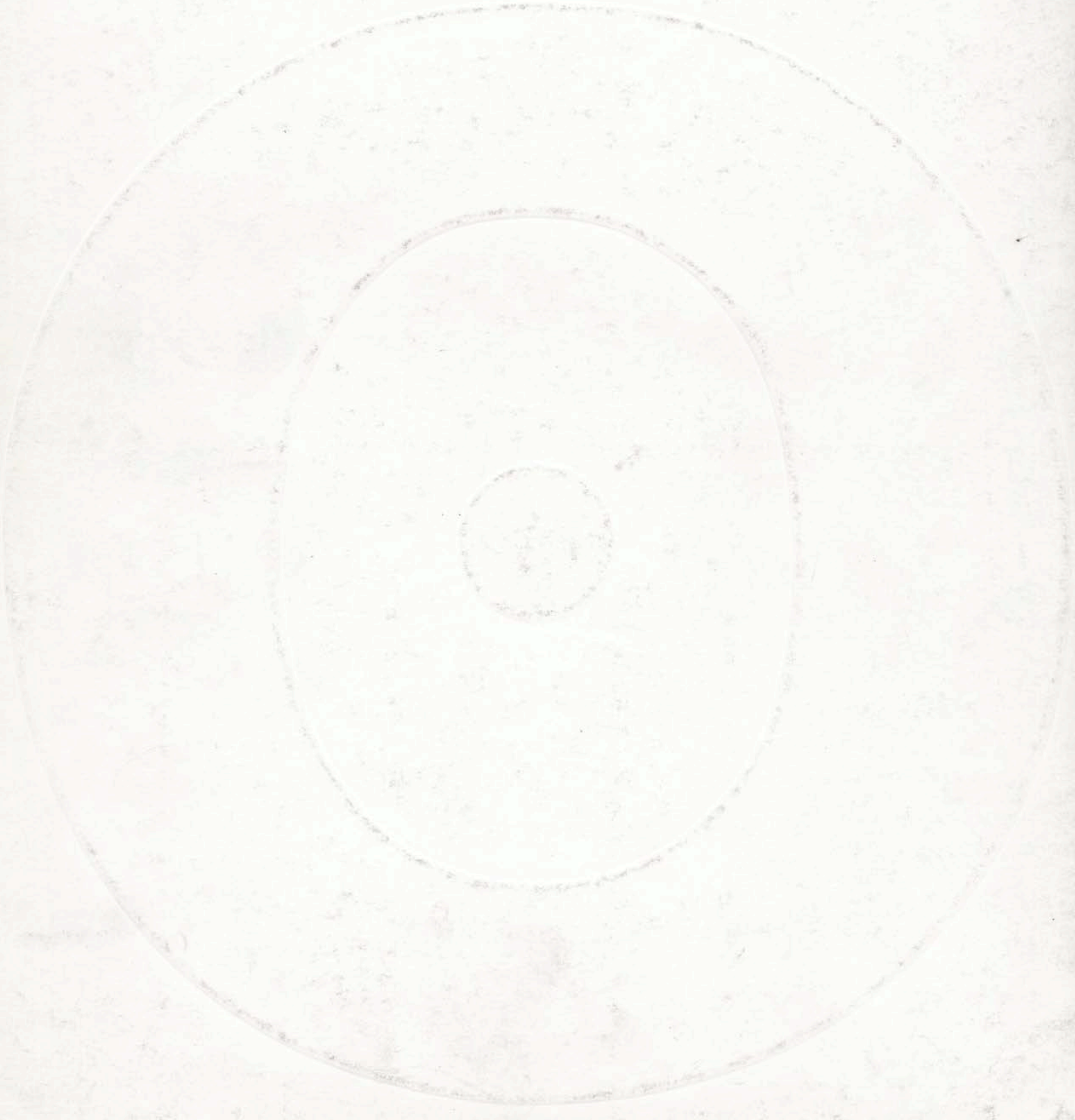
dot zero 1



To Be of Service

This is Dot Zero number one.

It is the start of what we hope will be a continuing intellectual excursion into the visual world around us. In this publication the serious will find stimulation; the dedicated . . . encouragement. To those bored with the clichés of visual communication Dot Zero provides a new Point of Departure.

We invite you to explore Dot Zero, to read and react to the thought and imagery that inhabit its pages. And, share with us the sense of pride and exhilaration we have felt in undertaking to sponsor it.

As sponsors, Finch, Pruyn and Company, Glens Falls, New York, believes its involvement in Dot Zero is a productive way of restating our traditional commitment of service to you and your profession.

Finch, Pruyn has had a long time to establish meaningful traditions. We have been in business for more than one hundred years. Performing in excess of the expected has become an important part of our way of doing business. We have learned to place a great deal of stock in pride of craftsmanship, honest value, and in service.

This is why we are sponsoring Dot Zero:

To be of service, to indicate an awareness of our own responsibilities, to express our concern with the fulfillment of visual communication and design . . . and, to demonstrate the facility of our papers and the printed page.

We would hope that you will come to look upon Dot Zero as a fruitful source of inspiration, and a continuing reminder of our capabilities and our willingness to serve you.

Lyman A. Beeman

Lyman A. Beeman
President
Finch, Pruyn and Company

Finding Dot Zero

When I first was thinking of a name for a contemporary magazine of design, there came to my mind Dotsero, a town on the Colorado River, where the Rio Grande railroad joins the Royal Gorge Route.
From this point a survey was made of the Colorado River in 1885.
As the initial point, it appears on the record as ".0" (dot zero).
Hence the name.

Zero, the figure "0" in the arabic notation for numbers, meaning naught, is the origin or point of departure in reckoning. It is the point of nullity that would symbolize the unbiased point of view, devoid of influence and coloring, which an informative and impartial magazine assumes in the selection and presentation of its editorial material.
Furthermore, ⊙ is to the eye and to the ear a memorable and expressive mark suited to stand as symbol for the topics of design theory and practice.

In the nullity of the constant .0, which is less than any assignable magnitude or quantity, lies the analogy with the magazine Dot Zero, which plans to assume an unattached attitude by starting from naught and freeing itself from the impediments of taking sides.

It is dot zero ⊙ hour from which the planned movement of the magazine will start.

Herbert Bayer

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Editorial

Transformation of our world is accelerating so rapidly that quantitative change has become a qualitative difference. Areas and disciplines that yesterday seemed unrelated are today discovered to be interwoven and interdependent at a more meaningful level. Matters no longer join up by pressing solidly against one another, but by the pull they exert against one another.

It no longer surprises us that a polished steel surface at one million magnifications looks like a satellite photograph of earth, or that a man, rather than an angel, is floating gracefully around the earth at orbital speed. We have swallowed ideas and images that our grandparents would have choked on; we are no longer in the condition of the aborigines who were so unused to reading flat pictures that they couldn't recognize a photograph even of their own neighbors.

We have come so far beyond Jules Verne and H. G. Wells that we can almost face the idea that anything man can even think *of, he will one day be able to create.*

But if our old ways of thinking, seeing, communicating, have become obsolete, our new ways can become obsolete even more rapidly. Before the paint is dry on the protest poster, the issue has shifted—so much has our rate of communication changed. With frequent and multiple exposures at this rate, any position rapidly becomes a parody of itself; it is no accident that the advertising profession has accepted parody itself as one method of communication.

Adaptable as we are, however, the pace is dizzying.

It is nearly impossible to adjust our thinking fast enough to make good use of all our new potentials.

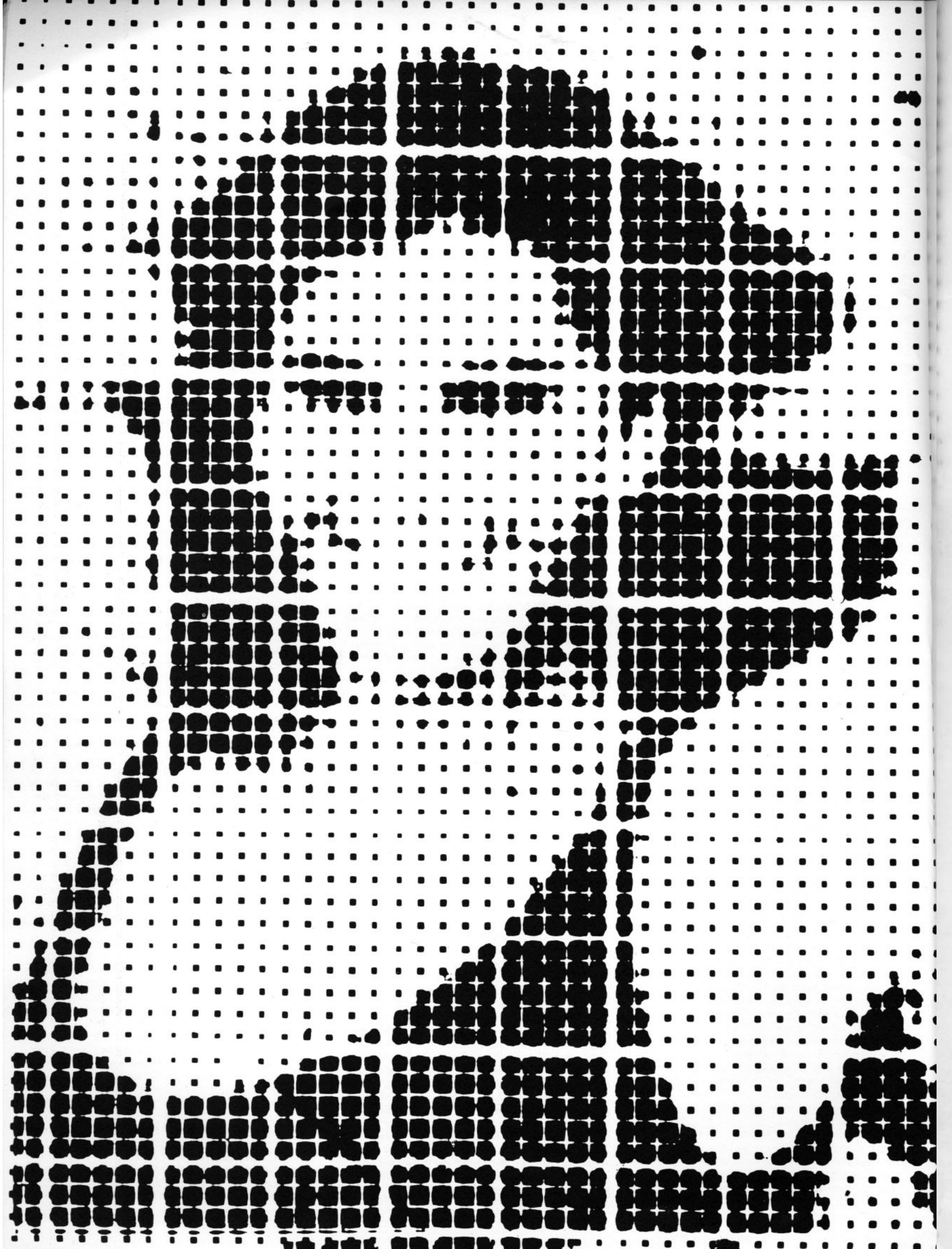
It is small wonder that many of our new attitudes lack wholeness, grace, and adequate recognition of the proper human use of human beings. No problems are any longer simple problems, and it is to the recognition of this fact that DOT ZERO is addressed.

Good design is no longer a matter of good taste and intelligence alone. Better cities are not made by better intentions, or better political administrations alone. Better solutions today, in communication as in other areas, require deeper probing, broader understanding, and more thorough integration of the growing mass of pertinent factors. The functions of communication, in particular, are beginning to need a more highly articulated grasp of the design problem; men engaged in these functions need a matrix of understanding of design in all its applications.

DOT ZERO is aimed at meeting this need. It is an interdisciplinary quarterly covering a network of design topics on an international scale. It will deal with the theory and practice of visual communication from varied points of reference, breaking down constantly what used to be thought of as barriers, and are now seen to be points of contact.

Wherever possible, we will ask members of one discipline to discuss the problems of another, from their own point of view. We shall work, within each issue, toward a correlated system of articles, each of which sheds light on the others. Each issue will embody a central theme, around which thinkers and writers, as well as eminent designers, artists, architects, photographers, typographers, printers, teachers, and businessmen will ply their variously shaped orbits.

On these articles, we shall feel free to editorialize, separately and italically, always maintaining the distinction between the contributor's thinking and editorial comment. There is nothing here intended to be final or definitive; we are a point of departure: DOT ZERO. *R.M.*



Decline of the Visual

Marshall McLuhan

Marshall McLuhan holds a Ph.D. in English literature from Cambridge, and a professorship at Toronto University; but for him the study of classical forms of communication has been mainly a point of departure, for it has led him to the study of communication itself as a phenomenon. The psychological and cultural consequences of the various media of communication has occupied his attention for some years, and has resulted in publications of such impact as The Gutenberg Galaxy *(1963) and* Understanding Media *(1964). It has also resulted in his former chairmanship of the Ford Foundation Seminar on Culture and Communication, and his current directorship of the Centre for Culture and Technology at the University of Toronto. This interdepartmental Centre was established to investigate the psychic and social consequences of all technologies, particularly our own. It draws its membership from the University's departments of anthropology, architecture and town planning, engineering, English, mathematics, political science, psychology and psychiatry. At the moment its chief concern is to define the order in which a culture establishes its preferences among the senses. When the visual apprehension of the world declines, as McLuhan describes it, then tactile and ritual sensitivities and responses begin to take over. What has brought about this decline of the visual, says McLuhan, is the increase in our speed. At the high speeds resulting from jet engines and electronic communications, visual means of apprehending the world simply don't apply. They are too slow to be effective, as the jet pilot's own eyes are too slow to depend on: by the time he has seen a potential obstacle, it is too late to avoid it.*

This transition from the coal-scuttle culture to the television culture has by now reached the man in every street, according to McLuhan, and affected his way of dealing with his whole environment, pushing it toward the non-discursive, anti-intellectual, quasi-mystical, immediately physical modes of communication, modes that would have made no sense a short time ago. It was, presumably, no accident that our first view of Mars came through as a jumble of numbers to be decoded from a tape.

McLuhan's own explosive universality, and his intuitive illumination of a broad intellectual and cultural landscape, are like the flashes of lightning that presage a change in the weather: a fitting expression of the changing modes of awareness he finds in our contemporary culture.

At a recent Delos conference the delegates met to consider the "crisis in human settlement." One basic consideration was that in the next forty or fifty years there will be more buildings erected in the world than in the previous 6,000 years. At the present rate of building, each year sees more space enclosed than the previous forty or fifty years. What eludes the understanding of the architects and planners is that these rates of change and growth are even greater in other areas of human activity. While they worry about a population "explosion," electricity has imploded, or contracted, the world to the dimensions of a village.

One thing is clear to the builders and town planners. Enormous increase in the speed and volume of building requires a totally new approach to the problems of design. A jet crew has to use different resources of perception from a pedestrian. But the very speed that calls for advanced awareness and extended perceptions also makes possible the recognition of patterns that are not accessible to those moving at lower rates. At 12,000 feet the earth is still like representational painting. At 35,000 feet it begins to acquire abstract design. As the visual component is lowered, the tactile and kinesthetic components increase. Sheer design emerges as supreme. As change becomes our only constant, speed becomes a gyroscopic factor of stability in our world. And like the jet pilot, our entire society today lives by instrumentation, not by the unaided human senses.

With electricity, man extended his nervous system globally. Earlier extensions or technologies were fragmentary extensions of the body. Clothing extends the skin, the wheel the feet, script the eye. Thus the centuries of gradual mechanization by fragmentary extension have been reversed in a rush by the integral circuitry of the electric extensions of our nervous system. With such electric circuitry we move swiftly out of the world of the wheel and of classified data into a world of pattern recognition. The learning process itself can move from the phase of the acquisition of data to the plane of discovery.

Instant communication insures that all factors of the environment and of experience shall co-exist in a state of active interplay. It is interplay that yields an awareness of form and design, whereas at lower rates of movement one is left with facets and points of view. It is no paradox that pattern or design does not flourish in highly visual or highly literate cultures. Industrial societies push the visual sense into isolation because the fragmentation and analysis of the processes subjected to mechanization are managed by visual means. It is the visual power to isolate and arrest aspects of functions (a power not shared by the other senses) that is so indispensable to the mechanizing processes. And in this isolation design suffers. But with the electric extension of the nerves and of "feedback" the visual sense comes back into relation with the other senses, particularly with the sense of active touch. For the electrical is not mechanical or fragmentary but integrally "looped."

With television in particular there seems to occur an extension of the sense of active exploratory touch (which involves all the senses simultaneously) rather than of sight alone. But in all electric phenomena the visual is only one component in a complex interplay. And since in the Age of Information most transactions are managed electrically, the electric technology has meant for Western man a considerable drop in the visual component in his experience, and a corresponding increase in the activity of his other senses. Indeed, with the advent of electric technology we have entered a relatively dim, unconscious world in which the extension of everybody's nerves has involved him deeply in all other lives. And while this has threatened the sense of identity of many people, it has heightened our general awareness of the shape and meaning of lives and events to a level of extreme sensitivity.

In his new book, *The Beginnings of Architecture,* Siegfried Giedion cites several times the evidence that prior to script there is no architecture in any culture. With script comes the amplifying of the role of purely visual values and a diminishing of the audio-tactile complex. With script the vertical-horizontal planes can separate from the depth involvement of kinetic stress, and from touch and sound. The visual sense alone offers the uniformity, continuity and connectedness needed in "rational" or visual organization of experience. Touch, sound, and the rest have neither the uniformity nor the connectedness needed for the architectural "enclosure" of space. But preliterate men have an unrivalled feeling for the unique life of forms, which visual man by his nature tends to reduce and enclose in uniform and continuous space. Writing itself is such a reduction of the complex sensory modes of words into a single visual mode. And now in the electric age when all sensory modes are simultaneously accessible, the tyranny of typography, which imposes its monotonous regime on all aspects of life and perception, can no longer be sustained. Yet the typographer can reap some advantage from the electrical revolution. For the first time, he is free to exploit letters as abstract sculptural designs.

I am suggesting that in the electric age men are able for the first time to perceive how their own sensory typologies, psychically and socially, have assumed their present patterns. And, furthermore, they are free for the first time to restructure the typical sensory ratios that their cultures happen to have imposed upon them. We have already become aware of the role of art as a kind of CARE package dispatched to undernourished areas of the sensorium. We now become aware of the possibility of arranging the entire human environment as a work of art designed to maximize perception and to make everyday learning a process of discovery. Town planners are applying the Montessori method to ordinary living. And, reciprocally, as we move into the new age of architectural planning for the inclusive needs of a community of continuous learning, design becomes as necessary to the educator as to the engineer. The age-old gaps between art and commerce are closing as fast as those between education and government.

With the electric extension of the nervous system men have not only become involved with one another in depth, they have had to shift their stress of attention from action to reaction. It is now necessary to know in advance the consequences of any policy or action, since the results of such policy and action are experienced without delay. This was not necessary in the former fragmented and mechanical age, when the consequences of actions were delayed. One could wait and see. At electric speed no wait is possible. The most luminous and harmonious designs, involving all factors and all senses at once, now become mandatory for the most ordinary situations. Thus the typographer, for example, is confronted with the need to devise types that can recapture the senses of children in the age of television. Types acceptable to the pre-TV child are of no relevance to the TV child with his myopic demand for involvement in the text.

