasily over the beauty of this masterpiece.

9
F. de Saussure, Course in General Linguistics. Translated by L. Baskin, 1960.

10
The Latin "inimicus," for instance, refers directly to its etymological origin. In the French "ennemi" there is only an echo of "ami" and "amicus;" and in our English "enemy" not a trace of the foe remains who opposes the "friend." The Latin is relatively motivated, the English arbitrarily. The derivation of meaning is enacted within the coordinates of this dialectical framework in every instance. Exceptions do not exist, only stations of compromise; and the French word "ennemi" is a good example of it. Mutatis mutandis, the same attitudes are evident in syntactical features of greater complexity as well, not merely in the isolated word. Their role is especially interesting in the metasyntactic apparatus where ideal connections and psychology begin to exert a powerful influence of their own.

11
The Rendez-vous du Dimanche 6 Fevrier 1916 displays a typed text on four postcards. Duchamp's commentary on it clarifies the lexical nature of it: "The construction was very painful in a way, because the minute I did think of a verb to add to the subject, I would very often see a meaning, and immediately I saw a meaning I would cross out the verb and change it, until, working for quite a number of hours, the text finally read without any echo of the physical world...." The exclusion of structurally motivated semantic relations substitutes the lexical activity of the artist's self-signifying presence for the concept of communicative meanings.

12
The work is attributed to Rose Selavy who developed into the later Rrose Selavy. There is a prophetic note of sadness in the assertion that "Eros, c'est la vie."

13
Duchamp's valedictory self-portrait which shows his bronze-cast head pensively examining an abandoned knight on what is, in the circumstances, a deliberately absurd chessboard may have been intended as a commentary on all antirational games. For further commentary see MD Moule Vif, Paris: Editions Claude Givaudan, 1967. See also Art International. XI: 7, p. 72.

14
It is not insignificant that the logic of Duchamp's lexical extremism leads directly to Kosuth's tediously repetitive, conceptual dictionary entries via the puns, and that Manzoni's samples of "artist's crap" (tinned/canned) helped to perpetuate the urinal/fountain's autistic ethos.

15
Zurich Kunstgewerbemuseum Wegleitung, Number 234, 1960. P. 10.

16
Hamilton's resolve to imbue Duchamp with beauty can go to extreme lengths. His preliminary experimentation to reproduce The Large Glass provided him with the left-overs of laboratory material designed to attest techniques, and he included a glass version of the Témoins Oculistes in his exhibition although the piece has no authority as an independent work in the Duchamp canon. He justifies the decision with reference to beauty: "Since time was limited for the Newcastle reproduction of The Large Glass a short cut had to be found. A drawing was made, using no. 139 as the model, to prepare a silk screen....Richard Hamilton's experiments with this technique gave us an object too irresistible to exclude from the exhibition." Hamilton tends to think that "indifference provides a beauty unintended by Duchamp. His search for an object without aesthetic merit, one with the least virtue that he could find to allege his conviction that taste is the enemy of art, has proved futile. For the Duchamp personality, his essential artistic genius, has defeated him:" (page 5). This, of course, is criticism of the metaphysical kind which ignores every tangible and demonstrable quality of the work itself in order to entrench its claims behind the unassailable concept of sheer genius. The exorcising bent of his argument is not surprising in a man of Hamilton's outlook; he is an image maker in the grand tradition and his sympathies are utterly committed to heritage. Hamilton's traditionalism is rather obvious and the motorcar replaces in his iconography the stags and the sheep of nineteenth-century landscape painting. Hamilton imbues the aspect of steel with Samuel Palmer's mystic light in his compositions. He is certainly ill-equipped to show intellective sympathies with Duchamp's "enigma" (the word "enigma" is taken from Hamilton's own text).

17
Tate p. 5.

18
MOMA, 1973, pp. 99-116.

19
The reference to Wittgenstein and Carnap may well be overemphatic or mistaken.

20
"In Clio's domain the past's ghosts rattle their ineluctable chains according to the dictates of the interpreter's moral philosophy" (Johann Dieb, Briefwechsel mit Friedrich Engels. April 30, 1868. Liepzig 1974.)