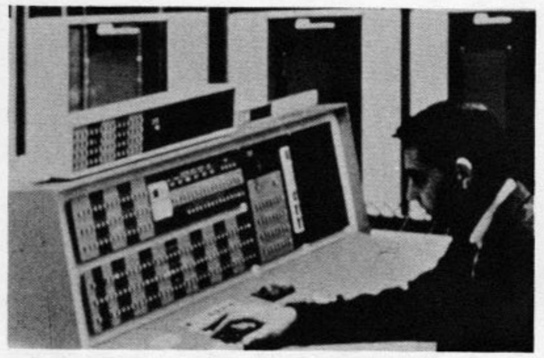
Another way in which to describe the revolution of our senses in the electric Age of Information is to cite the fact that at the graduate levels of study our universities, which were in the Mechanical Age places for processing a few young people, have today become organs of perception for the entire society. The subject of their studies has widened to include all of society (for example, statistical means of audience research), and the results of their studies (from the predictions of the weatherman to the instruments for perceiving the structure of matter) more directly serve the whole society.

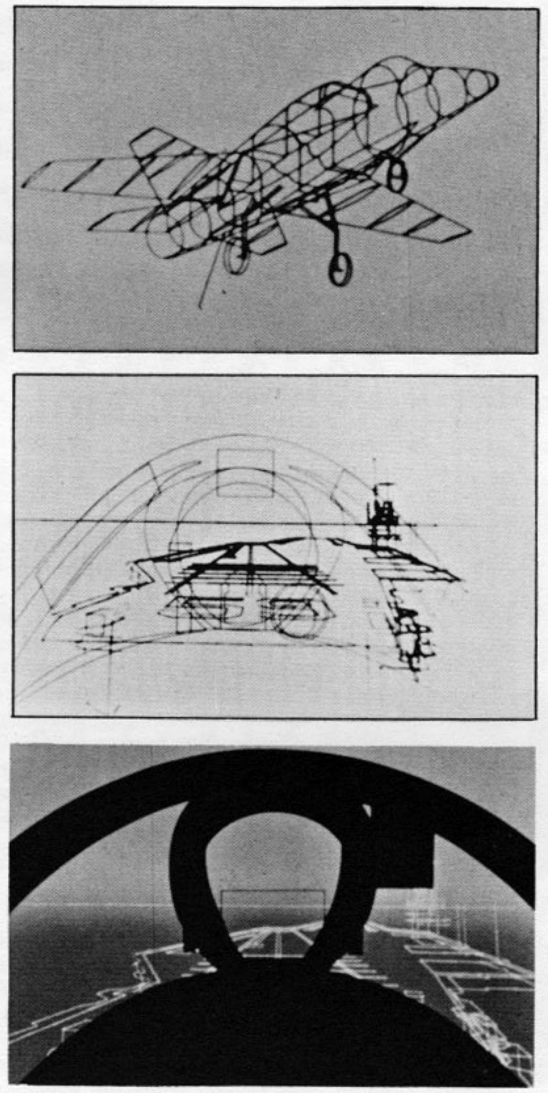
With this change of role of the university there has come a corresponding need to redesign every feature of the campus and the curriculum alike. It is a situation not unrelated to the one cited at the beginning of these observations. The new cities are no longer to be mere enclosures to house or contain populations of fragmented interests. They need to become immediate means of enhanced perception and enriched association.

A Feldman variation on a picture of a girl.

Computer Graphics: Extending the Visual Media

Maurice L. Constant





Computerized film drawings of plane landing from a "Carrier Approach Visibility Study" by Computer Graphics, Airplane Division, The Boeing Company.

Mr. Constant is twice a graduate of the University of Toronto: once in engineering, and again, after the war, in science. He was, for ten years, a member of the National Film Board of Canada, acting as a writer, director, and producer of documentary films. During this time, he set up the Science Film Unit, which developed equipment and techniques for time-lapse and high-speed photography. Since then he has operated as a consultant and an independent producer of films for television, in the fields of science, agriculture, anthropology, and international affairs. In 1964 he developed an interest in exhibition design, and became involved with five of the major pavilions for Expo '67, the Montreal world's fair. In January, 1965, he was appointed Assistant Professor of design with the Faculty of Engineering at the University of Waterloo. His current activities include teaching and research in computer theory, history and philosophy of science, and new projection techniques and teaching methods with enveloping image environments.

Computer graphics, a technique by which the computer generates images – still or moving, on paper, film or tape – has now passed through the research stage and entered the period of development. In consequence, the subject of computer-generated images has now become a matter of direct and immediate concern to the designer and film maker. In effect, one of the most powerful tools ever offered to the creative imagination is asking for direction from the user. What would you like me to do for you? What form would you like me to take?

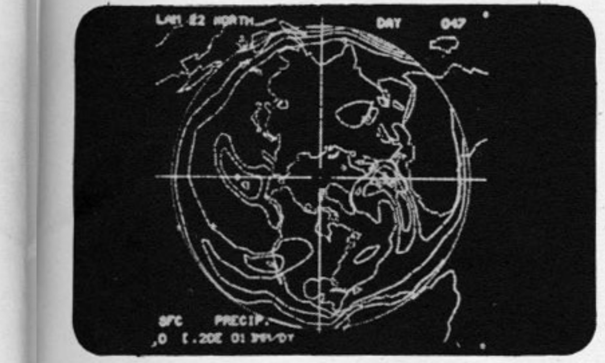
The sad fact is that up to the present, designers and film makers are hardly aware of the existence of this tool, much less its personal relevance, and where some interest has existed, too often the esoteric language and habits of mind of the computer scientist have discouraged further investigation.

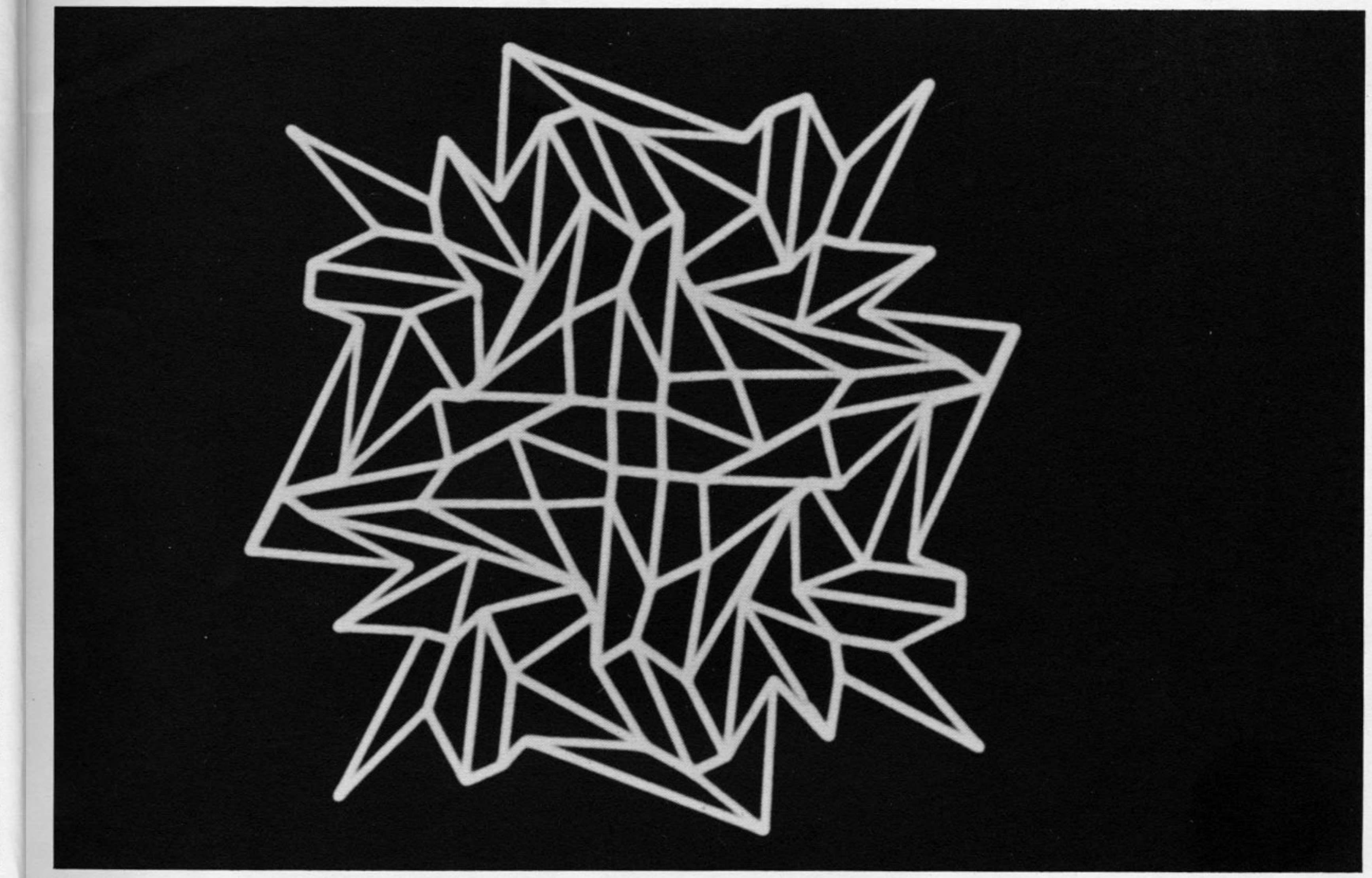
Nevertheless, some design-oriented minds, industrial designers and architects, have begun to explore the use of computer animation to evaluate structures and sequences. The architect or exhibition designer has been intrigued by the possibility of seeing on film an accurate model of the structure he has dreamed up. He can walk around it or through it, examine vistas, spatial relationships, and evaluate the effect of sequential experiences.

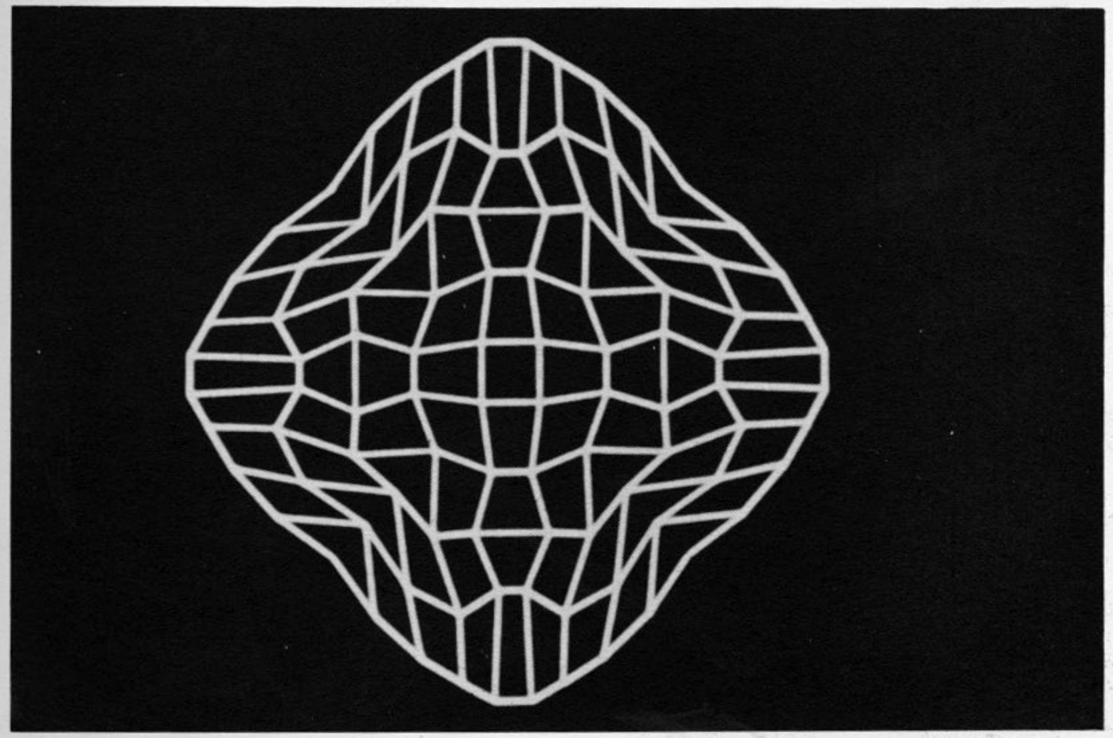
In general, it is not a matter of inventing a technology, but rather of taking existing technology and putting it together in a computer graphics system directed specifically at the needs of the designer and film maker. Hitherto, much of the relevant computer technology has concerned itself with the problems of the engineer, and the need to plot information in the form of a graph. Typical of this concern is the development of high contrast film techniques. However, let us consider the more sophisticated requirements of the film maker; these will include most of the concerns of the designer. Now we must broaden our interest in computer graphics beyond points and lines to somewhat more sophisticated requirements: shape, color, shading, tone, image quality, movement within the frame and from frame to frame (*shot to shot*).

All this implies, too, an interest in the means of manipulating these elements in a meaningful way, that is, according to the conventions of the film medium, and, as well, that the hardware involved be convenient, economical and, in general, more effective than existing film-making procedures.

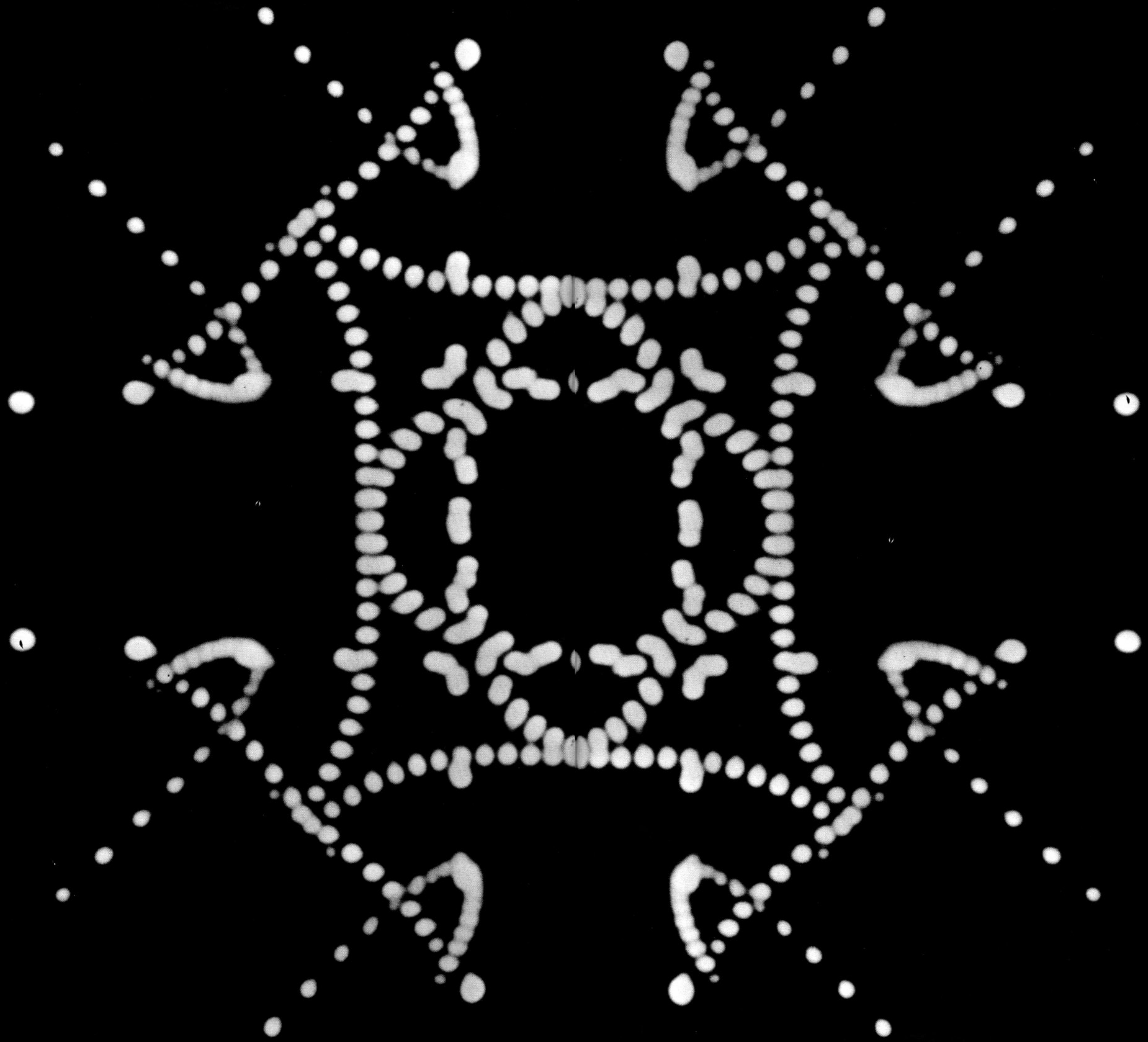
What do we wish to achieve? In general, to extend the film maker's powers to manipulate shapes and colors in space; to help him do the kinds of things

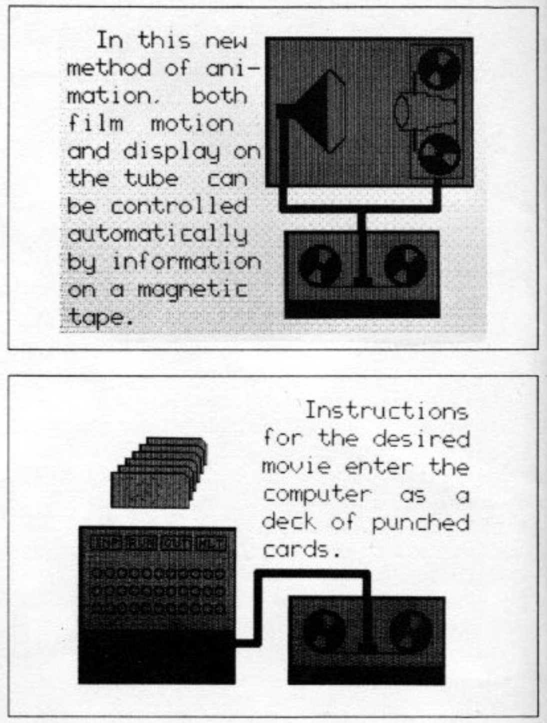






Grid figures transformed (including next two pages) by external pressure and a global projection developed in connection with research done at Laurence Radiation Laboratories.




In this new method of animation. both film motion and display on the tube can be controlled automatically by information on a magnetic tape.
Instructions for the desired movie enter the computer as a deck of punched cards.

Examples of computer animation techniques by Richard Knowlton of Bell Telephone Laboratories.

he has been doing but better, less laboriously, more economically and with greater accuracy. In many cases the peculiar powers of the computer make possible the construction of images which are beyond the scope of the film maker. For example, in the field of education, the subject matter of the sciences is full of expository material which suggests or sometimes demands visual capabilities beyond the present capacities of the film maker or the film medium. An obvious instance is the accurate rendering of complex movements or shapes governed by mathematical prescription or which require great numbers of laborious calculations and drawings.

We must be prepared, too, (a most exciting prospect) for the emergence of new techniques and modes of expression – based on the peculiar capabilities of the computer – of whose possibilities the film maker is not aware and which he cannot even imagine. It is quite possible that the continued extension of the film maker's powers in combination with new display and projection devices and ideas, such as multiple screen and total image envelopment, will produce not just a difference of degree but of kind – in effect, a new medium. In physics, for example, it is intriguing to contemplate the effect of teaching the fundamentals of motion or frames of reference by means of computer animation projected on the inner surface of a forty foot sphere.

Concretely, then, if we wish to direct the development of computer graphics technology towards the needs of the designer, what do we want in terms of hardware and capabilities?

At the present, from the point of view of designers and film makers, there are two fundamentally different techniques for obtaining computer-generated images. Over-simplifying actual procedures to make the point, it is sufficient to say that in one case you feed the instructions into the computer in the form of punch-cards or tapes, then see the graphic results of the computer's operations displayed on paper, film, or the face of a cathode ray tube. In the second case, the user sits in front of a console. With a device known as a light pen he draws lines and shapes on what looks like the face of a television set. It is the development of the second system which holds the greatest promise for the designer because, unlike the first, it permits trial-and-error, experimentation, and creative doodling. Such a system requires a large memory bank, and this means linking it (with economic feasibility in mind) to a time-shared large-scale computer. Let us summarize our requirements:

Display console

We would like the computer scientist to give the designer a remotely located display console with both input and output capability linked by co-axial cable to a time-shared computer. The system should be capable of sustaining a pictorial display and should permit the continuous interaction of the user with the display, using a light pen and/or keyboard to create or modify images. (To the designer and film maker, this continuous feedback is vital – an easy man-machine communication which permits trial-and-error design in a conversational mode.) It should include capabilities for storage, retrieval and revision of visual information. There would be retrievability at the user's option. There would be provision for the addition of stereo capabilities, e.g. double scope, or other such stereo devices. In this connection, some workers in the field have suggested an intriguing gadget (in addition to the light pen): a three-dimensional light pen, or glove, which would mould or form a three-dimensional representation (a virtual image) of an object, much as a sculptor might.

The system should be convenient from the film maker's point of view. Its operation should make minimal demands on the user, whether physical, mechanical or of technical understanding. In short, the user should be able to devote his time and energies as much as possible to achieving images and effects rather than playing with the machine.

It should permit privacy of operation. The system should be capable of being housed in a small office remote from the computer center, in a geographically convenient place. Nevertheless, the overriding consideration today is probably the economic one and this makes time-sharing, and all that it implies, an essential part of the scheme.

The keyboard, operation buttons, or programmable function keys should provide those manipulations which are part of the standard repertoire of the film maker as well as those which are peculiar to the computer's special capabilities.

Here are some of the things the film maker or designer would like to be able to do with all this: (1) Draw points and lines. (2) Vary the thickness of a line along its length. (3) Vary the brightness of points and lines. (4) Portray shapes by means of fine gradations of tone: shading; the definition to be such as to produce a high quality image consistent with today's moving picture standards. (5) Use a wide range of colors, as an artist might, to depict shapes, backgrounds, spatial relationships, moods, values, etc. (6) In the film maker's sense, do: pans, tilts, zooms in and out, fades, dissolves, superimpositions; in effect, duplicate camera movements over a still picture. (7) Manipulate images to make working procedures easier.

A device for graphical input

We would like to have a facility, a device for graphical input, which will digitize pictures (not just line drawings) of shapes in motion. The device, linked with appropriate programming, should be able to read and present information in digital form to the computer for storage and retrieval.

The purpose of all this is to provide the film maker with a means of acquiring *models* of shapes or movements taken (in many useful instances) from the real world, and storing them. You could file images and movements, for example a man walking, an arm waving, a leaf wafting to the ground. In order to do this, the machine, in a sense, has *analyzed* these shapes and movements. The film maker or designer could then call them forth, and, using them as structural models, modify them to get the particular version of the shape or movement that he wants. He might, then, alter shapes, or the relative motions of the parts, like a sculptor/choreographer who can change not only the pattern of the dance but also the shape of the dancing figure. Perhaps we could then synthesize a Churchillian figure who moved like a young boy. In any case, this graphical input device would incorporate existing pictorial material in its digestive system, so to speak, to be regurgitated when required, and reworked into a form appropriate to the new visual context in which it is to be integrated. Probably this translates, in the computer's terms, as asking for a graphic input device which can interrogate a small area of film and get a density answer. The device would be designed so that it will give multiple levels of tone information with enough resolution so that the details of a figure would be preserved. Implicit in the above is the film maker's concern not only with the accuracy (mathematical, physical or anatomical) of shapes moving in space, but, as well, their rhythm and character – the expressive aspects of a form or movement: awkwardness, grace, violence, discord.

A sound console

We would like to have a sound console, a device linked with appropriate programming, which can digitize sound (voice, music or sound effects), store it, retrieve it, reproduce it for editing purposes (in the film maker's sense) so that it can end up on the sound track of a film. It should be able to synthesize new sounds from the stored sound characteristics, for example a violin tone with a trumpet timbre. It should be able to give you Churchill's voice with all his mannerisms of speech, delivering a Russian anti-capitalist harangue. The user should be able to generate sound with some device corresponding to a light pen. Such a console could produce robot speech. It could respond to written or spoken English. For editing purposes, it could be used to do voice (or other sound) *justification* in the editing of sound and film. It could be used to give instructions to the editor, to identify shots, record desirable snatches of narration, etc. It should incorporate a retrieval system for getting any portion of a tape quickly.

A motion picture language

We need to design and tabulate the operands of a motion picture language, those elements which the film maker may think of as nouns (some workers call them *glyphs*): entities made up of any combinations of points, lines, colors or characters. Basic images in science would probably begin with circles, spheres, triangles, cones, atomic structures, etc. In any case, we would like to have at our disposal a sophisticated vocabulary of characters: letters, numerals, mathematical and scientific symbols.

As for the verbs of our language, the operating words (the functions), we might borrow from the film maker's vocabulary and usage as well as the computer's: pan right, pan left, zoom in, zoom out, tilt, fade, superimpose, etc. Rotate, translate, move on a drawn trajectory, move according to a rule. Enlarge, shrink, store, erase. Make a glyph. Make left and right eye images for stereo.

From the film maker's point of view, the adjectives (parameters of the function) would include descriptions of line or shape: color, gradations of shading, thin line, thick line, dotted line, high or low key, high or low contrast, smoothness of line or margin, irregularity of line or margin.

The adverbs would include descriptions of motion or positions in time: quickly, slowly, intermittently, oscillating, flapping, uniform speed, accelerating, irregularly or random. Orders to extend or contract the time scale of events, as in high-speed or time-lapse photography.

Clearly, the machine implementation of these adjectives and adverbs will require that they be converted into precise, quantifiable machine terms: How fast? For how long? etc.

The tabulation of a dictionary of such nouns, verbs, etc., in the long run must be based on usage and therefore should grow out of a program of pilot projects that have the development of a moving picture language very much in mind. This language of glyphs and operating words would grow in extent and power if it could be linked to our graphic input device, our image gobbler. The latter would provide countless models for glyphs and glyphs-in-motion.

Thus far we have considered a motion picture language in terms of man-machine communication. However, since we are asking for a computer-film maker technology (something new), it may be that a design or production language will have to be developed so that the various specialists can communicate with one another during the new, perhaps complex, stages and processes of production. Again, such a language will have to grow out of actual experience since the man-machine language will set up the terms for the man-to-man production language.

Computer-oriented projection systems

There is no reason to limit our thinking about display or projection systems to the face of a tube or a two-dimensional film screen. We should explore the possibilities of multiple screen techniques, stereo and total image environments.

Multiple screen

Multiple screen permits a contrapuntal, high-density flow of information. It is very flexible. It can combine still images with images in motion, color with black-and-white. It can show, simultaneously, many views or aspects of the same subject. It can compare or contrast several shapes and movements at one instant in time.

The multiple screen technique may be used by the film maker as a powerful design tool. The student may use it as a teaching or learning device, interacting with it as the designer does, but on a programmed basis. He may be shown film or static diagrams on some of the screens and be required to draw, fill in or modify shapes, symbols or movements, choose between pictorial alternatives or construct something new from given visual elements. Like the film maker, he could stop, speed up or slow down a visual sequence in order to study or alter its elements. The same tool that the film maker uses for designing images and sequences, the student uses for examining and learning.

Stereo and total image environments

There are two approaches to the stereo experience. You may look through a window into space (as when you look at the left and right eye images on a screen through stereo glasses) or you may find yourself surrounded by space (an effect partially obtained in the planetarium, in dome displays, or by very, very wide screen.)

Our display console, described earlier, would exemplify the window-on-space approach, combining a stereo viewer with the double images on the display screen. This capability is indispensable when dealing with images, movements and structures where a sense of depth is important to a true understanding of spatial relationships.

In addition to this, we should explore the intriguing possibilities of total image environments. It is possible to project a moving picture image on almost the entire inner surface of a sphere. If we combine live with computer-generated images we can project them on such a screen. Further, by developing a computer-coupled projector with a considerable range of controllable speeds we could control the time scale of events depicted and obtain, with exactitude, any of a complete range of effects typical in high-speed or time-lapse photography.

It means we could move the student into a world in which we have complete control of time and size. We can have him watch a yearly procession of the heavenly bodies in five minutes or watch the world rushing by him at thousands of miles per hour. He can find himself five microns small, surrounded by the protozoa in a drop of water, or observe, in ultra slow motion, the pattern of shattering glass. Through computer-generated animation he can be given an accurate view of a complex structure as seen from within, or of changing frames of reference which surround him.

It should be pointed out that it is possible to combine the multiple and spherical screen techniques to give the effect of many discrete visual frames (or windows) of any desired shape or size and in any combination, located almost anywhere you wish on the inner surface of the sphere.

Where do we stand now?

What is the timetable of our expectations? Many of the devices we have asked for would obviously take 10 or 20 years to develop, given time, money and interest. Others we can have immediately–again, given money and interest. Much of the technology we want already exists in one form or another in various places across the country. It needs to be brought together and focused on the needs of the film maker and designer. To achieve some of the things we ask for we may have to wait. How long?

Capabilities: operations per second

Today, the IBM 7094 handles between 100,000 and 250,000 operations per second. This year the C.D.C. 6600 will handle 2 to 5 million operations per second. In 1968, it is expected that the C.D.C. 6800 will probably be able to handle between 8 and 35 million operations per second. By 1970, projections based on research on new component elements would indicate the possibility of 50 to 100 million operations per second.

Tonality

There is no tonality today. With a raster of 2^{10} x 2^{10} points resolution is poor. Today, by going to 2^{12} we can approximate the quality of a wire photo. We may be able to achieve what we want at 2^{12} but it would be fairly certain at 2^{14}. We need time to experiment, with levels of intensity, with high frequency *wooble,* with new film emulsions and new processing procedures, with sub-routines for *shade.* It would probably take a year to get it.

Color

The difficulty today is with the quality of the phosphor. High quality color effects can be obtained, but only as a dark room technique. It is felt by some that a way might be found of producing color on the C.R.T. face and that it would probably take between 18 and 24 months to do it.

Stereo

The technology exists. It is really a matter of someone wanting it badly enough to pay for it.

A motion picture language

Basically, we ought to get started right away. Implicit in our requirements are a large memory, ability to execute floating point arithmetic and Byte manipulation ability. At the moment a prime consideration is the nonavailability of real time-sharing systems. Nevertheless, all the elements of the language can be developed independently to the time sharing to some extent, on a small machine whose costs will not swamp the budget. Basically, it would have a flexible input, output, and interrupt control capability. Obviously, the level of sophistication and control will be influenced by the support computer. We can develop a language and make films using a small machine and the C.D.C. 6600, when available, would permit time-sharing. It is important that the various teams who are working on these developments take great care to keep machine dependence out of the language. There is every likelihood that something workable would emerge after one year of effort. Since time and experience are fundamental to the development of a motion picture language, it could only be from that vantage point that we could assess the problem and time commitments to follow.

The display console and related capabilities

We have been asking for a very sophisticated system, and its implications will have to be studied in some depth before assessing its chances for realization. In this connection, it might be worth considering a poor man's version of this console. The one we described was essentially a high quality designer's or film maker's tool. Why not a student's version, a learning tool – essentially a T.V. set, costing under $1,000 to install? In this regard, even the console at which the designer sits need not be of the highest quality. Only the photographic display (elsewhere?) must meet motion picture standards.

Where do we go from here?

The key to rapid progress in achieving the sort of technology we are looking for lies in the concerted efforts of computer scientist and visual designer – the machine maker and the machine user, working together to solve the problems inherent in a given task. Clearly, the state of the art is such that a well-designed language for computer graphics would be of interest, not only to designers and film makers, but also to workers in many diverse fields: medicine, economics, mathematics, sociology, physics, architecture, etc. It is important that the interests and needs of this wide variety of users be coordinated.

Recently, a conference was held to discuss these matters among physicists, engineers and mathematicians (Conference on Computer Animation, Bell Telephone Laboratories, Murray Hill, New Jersey, September, 1965). A committee was appointed to "explore the needs, investigate timetables of pertinent developments, compare costs and benefits to potential users, and formulate specific programs that should be undertaken."