21
Most of the notes for this study were written several years ago for a course of lectures in the University of Illinois. It would be ungrateful to deny the debt which the present cast of these pages owes to Bill and to Antin. There is, certainly, the wish to arrive at conclusions. In the light of this wish Antin's magnificent exegesis does seem like a running commentary on Max Bill's contention, although he does not quote it. But it would be very misleading indeed if the inferences in this article pretended to be a continuation of the beginnings so stimulatingly put in their work. Paradoxically, the propositions put forward in this essay stem from very different sources. Their formulation owes a good deal to evolutionary ideas which are inextricably involved in any critical argument. A relative motivation is an essential component in historical and analytical writing. No scrutiny can be devoted to isolated occurrences. Examination takes place within a context, and information is of no value unless it is referentially intended. Any genuine commentary aims to locate new items of knowledge in a fixed scheme of given data in order to stress relationships. These relationships provide observations with meaning.

22
It is surely to the point that William Tucker's new book on sculpture between 1860 and 1965 is called The Language of Sculpture (London: Thames and Hudson, 1974).

23
Even the extremist revolutionary tries to fit himself into conventional aesthetics. Body artists stain papers and picture surfaces with the body's juices and are on record in claiming that "the human body is being substituted for the role of the paintbrush." It has even been asserted that the tints thus obtained "provide more natural pigments" than the paint factory.

24
Aspects of the Theory of Syntax, Cambridge: MIT Press, 1965, p. 58.

25
Antin's thought processes follow the cues of the inspiration exclusively.

26
Duchamp enthusiasts and the proliferating schools of Neo-Marcellianism which pander to their taste are at liberty to maintain that semantic absurdity reflects the meaninglessness which societies attribute to art.

27
The word "learner" (or "artist"?) is a legitimate substitution for the word "child" in this sentence, and the statement gains a good deal of forcefulness in its applicability to the artist's special problems if in fact it is reread with the amendment in mind. Chomsky, ibid.

Figure 2

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At the Edge of Meaning
The use of video, computer graphics, and holographic communication suggest that a diagrammatic, three-dimensional typography is an appropriate means of visible language to express the potential of these media. This special issue of Visible Language explores some aspects of such an approach to visible language.

Aaron Marcus
is visiting lecturer at the Bezalel Academy of Art and Design (10 Shmuel Hanagid Street, Jerusalem, Israel). He is on leave from the School of Architecture and Urban Planning at Princeton University (where he has taught nine years) and from the University's Interactive Computer Graphics Laboratory. He has also taught in the Visual Arts Program and worked in the University's Publications Office. He has created, lectured, and written about, and exhibited internationally works of computer graphics and concrete poetry.

Nelson Howe
is an artist working in New York City (307 West Broadway, New York, NY 10013). He has participated in numerous events and exhibits in the U.S. His work has appeared in limited edition books and in Print Magazine, Harpers, and The Village Voice. His book To the Sincere Reader (Wittenborn, 1969) was named one of the 50 Best Books of the Year by the American Institute of Graphic Arts. Mr. Howe's art work concentrates on coded systems and "scores" for public participation events.

Observations Concerning Practical Visual Languages
Normal means of communication—human languages—are very well suited to a description of linear order. As one makes use of the verbal system in almost all spheres of culture, there follows involuntarily an orientation to certain regularities. One tends to recognize chronological and casual orders and to overlook other types of connections. According to modern knowledge other relationships have at least as much importance in our world, e.g., reciprocity effects, feedback, and cyclical processes. For the description of all so-called network connections, one needs a more visual coding system. In the verbal realm a complex system exists that is distinguished by its applicability to a great number of conditions, but there are only starting points in the visual sector. It is to be expected that there will gradually come into existence a normal visual grammar In this way, new visual languages may develop which are as practical as verbal languages. Starting points can be seen in diagrams for automata that are used in general automata theory. As a step in this direction examples should be examined which have already proven successful in scientific realms, namely representation by graphs and by Venn diagrams.