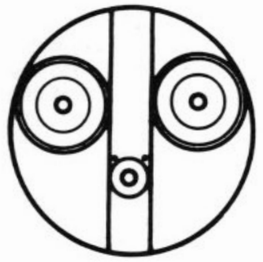
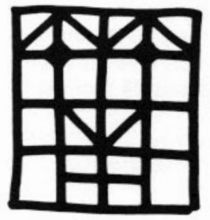
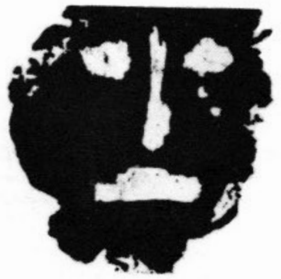
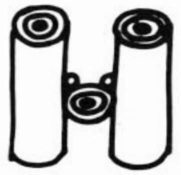
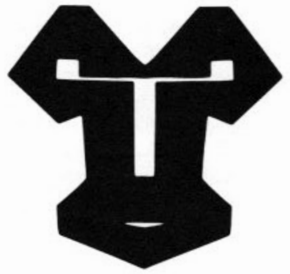
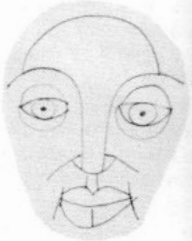
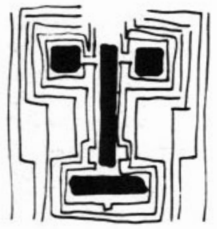
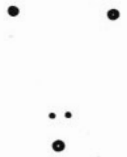
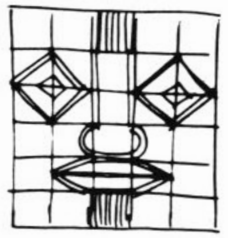
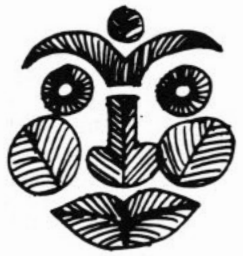
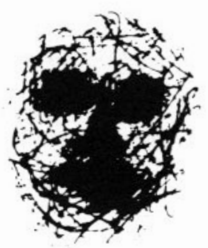
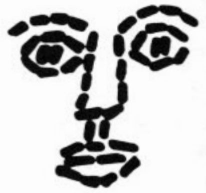
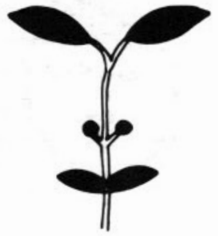
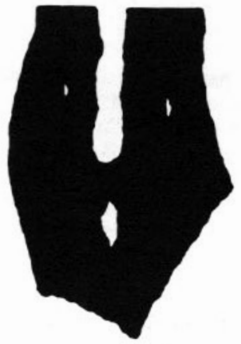
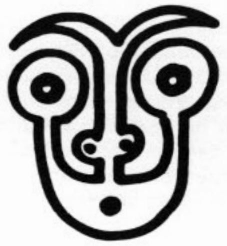
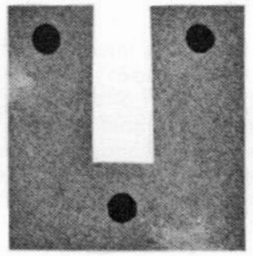
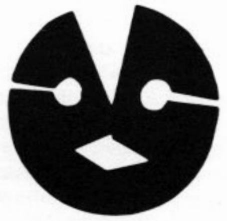
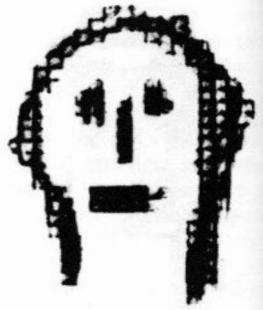
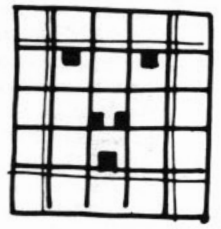
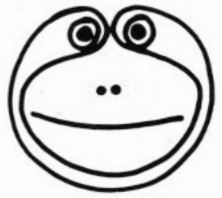
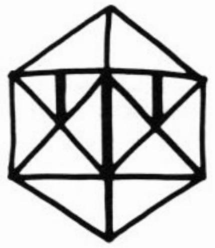
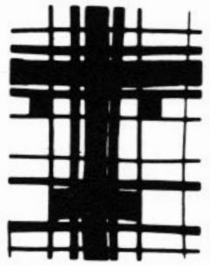
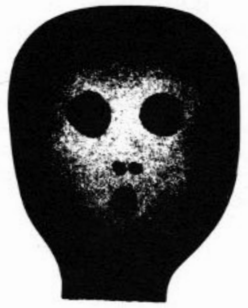
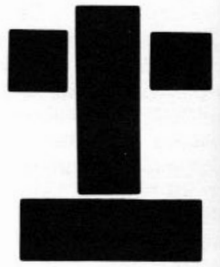
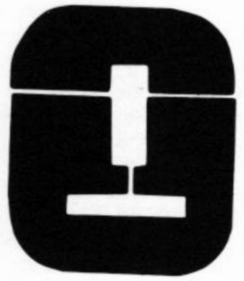
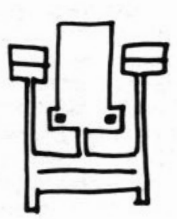
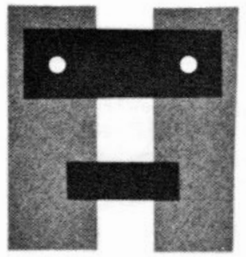
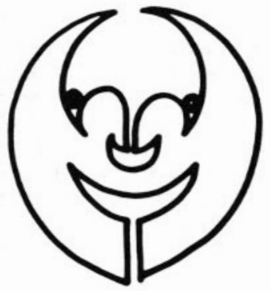
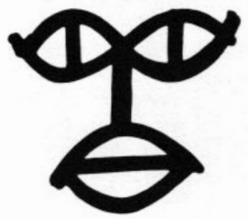
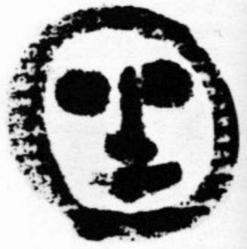
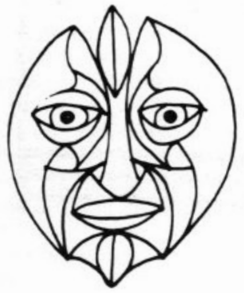
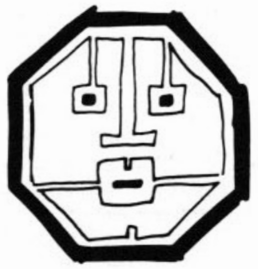
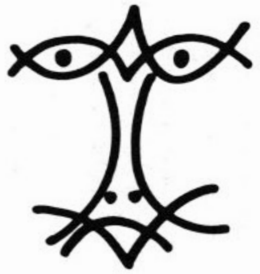
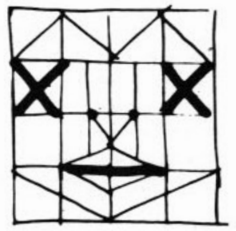
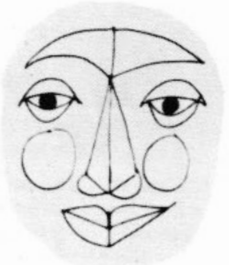
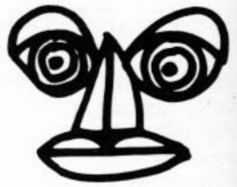
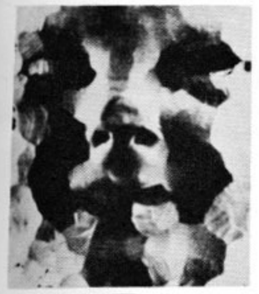
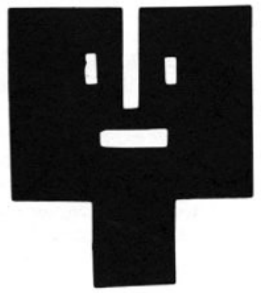
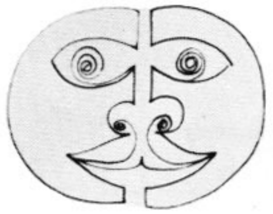
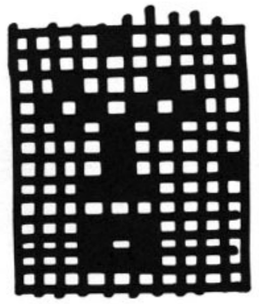
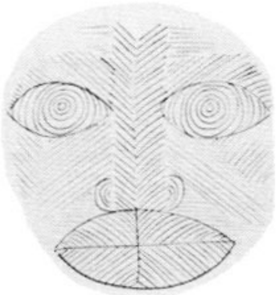
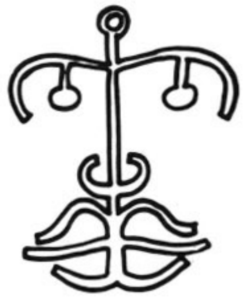
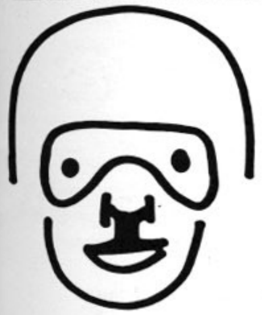
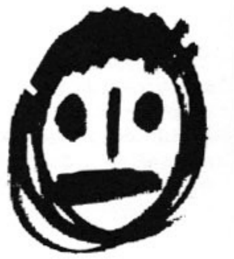
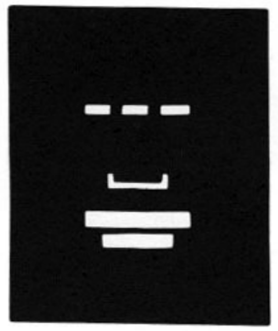
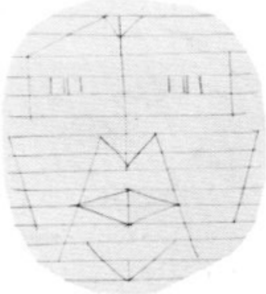
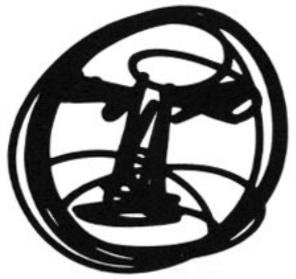
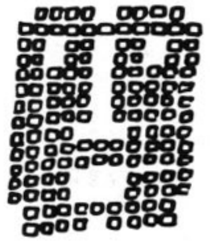
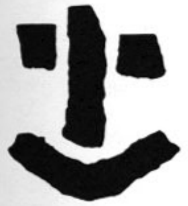
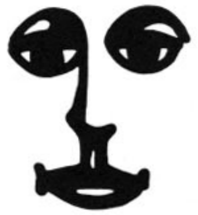
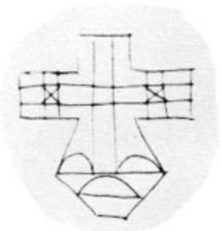
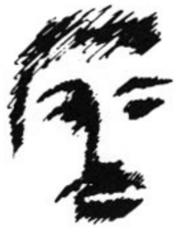
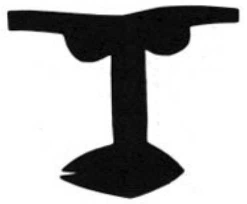
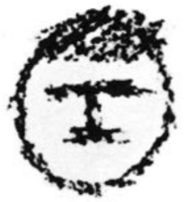
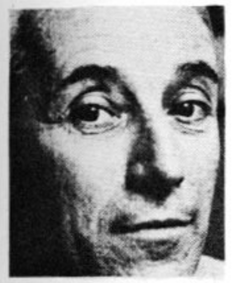
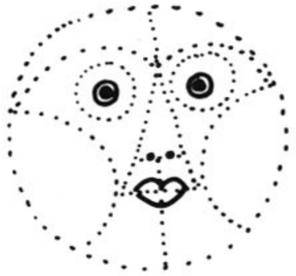
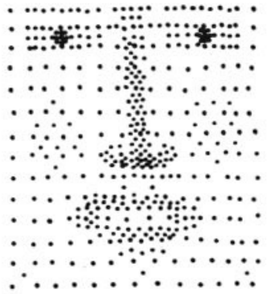
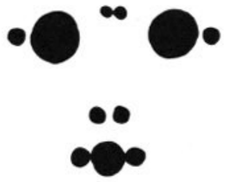
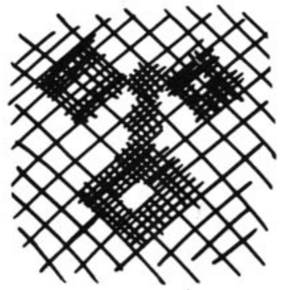
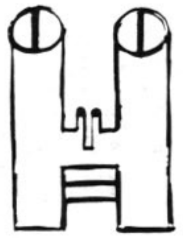
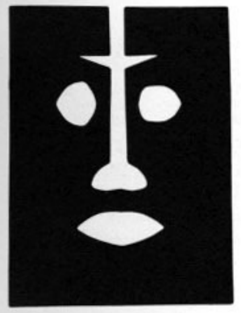
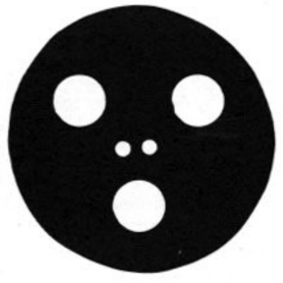
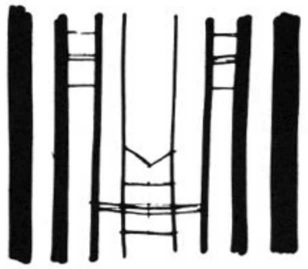
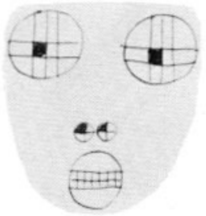
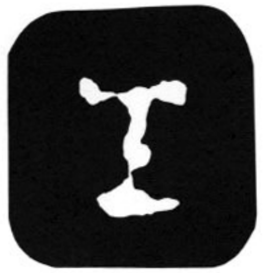
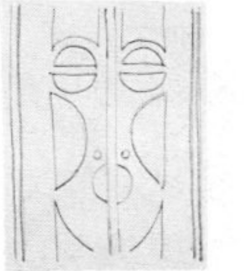
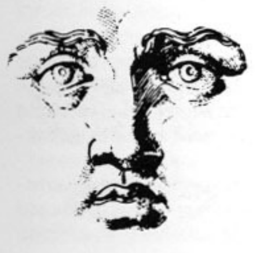
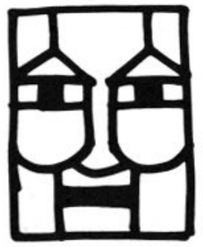
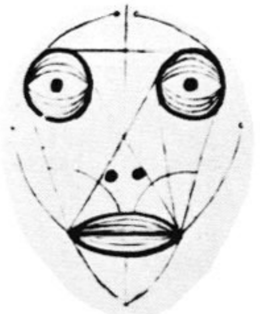
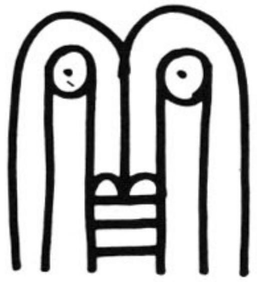
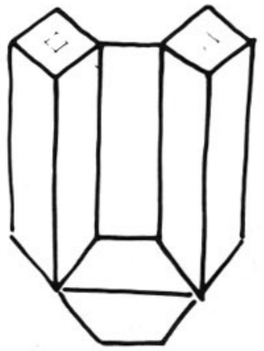
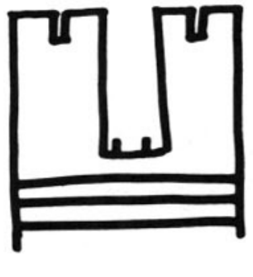
Designers and film makers would do well to get together and do likewise.

Variations on the Face

Bruno Munari

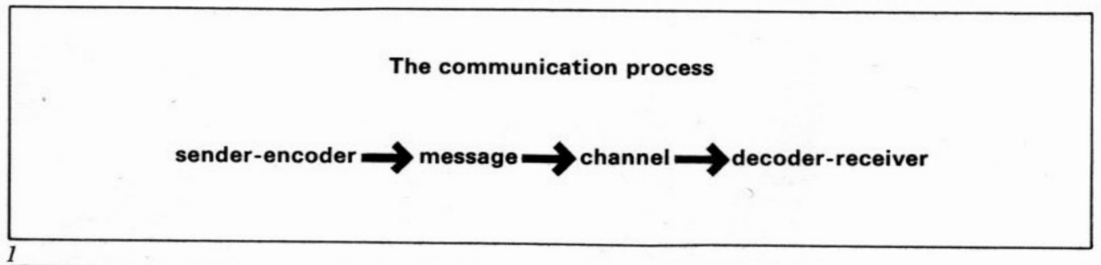
Bruno Munari is a well known Milanese designer and graphic artist who has twice been awarded the Compasso d'Oro for excellence in his field. He is known for his researches in visual communication and cinematography, and for various exhibitions of his work in Europe and the United States. His recognition in this country will be confirmed by a one-man show of his work scheduled to open on September 23, at the Howard Wise Gallery, 50 West 57th Street.

It is interesting to note that we can accept these faces as we would accept variations on a musical theme: a response that would have been nearly impossible B.P. (Before Picasso). We no longer react to distortion of the human configuration with shock, but with amusement and interest. Perhaps this acceptance of distortion is more functional than it seems . . . could we be preparing ourselves psychologically (if rather left-handedly) for the acceptance of the quasi-human, the near-human, and the not-human, if (when?) we finally meet it.

The Psychology of Visual Communication

Martin Krampen



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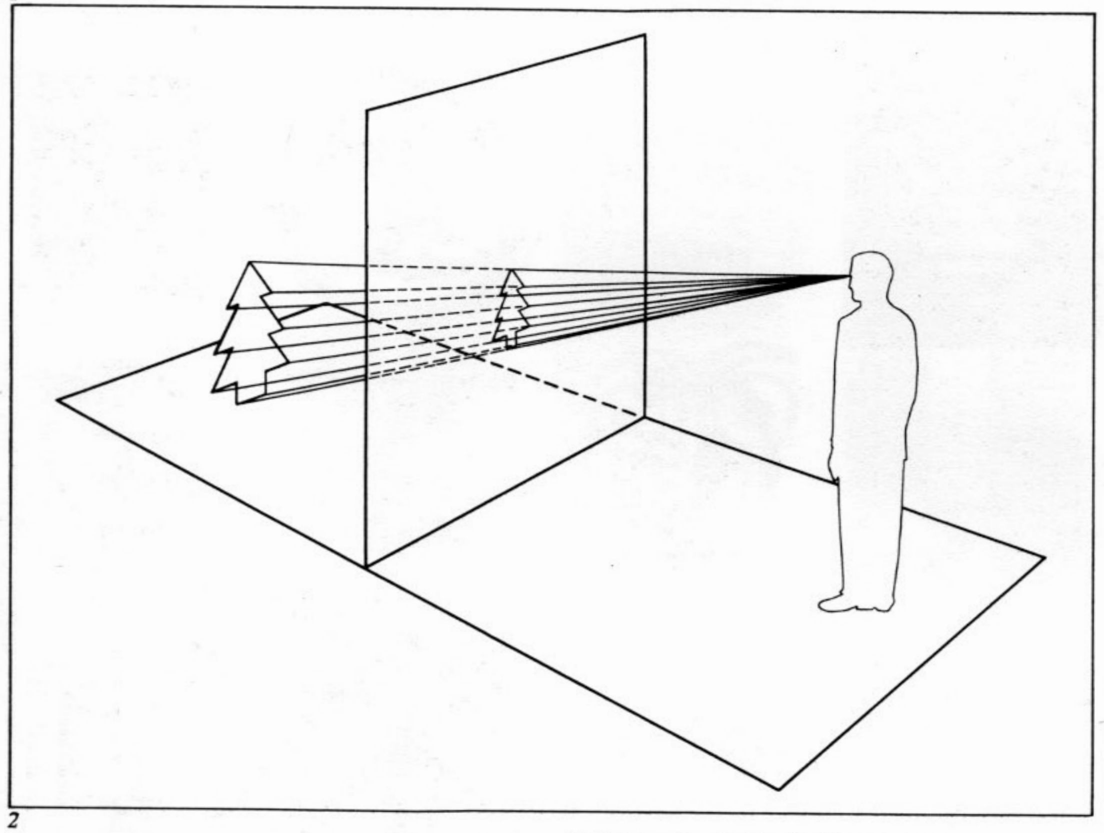

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1. Shannon's communication model.
2. Looking at a tree through a sheet of glass.

Martin Krampen's background covers several countries and the study of psychology, philosophy, theology, painting, design, and visual communication. He has a Ph.D. in communication arts from Michigan State University. He has had a wide variety of research experience here and abroad, has taught and lectured at a number of American and European design schools and institutes of technology, and has been a practicing graphic designer with more than one award to his credit. He is at present teaching a graduate course in Creative Synthesis *at the University of Waterloo in Ontario, Canada. Dr. Krampen examines the psychology of visual communication by means of a telegraphic model. Adopting Shannon's communication analysis, Krampen finds common ground between verbal and non-verbal communication in the use of* surrogates, *which act in all transmissions of information. In non-verbal situations, the surrogate is not a series of words but a configuration of images. The designer's job, according to Krampen, is to perceive and predict the message communicated by a given configuration, and to create new configurations effective in communicating messages, choosing appropriate channels and codes.*

What is communication? How do people go about sharing their ideas with others? What is this process by which the images generated by one brain can be made to arise in other brains beyond a separating gulf of space?

One way of describing the communication process may be to adopt the model of the communication engineers. Claude Shannon, of the Bell Telephone Laboratories, proposed a model of the communication process (1949) which can be adapted to our needs. It consists of four basic ingredients: the sender-encoder, the message, the transmission channel, and the decoder-receiver.

When a person wants to communicate, he becomes at once a sender (who chooses a message from a set of possible messages) and an encoder (who puts the message in an appropriate code, be it verbal or visual). The message is composed of the ideas or images he wants to transmit, encoded in a suitable form. The channel is the sensory equipment of the receiver (auditory or visual, or both) through which the coded message reaches him. The person at the terminal point of the transmission process becomes at once the decoder (who re-transforms the coded message into meaningful ideas) and the receiver (who interprets the ideas *in his own terms*). In order to arouse our images in other people's minds, we have to produce a message suitable for the sensory channel of the receiver, in a code accessible to him as decoder. Painters, photographers, designers, architects and engineers encode their images and ideas in drawings, pictures, models and other forms suitable for the visual transmission channel.

While visual communication is obviously different from verbal communication, there are aspects in which both are alike. Both convey second-hand experience. The receiver of the communication is not himself aware of the ideas or objects the sender is aware of. He is being made aware of ideas or objects experienced by another person, the sender. Verbal and pictorial messages alike are vehicles for this kind of indirect perception. Both present us with substitutes for direct experience.

Gibson (1954) has called these substitutes *surrogates.* He defines a surrogate as "a stimulus produced by another individual which is relatively specific to some object, place, or event not at present affecting the sense organs of the perceiving individual." An important feature of this definition is that it accentuates the *artificial* character of the surrogate. It also states that there must be a one to one relationship between the surrogate and its referent, whether the referent be an object, an event, or an abstract idea. What kinds of properties must a surrogate share with the thing it stands for? Can a surrogate be wholly unlike its referent?

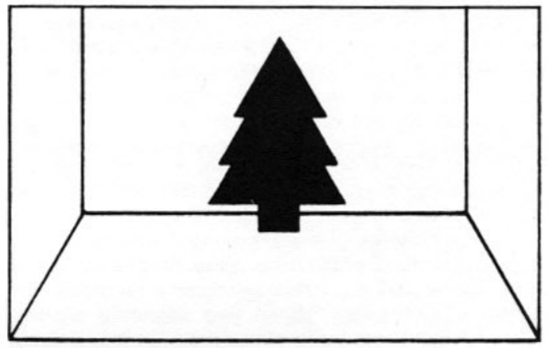
There are two kinds of correspondence between surrogates and their referent objects. First, surrogates may be arbitrarily paired with an object, and the correspondence is valid by convention among a group of people. For example, the letters T, R, E, E, are, for English speaking people, a surrogate for the object *tree.* This type of surrogate is called *conventional.* Second, the surrogate may correspond to an object by *projection.* For example, if we look at a tree through a sheet of glass, we can trace the silhouette of the tree. on the glass and use it as a surrogate for the object tree. In this case correspondence rests upon the fact that a recognizable outline of a tree offers a visual stimulus similar to the pattern reflected by the tree itself. Since the patterns perceived are similar, they can be interpreted as pertaining to the same thing. This type of surrogate is called *non-conventional,* or *optical.*

Mixed surrogates combine the properties of both conventional and optical relationships. They are specific to their referent objects partly by virtue of agreement and partly by virtue of optical recognizability. Pictographs, Chinese characters, traffic signs and certain other conventionalized representations share this category.

What does this difference between conventional and non-conventional surrogates imply for purposes of communication? Has pictorial communication any advantages over verbal communication? Just this: in so far as it is genuinely pictorial, the receiver needs little learning to identify its referent correctly. If the surrogate is mixed, he will need somewhat more, but still not so much as is required for the decoding of conventional surrogates, which, in order to be useful, must be learned by both the sender and the receiver, as a language is learned, from human teachers. Whatever learning process plays a role in visual communication, it seems to go far back in the life of the individual. One would probably be correct in assuming that inborn physiological mechanisms are involved, as well as experience of the environment. It should be noted that both conventional and optical surrogates can be relatively specific or relatively unspecific with respect to their referents. Both language and pictures may be ambiguous, and the resulting second-hand experience of the receiver will then be ambiguous also. Pictures are said to have more or less *fidelity;* words may have more than one meaning; contexts affect meanings of both verbal and graphic surrogates, as we shall see again in this discussion

The perception of outline drawings

What process makes us take a line on paper as a surrogate for the edge of an object? By definition, an edge is the abrupt end of an object's surface at a certain distance from the observer's eye. Edges of objects in space and silhouettes or outlines on paper have one important feature in common; where they finish, a more or less abrupt change in luminosity takes place. Each time our eye is confronted with a sufficiently sharp break in luminosity, we tend to see the edge of a surface. This mechanism of perception is the reason why silhouettes and outline draw-



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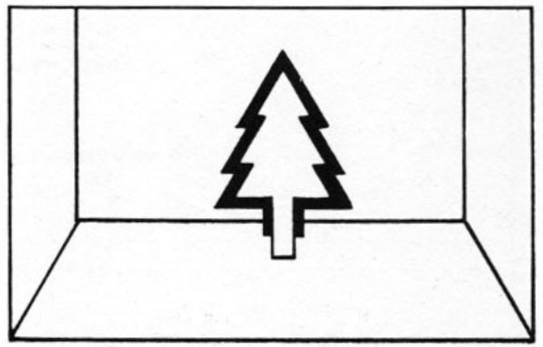

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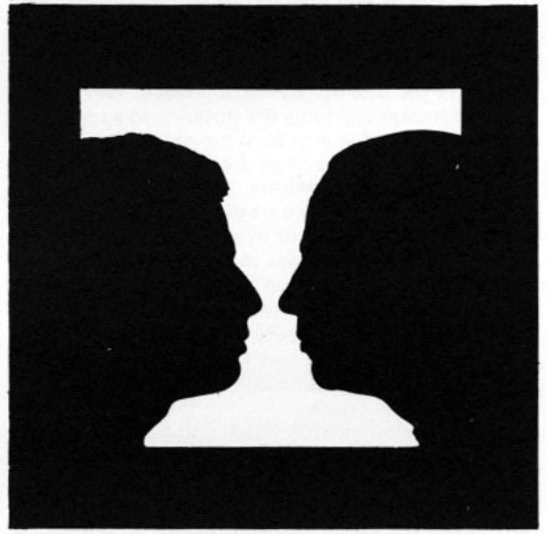

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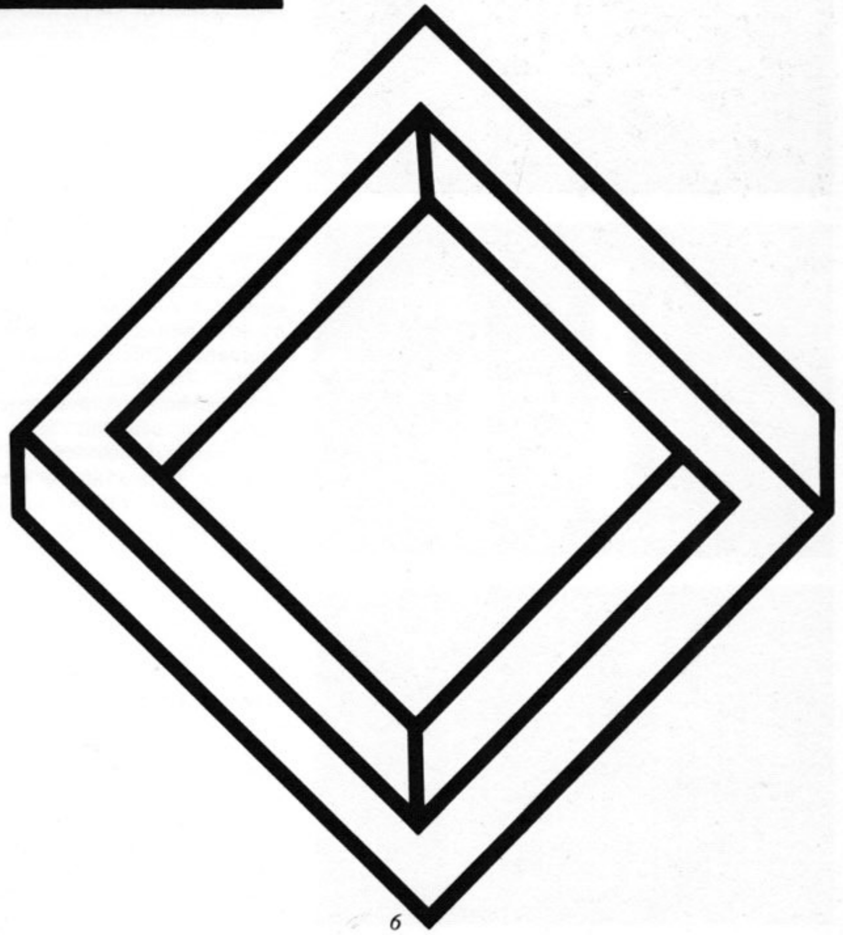

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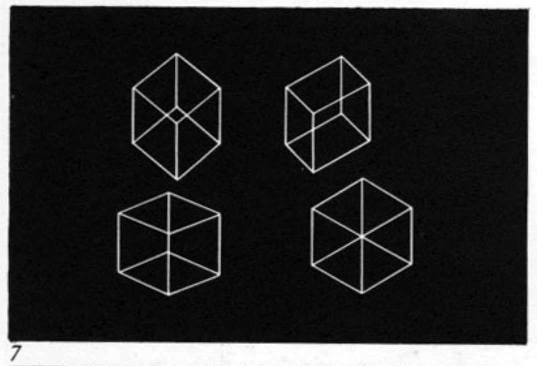
3. Object as a silhouette.
4. Object as an outline.
5. A. reversible figure.
6. An impossible object.



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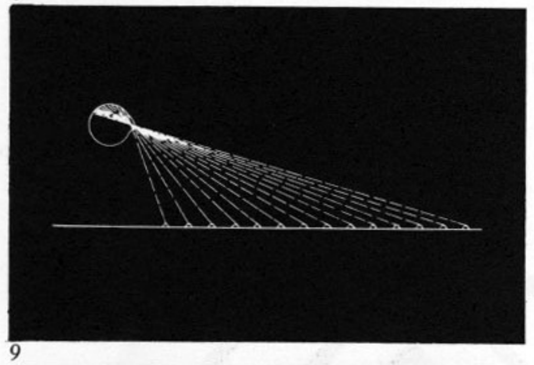

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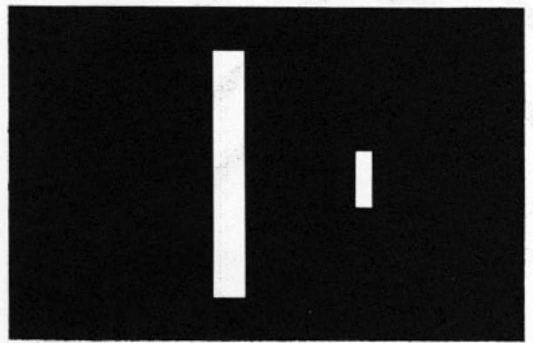

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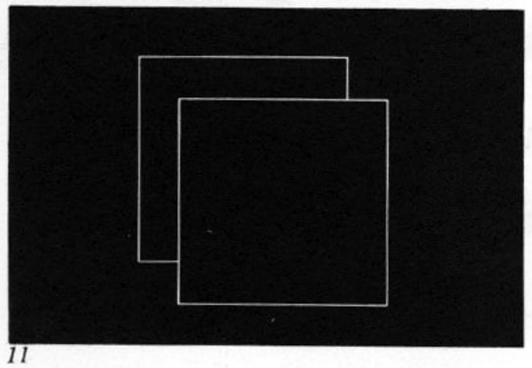

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ings can be used as surrogates for the spatial arrangement of objects. Our normal experience of visual perspective accounts for the effectiveness of *overlap* as an indicator of distance in an optical surrogate. Whenever we see object shapes, we see them because they are edged and whenever we see edges, we attribute them to one object only. *It is characteristic of edges that they belong as object boundaries only to one surface in one direction at a time.* If one of two adjoining regions has a recognizable (positive) shape, the shape of the other is lost (negative). But it is possible that a contour becomes a surrogate for either of two edges. When two adjoining regions both have a recognizable shape the edge may belong to either shape, and give rise to so-called *reversible figures.* Also, edges seem to have only a limited sphere of influence, within which they determine how we perceive the direction into which a surface extends. Past that sphere of influence, two edges opposite in sign will force the observer to sudden reappraisals of his distance from the object. Thus, contradictory perceptions may be experienced, as in so-called *impossible objects.* Thus a line acting as surrogate for one or more edges can be subject, depending on its context, to three kinds of ambiguity. Positive and negative areas may reverse themselves, the ground being perceived as figure, and the figure as ground; the direction of a contour may reverse itself, presenting a convexity where a concavity had been seen; or a contour may be perceived as contradicting the message communicated by another contour of the same figure.

In order to be efficient in visual communication, the designer must be able to predict which edge will be perceived as belonging to which surface. Far from being a single factor, it is the entire configuration or organization of the picture, the *Gestalt,* which determines what will be perceived as figure and what as ground. In this sense, the production of a visual message can be called "Gestaltung," that is, "bringing about a predictable configuration." The designer's job is to perceive and predict the message communicated by a given configuration, and to create new configurations effective in communicating messages.

The Gestalt theory of perception suggested a set of rules for visual communication. On the subject of grouping, for example: proximity and similarity of shapes (or objects) will group them together for the perceiver. Also: where more than one organization could be perceived, the observer will see the simplest alternative. This has been called the "law of simplicity." The trouble with Gestalt theory is that it provides only intuitive statements and demonstrations, while scientific "laws" should be based upon quantitative measurement. There is some beginning, however, in quantifying Gestalt hypotheses. Information theory, with its concept of redundancy, seems to provide a promising starting point. Organization, or *Gestalt,* and *redundancy,* as used in information theory, seem to be parallel concepts. We could thus predict that *the probability of a given perceptual response to any pattern is an inverse function of the amount of information required to define that pattern.* For instance: the degree to which any version of a drawing is perceived as its solid rather than its flat alternative is proportional to its complexity as a flat pattern. In any pattern which is possible to perceive in more than one way, the more angles and lines there are in it the more complex it becomes as a flat pattern, and the more likely the observer is to choose the simpler alternative and see it as a solid. Thus the Gestalt law of simplicity seems to provide a quantifiable predictor of which alternative is likely to be perceived in an ambiguous stimulus pattern.

Volume surrogates and depth cues

We have seen how outline drawings can work as surrogates for surfaces overlapping in space; but photographs (and other pictures) function as surrogates for solid voluminous objects and scenes. What are the optic features of solid objects which can also be produced by the dappled surface of a shaded picture?

Most surfaces of actual objects and scenes have a texture more or less evenly distributed. When we stand in front of a plowed field we see a texture of earth crumbs, coarse in the foreground (where the distance from the eye is short) and becoming finer as the distance increases. Thus, as lines with their abrupt changes in luminosity trigger the perception of edges, *texture gradients* trigger the perception of receding surfaces. They provide us with information on what is far away and what is close, and about the relative size of the objects. These gradients can be produced with great fidelity by pictorial surrogates, especially by photographs.

Since we are surrounded by textured and shaded surfaces such as stone walls, veined marble, clouded skies, etc., we are surrounded by potential pictures. A selection from all the dappled surfaces produced by nature could theoretically furnish us with surrogates for any conceivable object or scene we might want to portray. A photographer may seek out a cloud formation which seems to represent architecture or a human body. The same operation is also at work when we look at the famous Rohrschach inkblots or at some forms of abstract painting. The effect of these pictures is produced less by the activity of the creator-encoder than by the intention and selective attention of the viewer-receiver.

Again, actual objects in our environment are individually oriented with respect to sources of light. They will thus exhibit shading on their surfaces, and will cast shadows. The optic characteristics of shading and shadow can also be produced by pigment density in a painting or photograph.

In addition to texture gradients and light gradients, there are other optical cues for depth in space which can be artificially produced in surrogates. Most of these cues were in fact used by artists long before they were intellectualized by the artists themselves, or by scientists. At least four of these classical depth cues should be mentioned: size, overlay, linear perspective, and color (or atmospheric perspective: the tendency of all colors to approach each other as they recede into the distance causes us to perceive sharply contrasting objects as nearer than indistinctly contrasting ones.)

Three-dimensional surrogates

Gibson (1954) defines a model as a "physical object whose various surfaces have the same dimensions as the corresponding surfaces of the original object, and hence are geometrically congruent with them, but which is made of a different substance from the original." Scale models preserve the proportions of the dimensions in a minor scale; but they will, under some conditions, still produce a projection on the retina identical with that of the original object, and can become, visually, virtually indistinguishable from it. The receiver of a visual message need not perceive all the properties of the absent situation. Only the ones relevant for its future relation to him are significant. In this sense, distortion and exaggeration may become a method in visual communication. During the war it was found that distortions exaggerating the characteristic features of a given type of airplane, in the scale models used to teach aircraft recognition, improved the rate of learning somewhat. Distortion and exaggeration as used in caricatures are well known for their capacity to convey complex messages in a highly condensed form.

Toward a theory of visual communication

A theory of visual communication should take its point of departure from a classification of the basic types of coding involved in producing visual messages. For each type of coding, the various coding techniques should be specified. The perceptual functioning of particular subclasses of surrogates should be spelled out as to advantages and disadvantages, and the reasons for them. Finally, the resulting list of surrogates should be systematically related to all the other variables in the communication process.

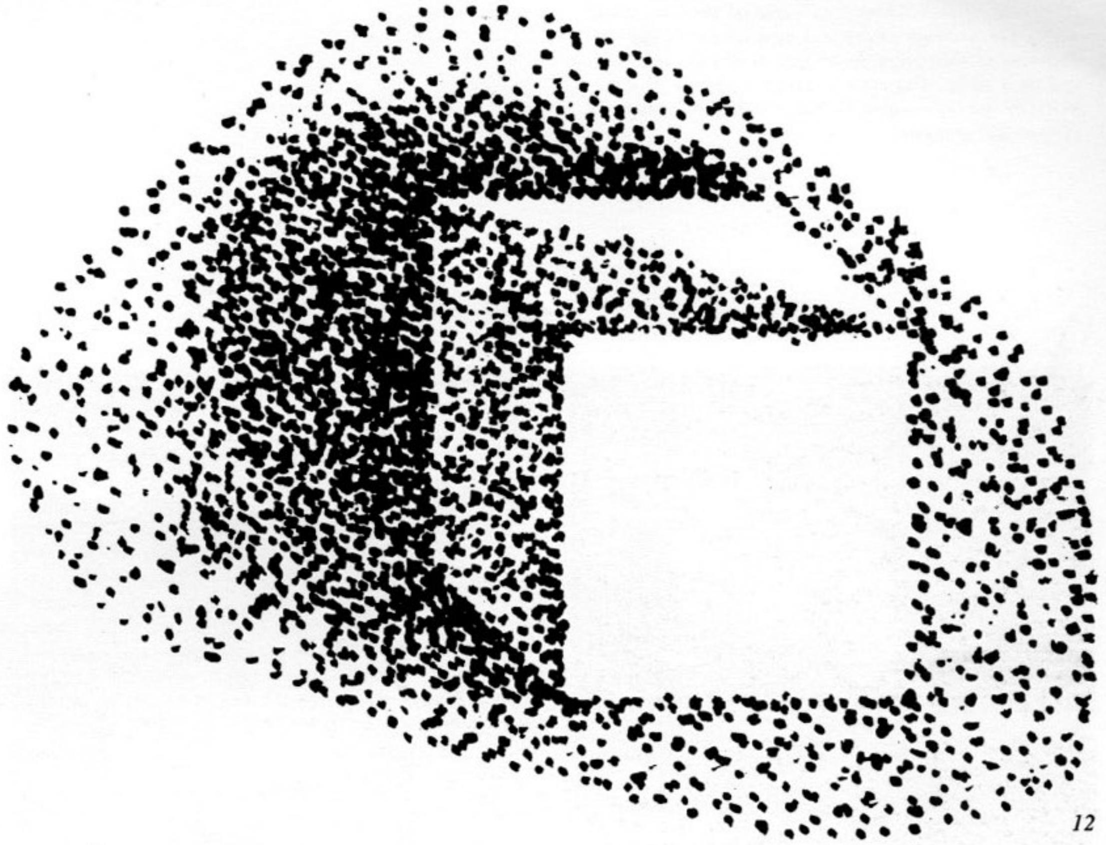
Conventional, non-conventional, and mixed surrogates are the major subdivisions resulting from different coding methods. Non-conventional coding includes model-building, photographic and hand graphic procedures. Conventional coding occurs in visual communication when we use typographic procedures. Mixed surrogates, partly conventional and partly non-conventional in nature, are produced by hand-graphic procedures.

Coding by setting up a conventional or non-conventional correspondence between surrogate and referent is similar to two different methods of coding in computers. In digital computers the input is coded in discrete units at regular intervals. The letters of a word, and the words of a sentence, are also regularly spaced discrete units. In analogue computers, models of real processes (e.g., the production process in a factory) are simulated by the manipulation of voltages corresponding to properties or relationships in the model. The quantities represented in an analogue computer vary continuously in parallel with variations in the real process. Digital computers, on the other hand, are essentially counting devices, where the variables, instead of being continuous, are broken down into discrete amounts.

It has been proposed to call the coding of messages by conventional surrogates "digital coding," while non-conventional coding could be called "analogical coding."

For either type of surrogate the visual transmission channel remains the only constant in the communication process. Sender-encoder and decoder-receiver variables may change. For instance, different levels of encoding skills should result in surrogates of different quality, and therefore in different reactions on the side of the decoder-receiver. Likewise, the sender's knowledge about the subject matter or about the receiver, the sender's attitude toward the message or the receiver, or social and cultural factors affecting the sender, should result in different choices regarding the type of surrogate to be used. On the other hand, different levels of decoding skills may influence the outcome of the attempted communication. A receiver who is not schooled in reading a plan or a diagram will fail to understand the intended message. Likewise, the receiver's knowledge about the subject matter and the sender, his attitudes, and the social factors affecting him, will tend to improve or diminish the effect of any surrogate chosen for a given message.

To repeat: the designer's job is to predict the message communicated by a given configuration to a given receiver; and with a greater knowledge of the perceptual factors involved, to create new configurations which will communicate more effectively.



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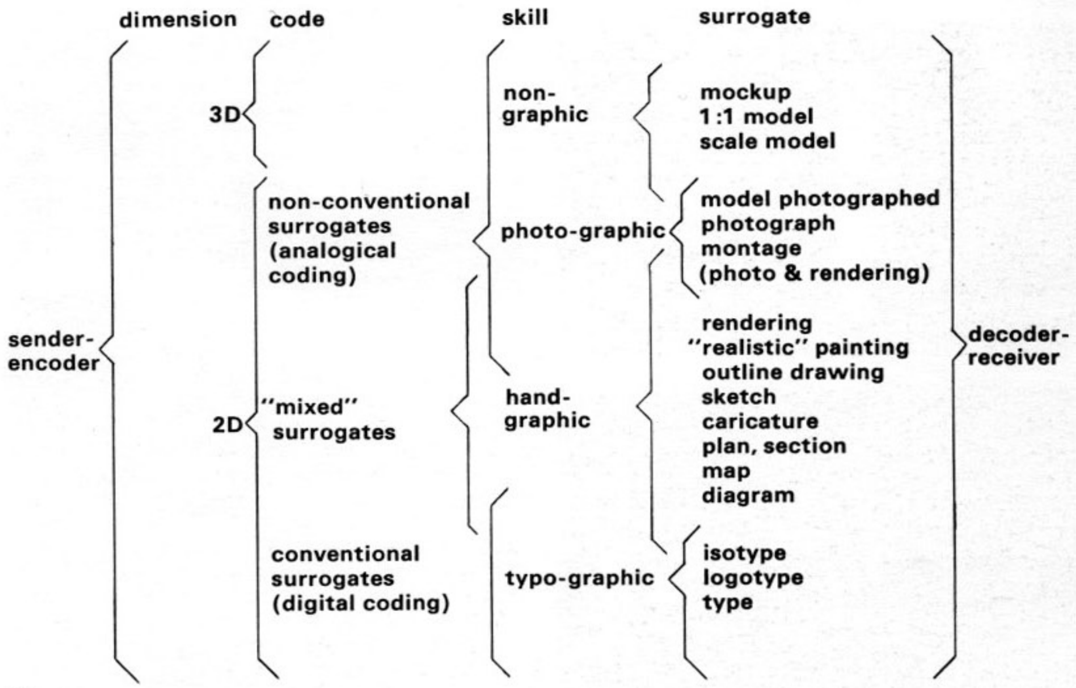
7. Solidity and flatness can be seen as a function of complexity.
8. A ploughed field as an example of a texture gradient.
9. Diagrammatic elevation of ploughed field.
10. Classical clue: perspective
11. Classical clue: overlay
12. Shading and shadow as optical clues.
13. Chart of coding techniques.