Herbert W, Franke
(D-8195, Puppling 40, West Germany) is a free-lance scientist and writer and teaches at the University of Munich where he has been appointed for the study of cybernetic aesthetics. After five years' activity in industry, he worked on cybernetic art theory and occupied himself with computer graphics and art. He took part in the exhibition Wege zur Computerkunst, which was exhibited internationally. Dr. Franke has written Computergraphics-Computer Art, Phänomen Kunst, and Apparative Kunst (with Gottfried Jäger). He is currently preparing publications and exhibitions concerned with interdisciplinary areas of art, science, and technology.

Computer-Produced Grey Scales
Pictorial output from computers is usually binary—that is, microscopically black or white at a point owing to the physical processes involved. A number of techniques have been developed in the past to derive subjective grey values using binary-output devices. Several new extensions of these techniques are reported here. The basic procedure is to quantize space into cells which are filled with different sizes and shapes of black areas on a white background (or vice versa). We include several examples which result from judicious selection of patterns or from rules which divide cells into particular classes of black and white regions. Some of the results raise intriguing questions about the physiology and psychology of vision.

Ken Knowlton
is a member of the Computing Techniques Research Department of Bell Telephone Laboratories (Mountain Avenue, Murray Hill, New Jersey 07974). During 1971-2 he was a visiting lecturer of computer graphics and computer art at the University of California/Santa Cruz. He has explored the art-technology interface in collaboration with filmmakers and painters and has authored several graphics-oriented programming languages including BEFLIX, a general language for computer production of still pictures and movies.

Leon D. Harmon
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Thomas Ockerse,
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Signs
The signage encountered in the urban environment constitutes the material for an authentic American poetry. The collaborators of the verbi-visual poem "Signs" describe and analyze their contributions to the final work.

Jonathan Price
is an artist with Westbroadway Gallery in New York City (125 Prince Street, New York, NY 10012). He teaches Shakespeare and creative writing at the University of Bridgeport where he directs the Shakespeare Institute. He has created concrete poems that have appeared in anthologies, television shows, and museums in the United States and abroad, and has co-authored with John Lahr LIFE SHOW How to See Theater in Life, and Life in Theater (Viking, 1973). His latest book is Video: A Medium Discovers Itself (New American Library, 1977).

Joel Katz
(18 Tenmore Road, Haverford, PA 19041) is a freelance graphic designer, photographer, writer, and educator. The co-author of two books, Katz has taught at Yale, the Rhode Island School of Design, and the Philadelphia College of Art. While associate of the architectural firm Murphy Levy Wurman in Philadelphia, he authored the Design Standards Manual: Graphics for the Southeastern Pennsylvania Transportation Authority. He is currently working as a graphic designer for the Publications Office of the University of Pennsylvania.

The Public Word

The priorities moulding the development of word/images constructed specifically to function within the public domain and those accepted as "art" have been very different and separate issues. This article is concerned with the possibility of developing a new public language—an alternative to the one now existing which is largely consecrated to consumption. An examination is made of billboard advertisements and movie marquee slogans. Graffiti is presented as an example of language inversion, establishing it as an intrusion on the high pressure message of advertising and potentially the closest thing to a public poetry.

Alison Sky

is a visual artist (60 Greene Street, New York, NY 10012). Through her association with SITE, Inc. (since 1969), an organization formed to develop art for the urban context, she has become involved with the development of a public dimension to poetry. In 1971 she founded ON SITE, a series of books produced annually dealing with new ideas in the environmental arts and architecture, which she continues to edit. Her work has appeared in numerous exhibitions and publications.

Reflections on the Theme: At the Edge of Meaning

In a changing typographic world, the one constant is writing—the rational ordering, recording, and communicating of intelligent thought. Governments and institutions no longer feel any concern about the teaching of writing. Universities, not only art and design schools, should assume a new responsibility for instruction in the planning of every material as well as intellectual aspect of handwritten, mechanized, or computerized writing.

Fernand Baudin

is a Belgian book-designer (64 rue du Village, 5983 Bonlez, Belgium) interested in palaeography and the history of typography. He teaches at the Design Department of the National Superior Institute for Architecture and Town Planning, Antwerp. As a member of the Ecole de Lure and of A.Typ.I. he published with John Dreyfus and Remy Magermans the following three publications on writing (now out of print): Dossier MacLuhan, Dossier Layout, and Dossier A.Z.

Wortgebilde durch Spiel und Kombinatorik: Or, Why Duchamp Loved Words

Meaningful art criticism is not possible unless the terms of language-description are successfully applied to the art historian's themes. Because there is no generally valid scheme of metalinguistics to embrace the different means of communicating visual language information, for its special purposes this study resurrects Saussure's distinction between the lexical and the arbitrary in order to examine the intellectual implications of Marcel Duchamp's oeuvre. The argument examines the rhetorical features of visual form in discussing the work and attempts to suggest broader issues, of socio-political significance, through their analysis.

R. C. Kenedy

is a curator in the Victoria and Albert Museum (London SW 7). For eight years advisory editor to Lugano Review and to Art International, he has also published articles in Encounter, Studio International, and Cahiers l'Herne, etc. He has published a version of The Golden Asse (Calder and Boyars, 1964, 2nd edn 1968) as well as eleven other books; and has translated Draumkwaede from medieval Norwegian. Presently he is studying the history of nineteenth- and twentieth-century illustrated books in France.

Richard Kostelanetz

is an artist and writer (P.O. Box 73, Canal Street Station, New York, NY 10013). He has published two collections of visual poetry, Visual Language (Assembling, 1970) and I Articulations (Kulchur, 1974); one collection of visual fiction, Short Fiction (Kulchur, 1974); and several books of art and literary criticism. His poems, fictions, and essays have appeared in many magazines and anthologies, and he has compiled several anthologies of literature and criticism, as well as organizing exhibitions of avant-garde writing and art.

Robert Cumming
is a conceptual artist teaching in the art department at the University of California at Los Angeles (Los Angeles, CA 90024). In the last ten years he has exhibited in the U.S., Canada, and Europe in over fifty group and one-man shows. He has published three limited edition books and has been the recipient of five major awards including two National Endowment for the Arts grants. His present conceptual art is oriented toward photo and text combinations.

Ian Hamilton Finlay
with his wife Susan, runs the Wild Hawthorne Press (Stonypath, Dunsyre, Lanark, Scotland), which introduced concrete poetry into Britain and has continued to publish poem/prints, booklets, books, and cards over the past fifteen years. The West Coast Poetry Review is publishing his "Selected Ponds," a collection of photographs of his garden-poems, introduced by the a architect-theorist Bernard Lassus of the Ecole des Beaux-Arts. Finlay has recently designed large-scale poems for the garden of the Max Planck Institute in Stuttgart, West Germany.

Daniel Friedman
is a graphic designer in New York City (Apt. 2a, 720 Greenwich Street, NY 10014). He has been an assistant professor at the State University of New York, College of Purchase, and formerly taught at Yale University. He received his formal training at Carnegie Institute of Technology, the Hochschule fuer Gestaltung in Ulm, and the Allgemeine Gewerbeschule in Basel. His professional interests are in areas of design, painting, education, and urban graphics.

Résumé des Articles
Traduction: Fernand Baudin

A la limite du signifié
Aaron Marcus

Les écrans vidéos, les graphismes électroniques, les holographies montrent bien qu'une typographie de la troisième dimension s'impose pour exploiter à fond le potentiel des ces nouveaux medias. Visible Language consacre un numéro spécial à quelques aspects de cette nouvelle approche.