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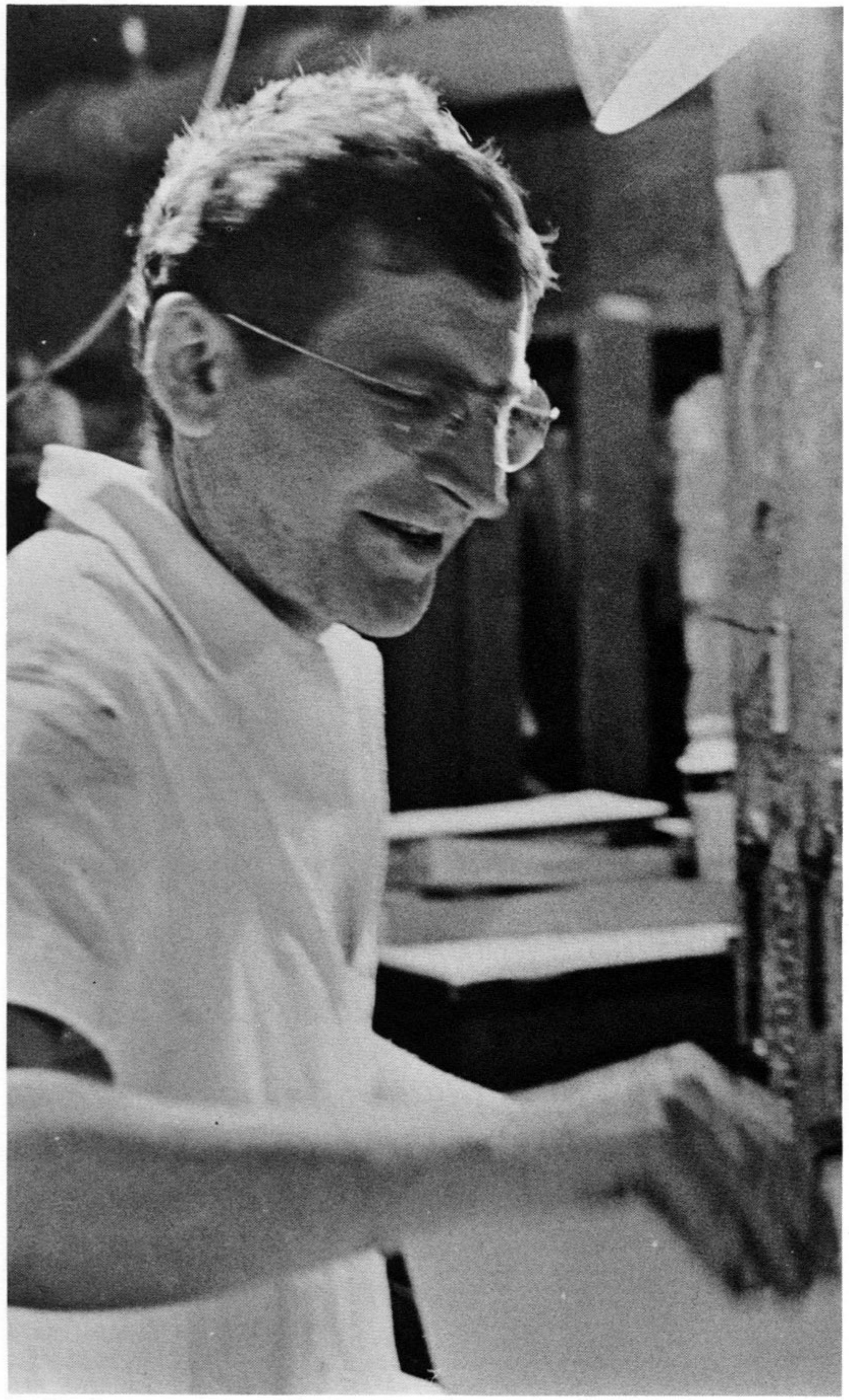
Speaking of transformations—and of the broadened uses of technology—here is a man who is in the business of transforming images. Using his selective eye as a point of departure, and the photo-offset press as his instrument, he plays the combinations almost like a piano.

Printing as an Art Form

Eugene Feldman



I was thirteen when I started printing; it seemed like a good way to make money. With one font of type, a mirror to read it with, and a Kelsey hand press, I set up shop as a job printer in the attic of my home, under the name of Falcon Press. My slogan was ADVERTISE OR THE SHERIFF WILL. The next year, when I was fourteen, I thought what I needed was a little class, so I changed it to PRINTING IS AN ART AT FALCON PRESS. What I meant by art, then, was that I could print better than the local barber, who was the village printer in his spare time. Throughout those two years and the next three, I printed dance tickets, stationery, raffle books, and feed bag tags. By the end of my last year in high school, I had bought two power presses, and had earned enough money to go to art school for two years. This is what I learned in art school: that you have to do much better, you have to make the effort; and that whatever art there is, it is within you, and not in the classroom. After that I enlisted in the army, and for three years I worked with a topographic battalion, mapping invasion areas, and learning offset from the large printing unit attached to our company.

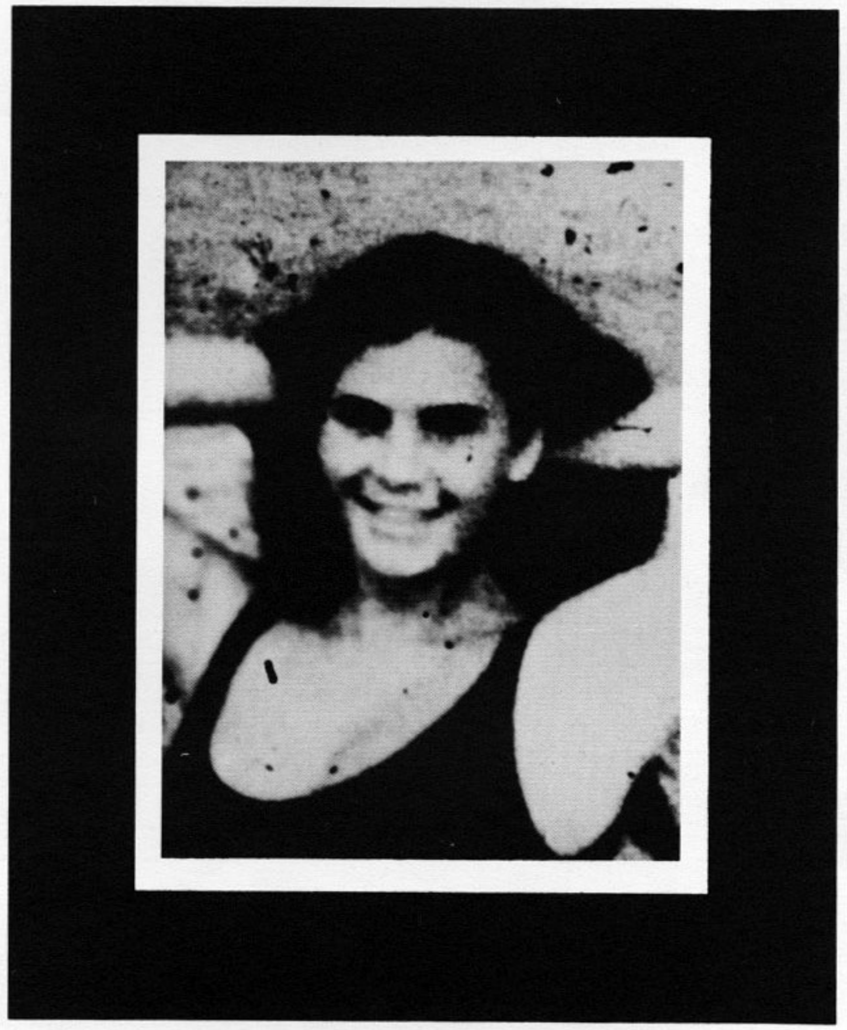
After the war, I moved the Falcon Press to Philadelphia, bought a small job shop, and converted the majority of my work from letterpress to offset. Since then I have worked commercially with a wide variety of experimental processes.

It just never occurred to me that I should make a choice between starving in a garret so that I could create beauty or living a bourgeois life in the suburbs because all I could make was money. Business was my gateway to art and art is part of my business. I could of course say, and it would be true, that creativity pays; but nobody will try to be creative because there is money in it. If that is their only motive, they won't succeed.

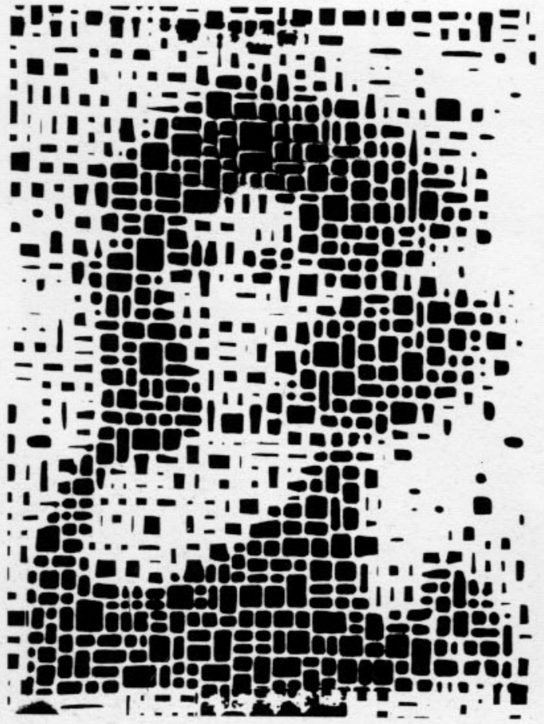
The third part in the trinity of my work, as integral to it as commerce and creativity, is teaching. Now, I am a teacher, but I know that I cannot teach the art in printing. I do not try. What I do want to do is to give the student the knowledge he will need: how the machines work, the way to use a hand press, a power press, an offset press, and how to make a plate. I want to teach him what I have learned in my shop: that a commercial job must be done perfectly and with pride, and that in order to do it the printer must have a regard for, an understanding of, his equipment and its capacities.

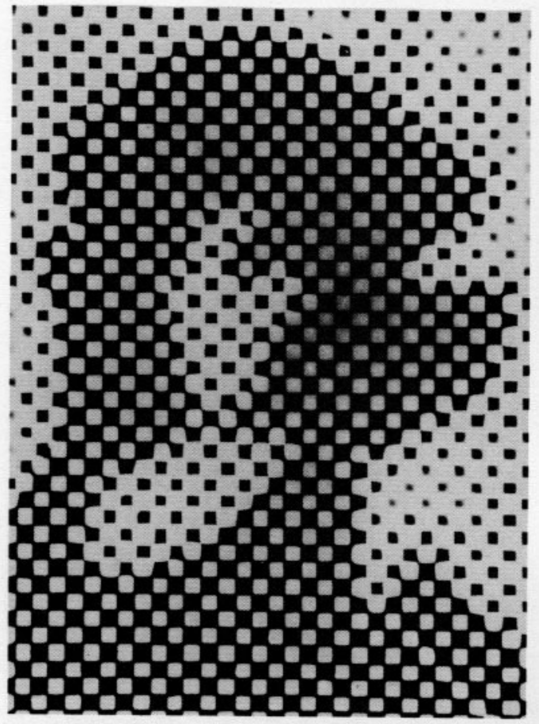
The first book that I printed, back in 1957, really came out of teaching. I had a Brazilian friend who was here to study. His interest in printing, and our friendship, led me to try to teach him what I knew about graphics. The result was a book: *Doorway to Portuguese*. Since then, I have printed four other books, the most recent one being the photographic study of the New York skyline from the New Jersey shore. Certainly it is true that my books are not artistic successes and commercial failures. Being in the business of printing, I could not afford such Pyrrhic victories. On the other hand, they are not on the best seller lists, either. However, each has been successful enough to finance the next. Each has, in addition (though not created for that purpose), served as a form of advertising for the Falcon Press and, I think, as a kind of special pleading for the art of printing. I think, too, the books illustrate concretely what I have been trying to say: that graphics, commerce, and instruction are not separate in printing, but indivisible. Man can make art with a machine; offset press and hand press alike can be his brushes.

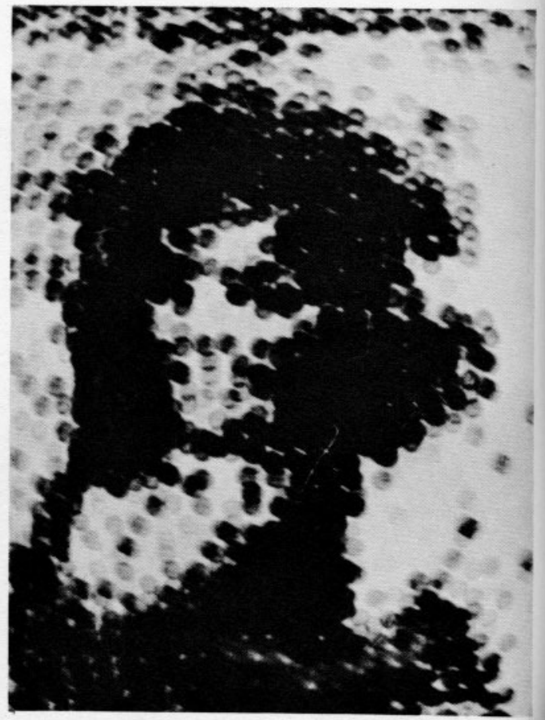
Eugene Feldman at work in his shop.

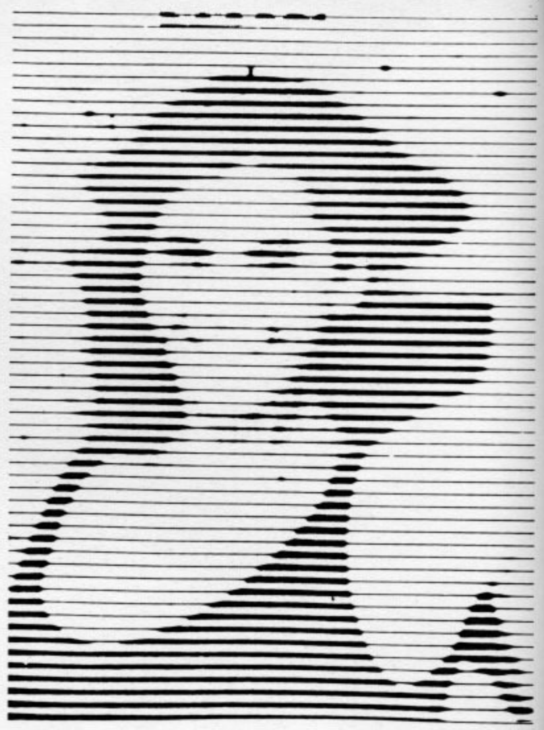


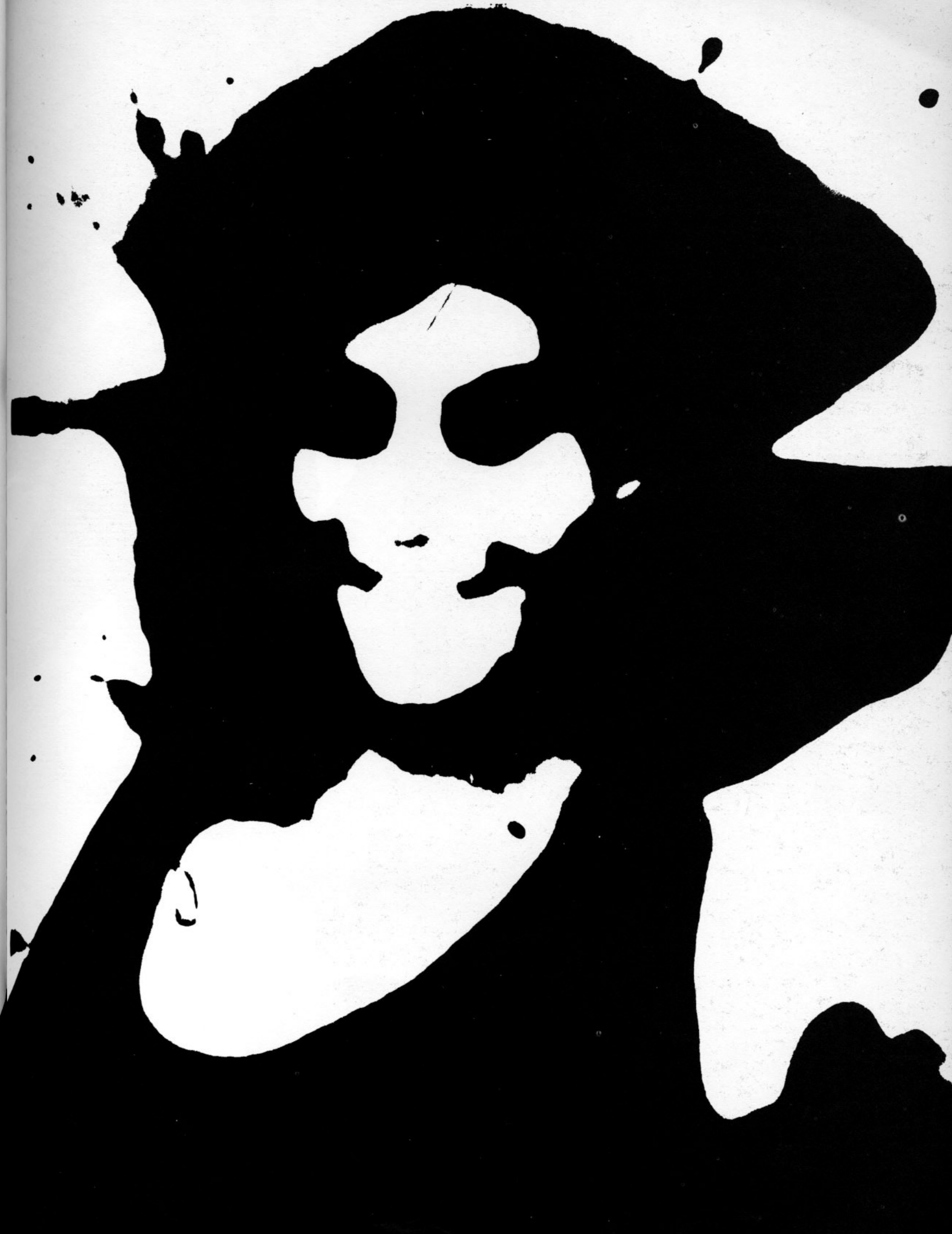
Starting with this picture Feldman has composed a series of improvisations which are shown on the next four pages; Followed by variations of a different figure in motion.