A propos de langages à la fois graphiques et pratiques
Herbert W. Franke

Le langage ordinaire convient parfaitement pour toute description de type linéaire. Comme on fait appel au langage parlé dans presque toutes les sphères de la culture, on tombe inévitablement dans certaines ornières, et on respecte, par ex., l'ordre chronologique et la relation cause à effet à l'exclusion d'autres types de relations. Il se trouve qu'aux yeux de la science moderne d'autres types de relations justement ont aujourd'hui au moins autant d'importance, tels que la réciprocité, la circularité, la rétrogression. C'est pourquoi, il nous faut un code plus graphique pour décrire tous les types de relations possibles dans tout ce qui peut s'exprimer sous forme de réseau. Dans le langage parlé nous disposons d'une système complexe qui se caractérise par la souplesse. Mais il faut expérer qu'une grammaire graphique s'élagorera petit à petit et que de nouveaux langages naîtront qui seront aussi pratiques que le langage parlé. On peut en voir des linéaments dans les diagrammes dont on se sert déjà couramment dans la théorie générale des automates. Pour avancer dans cette voie il faudrait étudier quelques uns des spécimens déja couramment employés par les scientifiques, notamment les diagrammes de Venn et les graphiques.

Des échelles de gris sur ordinateur
Ken Knowlton et Léon Harmon

Les images qui sortent d'un ordinateur généralement binaires: en raison même des procédés employés, on n'y verrait, au microscope, que des points blancs ou noirs. Il existe maintenant des dispositifs qui permettent de nuancer les gris tout en restant dans le binaire. L'article commente quelques applications de ces nouvelles techniques. Le principe consiste à diviser un espace donné en cellules qui sont ensuite plus ou moins remplies par des noirs (ou des blancs) de formes et de dimensions variables. Les illustrations montrent ce que l'on peut obtenir par le choix de motifs ou des filets qui altèrent la valeur des blancs et des noirs. Certaines de ces illustrations posent de réels problèmes quant à la physiologie et à la psychologie de la vision.

Signs
Jonathan Price et Joel Katz

Les inscriptions que présente le décor urbain sont une mine de poésie authentiquement américaine. Les auteurs de "Signs" présentent un commentaire sur leur poème verbo-visuel.

Les mots de la rue
Alison Sky

Les principes qui gouvernent l'élaboration des inscriptions publiques et ceux qui produisent ce qu'on appelle "art" sont deux choses bien distinctes. L'auteur envisage l'invention d'un nouveau genre d'inscriptions en remplacement de ce qui existe et qui est de toutes façons destiné à se dégrader et à disparaître. Il se réfère aux panneaux d'affichage, aux slogans des calicots de cinémas. Il voit dans les graffiti le moyen de retourner le langage, de rétorquer le matraquage publicitaire et de tendre autant que possible à instaurer une poésie de la rue.

Kurfassung der Beiträge
Übersetzung: Dirk Wendt

Variations sur le theme: A la limite du signifié
Fernand Baudin

Nous sommes en plein branle-bas typographique. La seule constante est l'écriture, c'est-à-dire la mise en ordre, l'enregistrement et la diffusion de la pensée réfléchie. Les autorités, les gouvernements semblent se désintéresser de l'enseignement de l'écriture. En réalité, les universités elle-mêmes et pas seulement les écoles d'art devraient assumer la responsabilité d'une formation adéquate dans l'organization de tous les aspects matériels aussi bien qu'intellectuels de l'écriture: manuelle, méchanique ou électronique.

Wortgebilde durch Spiel und Kombinatorik: ou, pourquoi Duchamp amait tant les mots
Robert Christopher Kenedy

Toute critique d'art est dénuée de sens tant que les termes utilisés ne correspondent pas au sujet traité. Comme in n'y a aucune convention fermement établie en métalinguistique pour traiter des différents médias, du langage visuel, de l'information et de leurs propriétés, l'auteur reprend la distinction que faisant déja Saussure entre le lexicologique et l'arbitraire. Il examine ensuite l'oeuvre de Marcel Duchamp pour en dégager toutes les significations implicites. Par l'analyse des éléments rhétoriques des formes il aboutit a une interprétation d'une portée socio-politique.

Am Rande der Bedeutung
Aaron Marcus

Der Gebrauch von Video, Computergraphik und holographischer Kommunikation legt es nahe, eine diagrammatische, drei-dimensionale Typographie als angemessenes Mittel der visuellen Sprache zum Ausdruck der Möglichkeiten dieser Medien zu betrachten. Diese Sonderausgabe von Visible Language untersucht einige Aspekte eines solchen Ansatze zur visuellen Sprache.