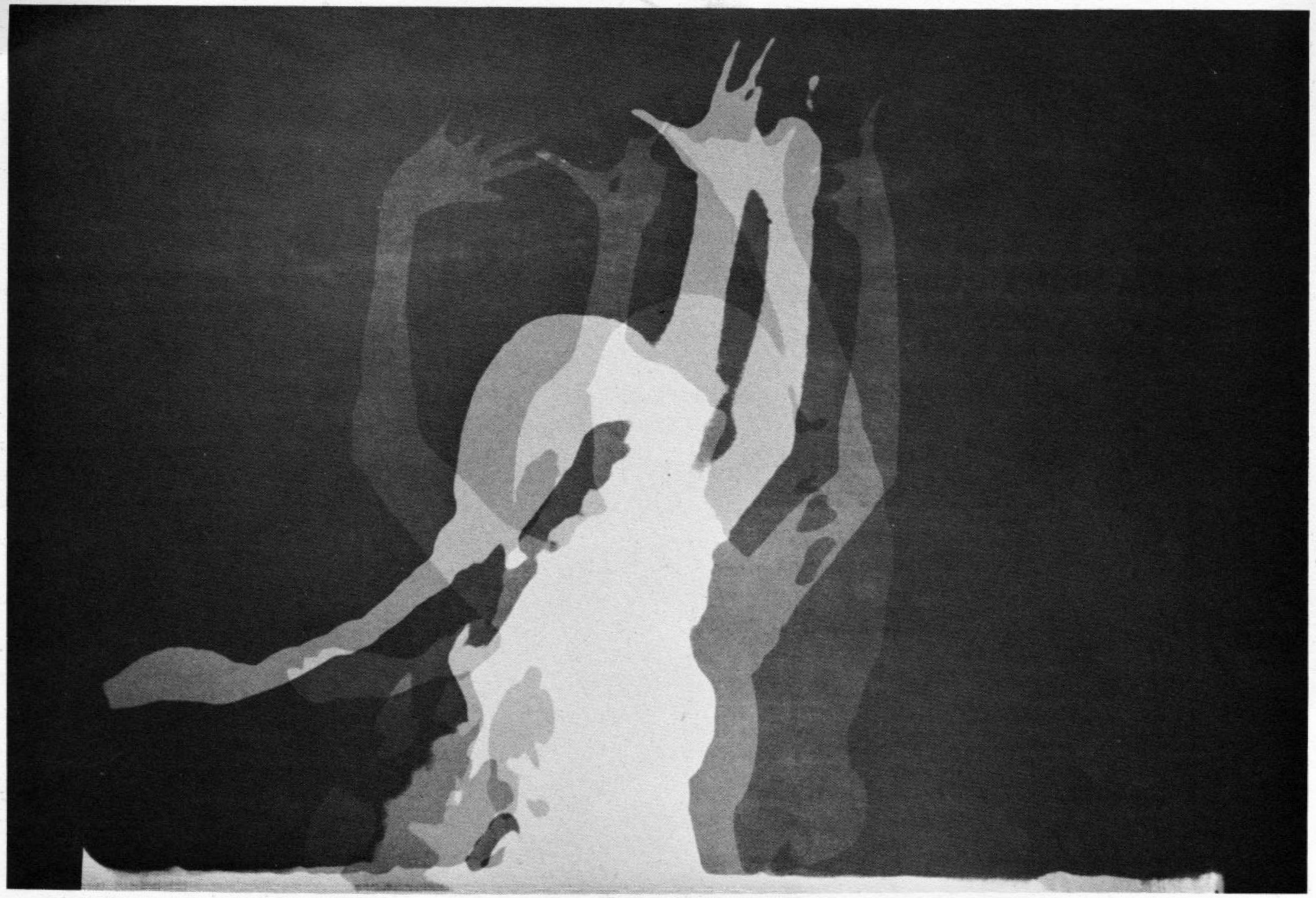


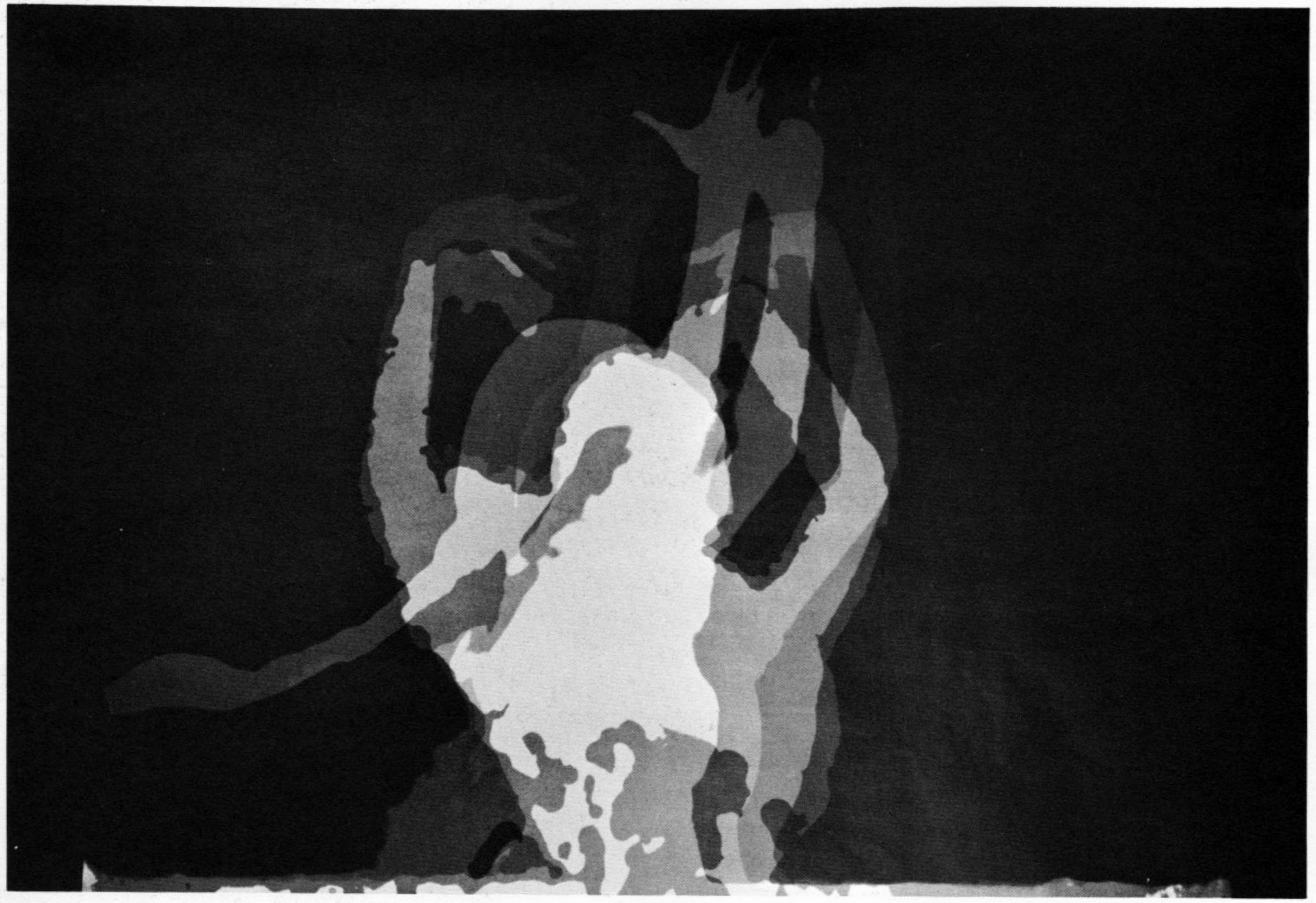


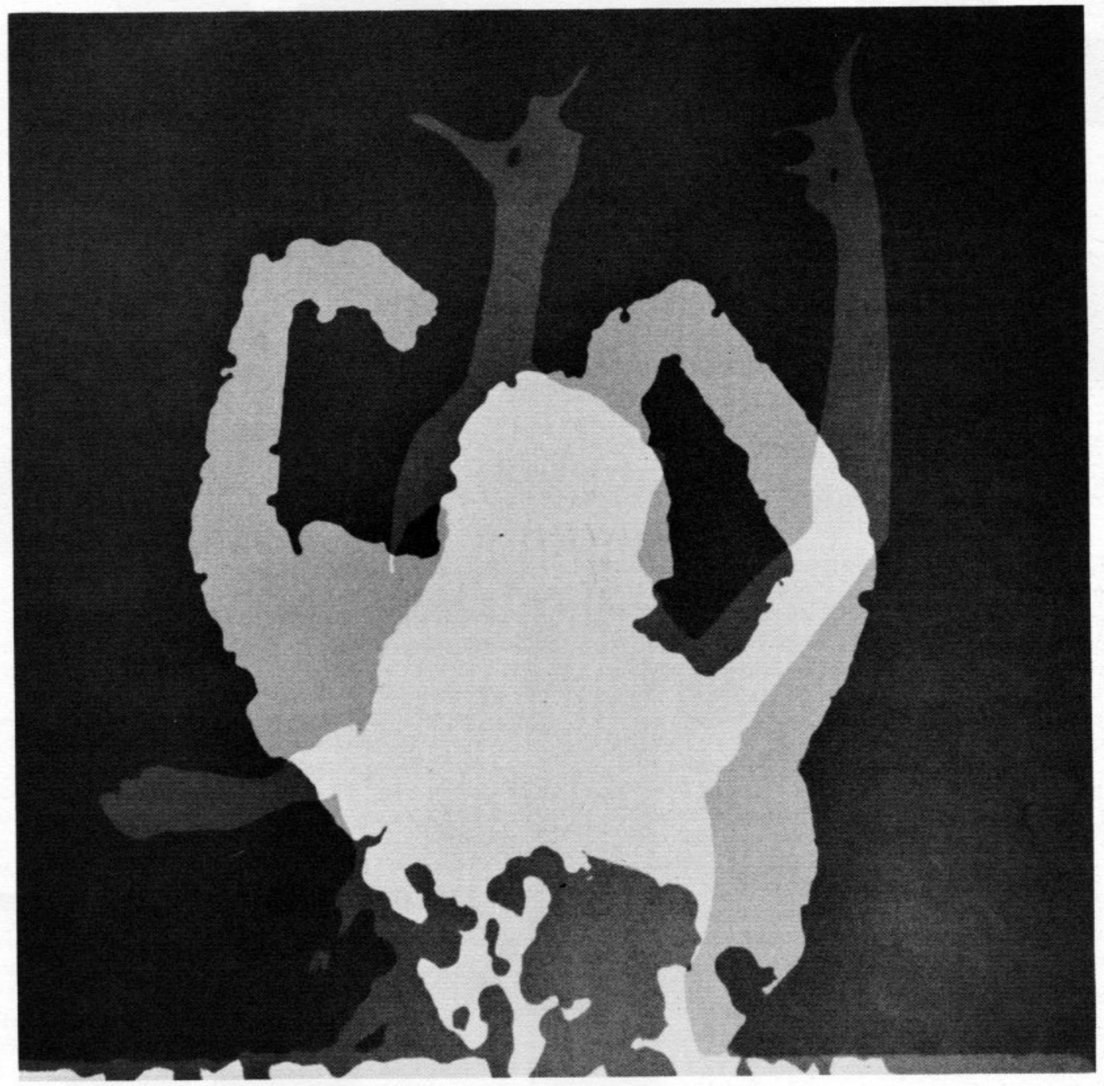


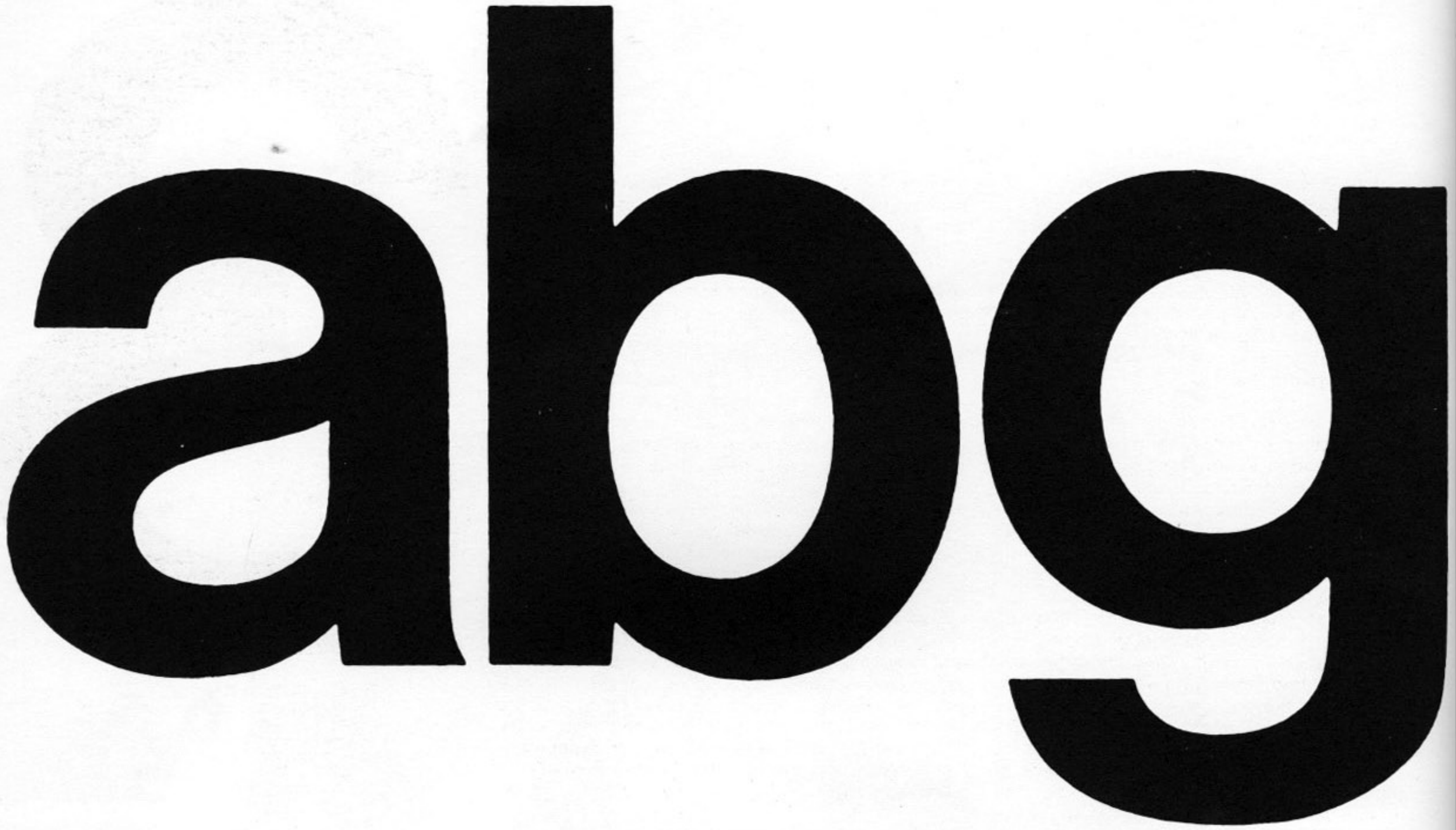












Questions of Legibility

Bror Zachrisson

Bror Zachrisson is the Director of The Graphic Institute, Stockholm, and a leading authority on the subject of typographic comprehension. It is a rare and valuable experience for any trade to have its most time-honored assumptions examined, as Dr. Zachrisson has done for printing. He has put the question of legibility to the test of careful experiment. While his results are sometimes tentative, they are also sometimes startling as they demolish some venerable controversies.

The *readability* of a text has to do with how easy, difficult, interesting, or accessible its contents are, relative to its reader. When typography and other physical aspects are concerned, one speaks of *legibility*. Here the size, shape, contrast of the letters, line width, justification, leading, and so forth, influence the reading rate, comprehension, eye-movements and other forms of behavior used as criteria for the measurement of legibility.

In several pioneer studies, Javal (1878) found that the eye moves in jumps (saccadic movements). Between these extremely swift movements, the eye would rest for a few tenths of a second (fixation), during which time the perceptive act (which we experience as continuous) would take place. With this discovery, the recording of eye-movements began. We are now able to observe these by means of photography, television, and electronics devices. The kind and number of such movements are an important criterion of legibility.

Among other early discoveries of importance were (1) that the upper half of a line of type was more recognizable, and therefore more legible, than the lower half; (2) that whole words are grasped as quickly as individual letters; (3) that sense words are read at greater speed than nonsense material; (4) that words could be perceived by indirect vision where single letters could not; and (5) that words with a characteristic form are read at a distance more easily than words of a more even appearance. Evidently, the meaningfulness of a word or symbol, its configuration or *gestalt strength,* plays an important part in perception.

There are two main schools of thought with regard to the measuring of legibility. One studies the way the human machine reacts. This school uses the *blink rate* as a criterion of legibility. The harder the text, the lesser the legibility, the more you blink. The second, and more frequently used, method of measuring legibility is the rate, or speed, of reading. In addition to these two methods, comprehension has been used as a criterion, and the eye-movement recordings mentioned above are also valuable.

For the purpose of studying the perception of *single units* of text, several techniques have been used. The problem here is not concerned with reading proper, or the reading of running text, but with the recognition and perception of a letter, a word or two, or a symbol. Instead of using the term *legibility* for the quality measured here, we have coined the expression *discernibility.* With the aid of changed illumination, distance, focal variation, indirect vision, short exposure, and divided vision, the perceptual efficacy of various shapes, colors, and sizes of letters and words can be compared.

Although there are many descriptions and operational definitions of legibility, there is no commonly accepted theory. Several persons have suggested points of departure for the construction of a comprehensive legibility theory, but the only one that seems likely to result in the formulation of an acceptable theory is one suggested by Poulton (1958). He advocates the use of the *rate of comprehension* (score for comprehension divided by time for reading) as a criterion in legibility experiments.

Whereas some legibility problems may be tackled by studies of behavior, performance in terms of speed, comprehension, etc., other more elusive aspects must be investigated with the aid of attitude measurements: aesthetic appeal, familiarity with type faces, and congeniality of type face and layout. Subjects involved in this kind of experiments are asked for their preferences, as elicited by methods such as scaling and ranking. Among these studies: Ovink (1938) found that some type face groups were considered expressive of luxury, others of strength, and others of precision; Burt (1959) investigated the congeniality value of different book faces for various kinds of literature; and Wrolstead (1960) made interesting comparisons between the reactions of experts and laymen to typographic quality.

During the past fifteen years, we have made some thirty experiments in legibility and form perception. Ten of the series reported in 1965 dealt with legibility and discernibility, five with such subjective criteria as preferences and opinions on congeniality and ease of reading, and two were set up to test the reader's familiarity with type faces and letter forms. In every case, experiments were set up with appropriate controls, and the results subjected to statistical analysis.

Familiarity

Among typographic designers there seems to exist a tacit understanding that a particular text needs a particular, congenial type face. This would imply that the general reader is susceptible to these nuances and well acquainted with graphic details. However, we have found that even compositors are not so familiar with (or conscious of) type faces and letter forms.

As a background for our later experiments, we conducted two simple recognition and reproduction tests. In one, a hundred adults were asked to identify generally, by means of sample pages, the type face used in the book they had been reading, and also the type face used in a quiz they had taken immediately before the experiment. The male results were a little better than the female ones, but in general neither differed much from what would have emerged by pure chance!

The second experiment tested what might seem obvious and superfluous as well: our knowledge of how ordinary printed letters really look. The subjects were sixty men from two publishing and printing houses, and a hundred college students, male and female. The assignment in the reproduction test was to draw (without demand on perfection) the lower case letters a, f, g, and t, in a simple print style. Further, a recognition test was given, in which these letters were presented in several incorrect versions and one correct one. We had found these letters to be more frequently misconstructed than the others.

There were significant differences between the trade representatives and the students. However, both groups had quite low scores: in the reproduction test the averages were well below 50 per cent, and in the recognition test, barely above it. These results may seem somewhat discouraging to the typographic designer. We are forced to consider that *set* (that is, interest, and the intention to learn) is important to learning. Our incidental learning, although highly repetitive, leaves surprisingly weak traces.

However, a preference test, in which the same hundred students were used, showed that these laymen ranked the elements of a book, in order of importance, as follows: type face, paper, text page, binding, illustrations, cover, title page. This corresponds closely with the results obtained from experts!

In another, subsequent, experiment, a similar close correspondence between the judgments of experts and laymen was found. In both cases, our lay samples showed an appreciation of typography and graphic design *as a whole.* This may indicate that typography and layout are more expressive than the type face itself, which is far from a new idea.

Legibility and discernibility

In this area we chose for objective study the factors of type face, type size, and typographic arrangement. For each factor, we selected pairs of alternatives which we found, by making a poll among publishers, to be of particular interest.

Among type faces we used a roman face and a san serif for comparison. Two legibility tests were made with children at the ages of about eight years and about eleven years. Oral and silent reading were used, and comprehension and error controls were made. Representative, equalized samples of both faces were used. The results showed good discrimination between reading skill groups; but there was no significant difference in legibility between roman and san serif. Experiments with single words were also made, and with three kinds of measuring devices we again found no significant differences in legibility. However, using a small sample of 28 male and female college students, we had some highly significant results with the ocular dominance test. Binocular rivalry, or ocular dominance, is a well-known phenomenon. If forced, by a stereoscopic device such as the haploscope, to regard one object with one eye and a different one with the other, and involuntary perceptive change takes place. The subject will see only one image during an interval, then suddenly he will perceive the competing stimulus. (At times, the images will blend.) With a dual timing device and a stereoscope, we can test what we have described as the gestalt strength of words by this method. It seemed of interest to use not only words of a neutral nature (for these we chose verbal numerals) but also emotive words. All were equalized as to letter content, contrast value and size; and, of course, were reversed for a second run with each subject, so as to avoid any bias resulting from inherent ocular dominance. The roman face showed a highly significant predominance. The relation needs no statistical finery: averages were 7:1 in length of time perceived!