Beobachtungen zu praktischen visuellen Sprachen
Herbert W. Franke

Normale Kommunikationsmittel—menschliche Sprachen—sind sehr gut geeignet für die Beschreibung linearer Ordnung. Da man das verbale System in fast allen Kulturkreissen verwendet, folgen sie unwillkürlich einer Ausrichtung zu bestimmten RegelmäBigkeiten. Man neigt dazu, chronologische und kausale Ordnungen zu erkennen, und andere Arten der Verbindung zu übersehen. Nach modernem Wissen sind andere Beziehungen mindestens ebenso bedeutsam in unserer Welt, z. B. Reziprozität, Rückmeldung, und zyklische Prozesse. Zur Beschreibung aller sogenannten Netzwerk-Verbindungen braucht man ein mehr visuelles Verschlüsselungs-system. Im verbalen Bereich existiert ein komplexes System, das durch seine Anwendbarkeit auf eine Vielzahl von Bedingungen ausgezeichnet ist, aber es gibt nur erst Anfangspunkte im visuellen Sektor. Es wird erwartet, dass allmählich eine normale visuelle Grammatik entstehen wird. Auf diese Weise können neue visuelle Sprachen entwickelt werden, die ebenso praktisch wie verbale Sprachen sind. Anfangspunkte können in den Diagrammen für Automaten gesehen werden, die in der allgemeinen Automaten-theorie gebraucht werden, die sich schon in wissenschaftlichen Bereichen als brauchbar erwiesen haben, nämlich die Darstellung durch Graphen und Venn'sche Diagramme.

Computer-erzeugte Grauskalen
Ken Knowlton und Leon Harmon

Bildausgaben von Computern sind normalerweise binär—das heisst, mikroskopisch gesehen schwarz oder weiss an einem Punkt infolge des Beteiligten physikalischen Prozesses. Es sind Techniker, entwickelt worden, mit denen man unter Benutzung binärer Ausgabmedien subjektive Grauwerte ableiten Kann; einige neue Erweiterungen solcher Techniken werden hier berichtet. Der Grundvorgang ist die Quantelung des Raums in Zellen, die mit unterschiedlichen Grössen und Formen schwarzer Flächen auf Weissen Hintegrund (oder umgkehrt) gefüllt werden. Wir fügen einige Beispiele bei die von einer sinnvollen Auswahl von Mustern oder Regeln zur Einteilung der Zellen in besondereKlassen von weiBen und schwarzen Gebieten herrühren. Einige der Ergebnisse führen zu interessanten Fragen über die Physiologie und Psychologie des Sehens.

Zeichen
Jonathan Price und Joel Katz

Die Zeichen, denen man in städtischer Umgebung begegnet, bilden das Material für eine authentische amerikanische Poesie. Die Mitarbeiter des verbal-visuellen Gedichts "Zeichen" beschreiben und analysieren ihre Beiträge zu dem Endergebnis.

Das öffentliche Wort
Allison Sky

Die Prioritäten bei der Gestaltung der Entwicklung von Wortbildern, die speziell zur Funktion in der öffentlichkeit konstruiert sind, und solchen, die als "Kunst" akzeptiert worden sind, waren sehr verschiedene und voneinander getrennte Dinge. Dieser Aufsatz befasst sich mit der Möglichkeit zur Entwicklung einer neuen öfftenlichen Sprache—einer Alternative zu der jetzt existierenden, die weithin dem Konsum gewidmet ist. Es wird eine Untersuchung von Ankündigungen auf Anschlagbrettern und Film-Slogans durchgeführt. Graffiti wird als Beispiel einer Sprachinversion gezeigt, als eine Durchdringung von hochkonzentrierter Anzeigenmitteilung und der möglicherweise nächstgelegenen Form zu einer öffentlichen Poesie.

Gedanken zu dem Thema: Am Rande der Bedeutung
Fernand Baudin

In einer sich verändernden typographischen Welt bleibt als eine
Konstante das Schreiben—die sinnvolle Ordnung, Aufzeichnung und Übermittlung intelligenter Gedanken. Regierungen und Institutionen machen sich um den Schreibunterricht keine Sorgen mehr. Universitäten, nicht nur Kunst— und Entwurfsschulen, sollten eine neue Verantwortung für die Ausbildung in der Planung jeden Materials sowie auch die intellektuellen Aspekte handeschriebenen mechanisch—oder computer—erzeugter Schriften übernehmen.

Wortgebilde durch Spiel und Kombinatorik: Oder, warum Duchamp Wörter liebte
Robert Christopher Kenedy

Sinnvolle Kunstkritik ist nicht möglich, solange nicht die Begriffe der Sprachbeschreibung erfolgreich in Themen der Kunstgeschichte angewendet werden können. Weil es kein allgemeingültiges Schema der Metalinguistik gibt, das die verschiedenen Mittel zur Übertragung visueller Sprachinformation umfasst, lässt diese Studie für ihren speziellen Zweck Saussure's Unterscheidung zwischen dem Lexikalischen und dem Willkürlichen wiederauflegen, um die intellektuellen Implikationen von Marcel Duchamp's Werk zu untersuchen. Die argumentation beleuchtet die rhetorischen Merkmale der visuellen Form während der Diskussion des Werkes und versucht, durch ihre Analyse breitere Anliegen von sozio-politischer Bedeutsamkeit nahezulegen.

Resumen de los Arículos
Traducción: Ana Fisch

Al borde del significado
Aaron Marcus

El uso de video, de gráfica de computadora y de comunicación holográfica sugiere que una tipografía diagramática y tri-dimensional es el medio aproprado para expresar el potencial es estos medios. Este numero especial de Visible Language explora algunos aspectos de tal enfoque eh el lenguaje visible.

Observaciones referentes a las lenguas visuales prácticas
Herbert W. Franke

Medios de comunicación normales—lenguas humanas—corresponden a la descripción de orden lineal. A medida que se va usando el sistema verbal en casi todos los círculos culturales, una orientación hacia ciertas regularidades involuntariamente sigue. Uno tiende a reconocer ordenes cronológicas y causales y pasar por alto otros tipos de conecciones. De acuerdo al conocimiento moderno otras relaciones tienen la misma importancia en nuestro mundo, por ejemplo, efectos recíprocos, estímulo y procesos cíclicos. Para la descripción de todas las conecciones de redes como se las llama uno necesita un sistema de código más visual. En el dominio verbal existe un complicado sistema que se distinque por su aplicación a un número grande de condiciones, pero son solo puntos iniciales en el sector visual. Es de esperar que gradualmente se vaya formando una gramática visual normal. En esta forma, nuevas lenguas visuales tan prácticas como las lenguas verbales se desarrollarían. Puntos de partida se pueden ver en diagramas para autómatas que se usan en la teoría autómata general. Como un paso en esta dirección se pueda examinar ejemplos que ya han demostrado tener éxito en el dominio científico como ser la representación por gráficos y por los diagramas Venn.

Signos
Jonathan Price y Joel Katz

La senalación que se encuentra en el espacio urbano constituye el material para una auténtica poesía. Los colaboradores del poema verbo-visual "signos" describen y analizan sus contribuciones al trabajo final.

Reflecciones sobre el tema: al borde del significado
Fernand Baudin

En un mundo tipográfico cambiante una constante es la escritura, la ordenación racional, el registro y la comunicación de un pensamiento inteligente. Gobiernos e instituciones no sienten más ninguna preoccupación acerca de la enseñanza de la escritura. Universidades, y no solamente escuelas de arte y diseno deberían asumir una nueva responsabilidad para la instrucción en el planeamicato de cada material como asi tampién el aspecto intelectual de la escritura manuscrita, mecanizada o computerizada.

La palabra pública
Alison Sky

Las prioridades que moldean el desarrollo de la palabra/imagen específicamente construídas para funcionar dentro del dominio público y de aquellas aceptadas como "arte" han sido cuestiones separadas y muy diferentes. Este artículo trata de la posibilidad de desarrollar un nuevo lenguaje público—alternativo al ya esistente que está en su mayor parte consagrado al consumo. Se hace un examen a la cartelera de avisos y a los slogan comerciales del cine. Se presenta como ejemplo de inversión del lenguaje al graffiti estableciéndolo como una intrusión sobre el mensaje de propaganda de alta tension y potencialmente la cosa mas próxima a la poesie publica.

Palabras
Robert Christopher Kenedy

Una critica de arte significativa no es posible salvo que los términos de lenguaje-descripción se apliquen exitosamente a los temas del historiador de arte. Debido a que no hay un esquema válido general de metalinguística que abarque los differentes medios para comunicar la información del lenguaje visual, este estudio, para sus fines especiales resucita la distinción de Saussure entre lo que es léxico y o que es arbitrario para examinar las implicaciones intelectuales de la obra de Marcel Duchamp. El argumento examina los rasgos retóricos de la forma visual discutiendo el trabajo y los intentos para sugerir temas más amplios, de significación sociopolítica por intermedio de su análisis.

Tonalidades grises producidas por computadoras
Ken Knowlton y Leon Harmon

El resultado pictórico de computadoras es por lo general binario— que es, microscópicamente negro o blanco en un punto debido al proceso físico que implica. Se han desarrollado técnicas para derivar tonalidades grises usando recursos binarios de producción; varias derivaciones nuevas de estas técnicas son mecionadas aquí. El procedimiento basico es cuantificar espacion en células que son llendas con tamaños y formas differentes de regiones negras que resultan de la juiciosa selección de diseños o de reglas que dividen y negro. Algunos de los resultados presentan preguntas intrigantes sobre la fisiología y psicología de la visión.

The Institute of Design assumed responsibility for the design and production of this issue of Visible Language. What began as a relatively straightforward design task, which had built into it the kind of realistic constraints difficult to simulate in the context of education, quickly developed into an experimental exercise.

The experimental ideas emerged from reading the highly speculative content of the manuscripts. The suggestions of simultaneous reading, juxtaposition, contextual relativity, and technological progression were simply too intriguing to ignore. Could we use these ideas to begin to explore new typographic configurations; to restructure the journal? Could we accomplish this without sacrificing legibility or continuity? How far could we push the playful, perceptual limits of word configurations? Was this an outrageous subversive manipulation of basically traditional journal exposition?

We experimented with many typographic manipulations. Most, despite their visual interest, were discarded because of poor legibility. A few remained legitimate alternatives to the tradition. We chose to selectively push some edges.

In the Marcus article, we generated the Lissitzsky quote by removing characters from the text—we played with context and perception. The typography for the Knowlton/Harmon article works out a system of typographic grey scales through changes in character weight, spacing and leading. The Baudin article was organized and typeset in three different ways: to a narrow column with key words or phrases in bolder type, phrase by phrase in the manner of Gerstner, and a direct representation of writing/typographic process, i.e., rough draft, manuscript, and typesetting. The Kenedy article develops the visual syntax of this journal through typographic organization and page layout.

Design and Production
Professor Sharon Poggenpohl along with three graduate students, Carter Clock, Diane Hanau-Strain, and Nikki Slusser-Krause worked closely as a team to explore possibilities, make variations, formulate design decisions, and ultimately produce this issue of the journal.

Typography
The body of the journal was set on an IBM Selectric Composer using the Univers series. We decided to sacrifice a degree of quality in order to explore the experimental potential of the composer. The body copy is 10/11 Univers light with bold titles. Captions and notes are set on 8/9 Univers light with bold titles.

Rydertypes in Chicago generously agreed to provide display type and special phototype manipulations. These appear on pages 54, 56, 58, 60, 62, 64, 66, and 142.

Paper
Georgia Pacific graciously supplied Hopper Vellum Opaque in 70 lb. text and 80 lb. cover for the production of this issue.

Lithography
Micro, Incorporated in Burlington Wisconsin printed the journal.

Visible Language Merald E. Wrolstad, Ph.D., Editor and Publisher

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