We had not come upon the idea of using binocular rivalry as a discernibility criterion until the very last moment, and then we had used adults, where children had been used for the earlier runs. We felt we had to try a sample of children with this device. These results also gave a highly significant predominance for roman, but the ratio was lower, 3:1.

Type size

Several well documented investigations in the relative legibility of type sizes have been made. These show that under normal conditions (of line width, type size, leading, etc.) the most frequently used sizes (9 to 12 points) are practically of the same legibility. Our problem concerned type sizes for children, particularly 8- and 11-year-olds. We had a suspicion that the scale of sizes advocated by several experts was based on opinion rather than observation. Although our own opinion tests gave similar results (small children preferred larger sizes to start with), our objective oral and silent reading experiments showed a different picture. Eight-year-olds were able to read 10, 14, and 16 point Garamond with the same efficiency, measured in errors per reading time. Eleven-year-olds read 8, 10, and 12 point Garamond at practically the same rate. The measure was reading rate, comprehension being controlled. The younger children were tested after three to four years of reading instruction. (It seems natural, however, to assume that larger sizes of letters, both for writing and for reading, are required at the very start of their instruction.)

Typography

Most people would probably say that a text is more readable, as well as legible, if it does not run on and on without interruption. Divisions into logical sections should aid comprehension, as measured, for instance, by immediate retention of essential content.

In our experiment we had 179 college students as subjects. Two four-page articles of different character were used. Both were presented set solid as well as divided into logical paragraphs or sections. Two different types of comprehension checks were used as measures. The results indicated that the nature of the contents was a decisive factor. One of the texts was dry, narrative, historical. The other was discursive and centered around a colorful individual. In the latter case, the division of the text gave comparatively less effect than the former. Apparently difficult material benefits more from being divided than easy, interesting material. (When re-reading Kant's *Critique of Pure Reason* recently, I remembered this experiment. Kant's text is very difficult. One doubts if it would be more accessible if the text page were jazzed up with divisions, heading, etc.)

Our second experiment with typographic arrangement concerned the problem of whether the right-hand margin in a column of text must be straight for good legibility. The experiment, which cannot be described in detail here, gave these results, among others:

The least proficient readers differed from middle and most proficient readers by longer reading time, more fixations, and more regressions (backward glances to insufficiently perceived words previously read). No general differences were shown between those who read texts with an even right margin and those who read texts with an uneven right margin. The outcomes, on the whole, show that *uneven line lengths do not decrease the legibility of the text.* We feel that this is worth consideration in a number of industrial applications.

Congeniality

Congenial typography implies a correspondence between content and visual form. The words *allusive* or *expressive* have been used, but we prefer the concept of *congeniality,* which seems to carry less of an aesthetic evaluation.

Early printing had many customs and traditions that might be regarded as attempts to suit the typographic style to the content matter. However, it is our view that the varying formats, margins, type face applications, etc., are first of all to be considered as appropriate for whole *genres,* or fields, of literature, rather than for individual examples of them. At the end of the nineteenth century, a tendency arose to find individual typographical solutions for individual assignments. The increase in means of expression and production promoted this tendency; habit and tradition, naturally, retarded it.

We chose to experiment in this area with comparisons between the judgments of experts and nonexperts (laymen). There being no fixed scale for what is or is not congenial typography, we felt it would be interesting to see if the belief (which every sound typographer has) in the possibility of designing a message in a way congenial with its contents, would hold good.

In this experiment we used as test material six series of typographic designs. Each series consisted of four solutions of a particular assignment. These solutions were varied in only two respects: symmetry/asymmetry and roman/san serif. The solutions were constructed by a leading designer. The items in the series were: (1) invitation card to a modern art exhibition; (2) invitation to a wedding; (3) magazine ad for a perfume; (4) title page for a book on modern architecture; (5) title page for a book of lyrical verse; (6) magazine ad for an oil stove.

A group of 36 experts ranked each series according to the congeniality value of its four solutions. There was a very good correspondence in these judgments. We could then proceed to test this consensus on the man in the street. Instead of a random sample, we chose three groups of people whose different reactions it seemed interesting to observe. These were 36 students at the School of Education, Stockholm University (neutral), 72 students at the Graphic Institute (typography-conscious), and 96 art history students at the University (art-conscious generally); 204 in all. Our first surprise was that these three groups reacted in practically the same way. We therefore treated the subjects, in analyzing the results, as a homogeneous sample. Our second surprise was that there was a very good correspondence between the judgments (preferences) of the experts and the nonexperts. We feel that this strengthens the opinion that typographic design has strong congeniality potential. This was borne out by a closer analysis of the results.

Conclusions

There are several points in the field of typography at which research scholars and craftsmen have reason for exchanging views. It is important that the professional typographer takes the opportunities offered, to present his practical problems to the experimental psychologist, the oculist, and (why not?) the semanticist. Some of these may be treated by way of experiments, judged by analogy, or analyzed and stated in a more fruitful way than before. The unprejudiced attitude of a researcher is often a healthy aid toward solving difficulties. Typographers have seldom taken heed of the modest results presented by scientific investigations. Psychologists, on the other hand, have not often taken the opportunity of studying the practice of typography, the type faces, their historical development, categorization, and measurements.

The mass medium of printing in our time deserves increasing attention. McLuhan (1962) attributes to printing the honor of creating the cultural basis for our epoch. *The Gutenberg Galaxy* is a fascinating example of comprehensive interpretation which obviously has been influenced by the powerful increase in printed information. The latter problem is often discussed by documentalists and librarians. Munn (1963) treats the question in an article, *The Rising Tide of Books,* in which it is mentioned that several American libraries have doubled their collections every sixteen years.

Our experiments, which we hope to continue, have been undertaken with much diffidence. The problem of legibility and reading is extremely complicated. We are convinced that it is the designer and not the research worker who will continue to make the important contributions to printing. However, it must be of interest to subject these contributions, as well as more time-honored usages, to scientific analysis.

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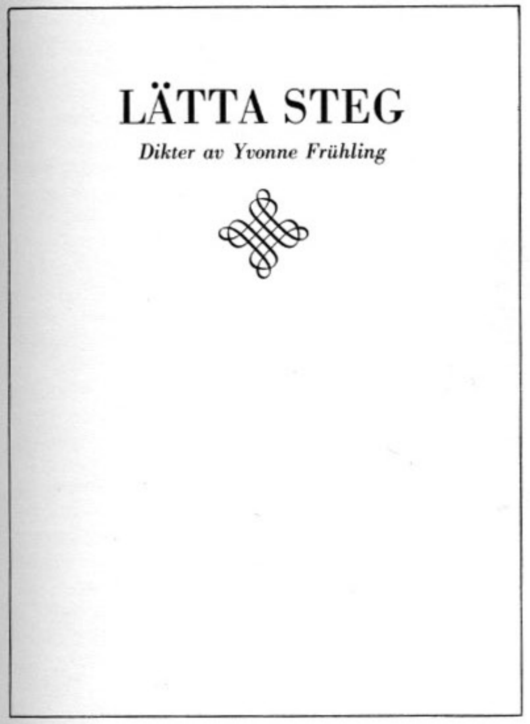
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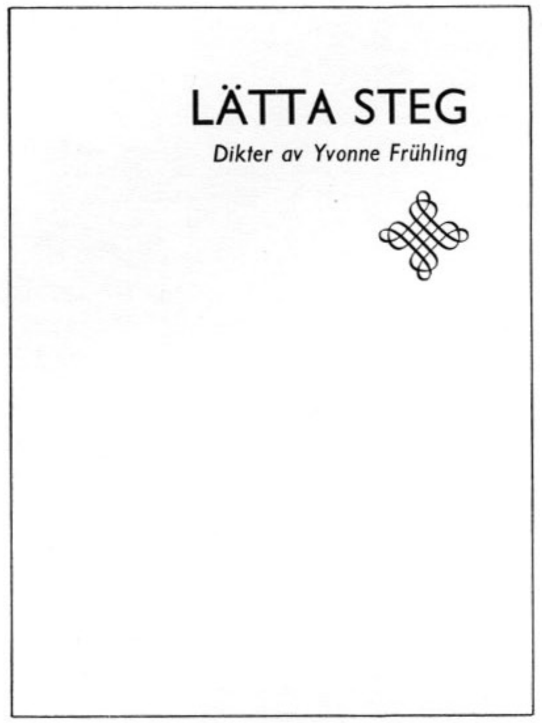
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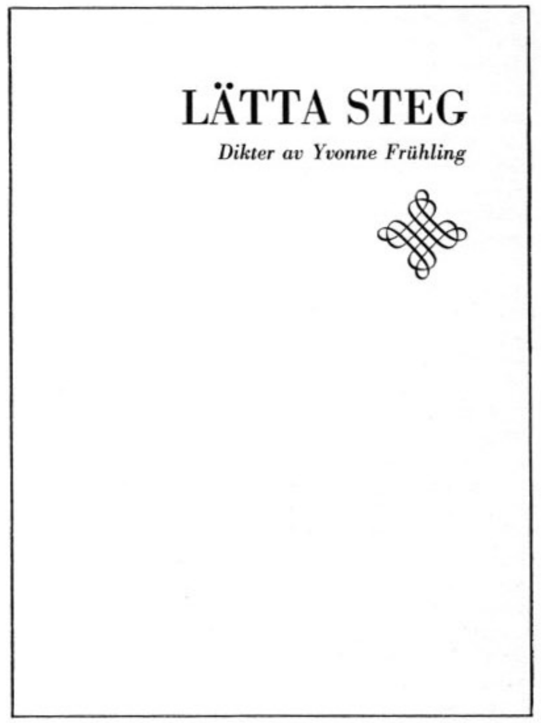
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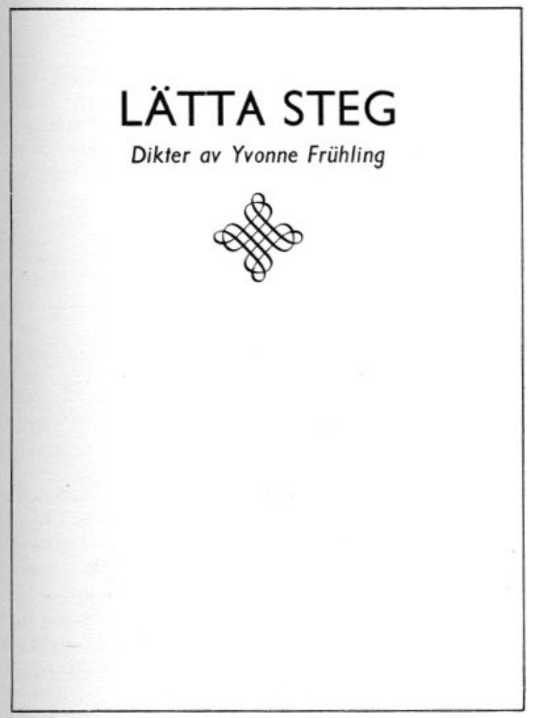
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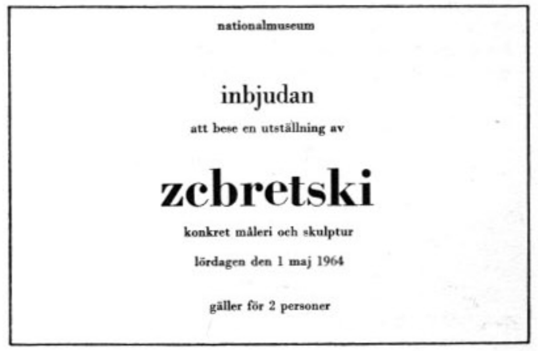
Dikter av Yvonne Frühling

1. Test card samples: title page for a book on lyrical verse.

2. Test card samples: invitation to a modern art exhibition.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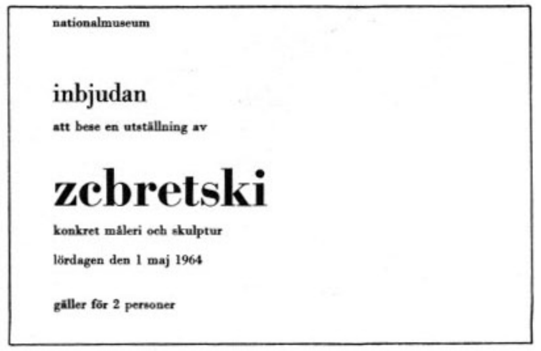
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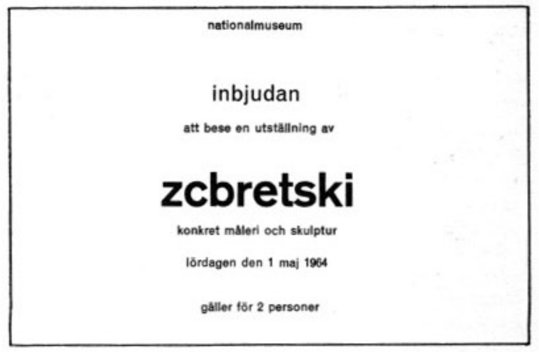
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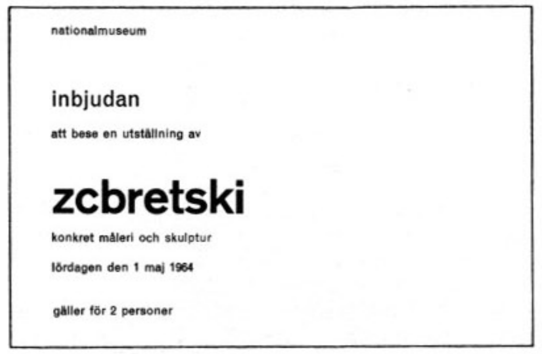
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Alternatives to Architecture

Arthur Drexler

1. Bingham Canyon copper mine, Utah. Begun 1915.

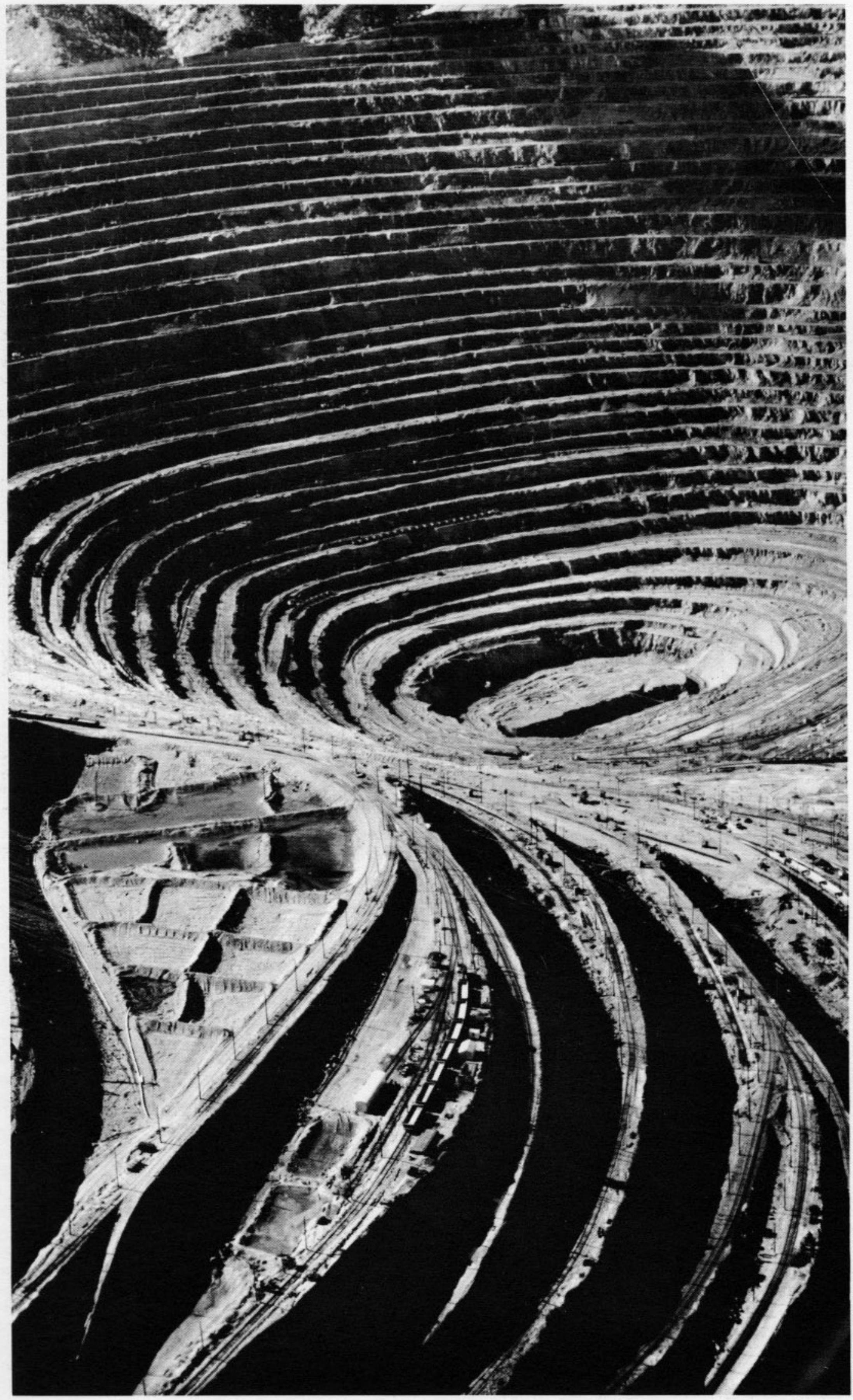


Photo credit: James P. Blair, National Geographic Society

Arthur Drexler is a native New Yorker, and attended the High School of Music and Art, and Cooper Union. During World War II he served with the United States Army Corps of Engineers from 1941 to 1946. Since 1951, he has been first Curator, and then Director, of the Department of Architecture and Design at the Museum of Modern Art. During this time he has also lectured at New York University's Institute of Fine Arts, Yale University, Harvard University, Pratt Institute, Massachusetts Institute of Technology, and other distinguished schools, and at the International Design Conference in Aspen, 1962. Mr. Drexler is known for more than a dozen years of stimulating exhibits at the Museum, including such diverse shows as the Japanese House, Ten Automobiles, Textiles U.S.A., Three Structures by Buckminster Fuller, Design for Sport, *and* 20th Century Engineering. *He is also known for his publications in the field of architecture and design, and for a number of private projects commissioned by various commercial and governmental offices.*

In this article, Mr. Drexler discusses the development of his personal—and highly individual—attitudes toward architecture. With our little remaining landscape being rapidly "developed" with ugly and expensive construction, Mr. Drexler's view strikes a unique note of elegance and economy. He is interested in using and saving the land itself. Perhaps such "contour" architecture may reclaim our devastated landscape as contour plowing reclaimed our ruined farms.

The interview takes place in the Saint-Guilhem room at the Cloisters. Kindly guards have sent the public home. The subject, seated in a window on the west wall, is rehearsing his thoughts about architecture; but not so intently that he fails to notice the arrival of a guest.

A: You had no trouble finding the way?
B: Hardly any; I am, after all, your other self, and we have been here before.

A: You don't mind my request? I mean, it *is* odd to insist on being interviewed.
B: The practice is not unknown, but since you have already given out your opinions I wonder what it is you wish to be asked.

A: I want you to question my logic, and perhaps my motives. Not so long ago architecture seemed to me a matter of alternatives, like the other arts. One could choose from the library of Great Works. The achievements of the masters – and especially the masters of our own time – were not less noble for being imperfect. Necessarily imperfect: the more convincing the art, and the more coherent the system of thought that generates or justifies that art, the more painful is the gap between the work and the Idea toward which it aspires. In this respect masterpieces offend more than mediocrities: the mediocre work tells us nothing, while the masterpiece reveals the existence of its ideal model. But by this act it renders itself superfluous: no glass tower, no steel frame, can make tangible that Ideal purity Mies himself has helped me to imagine. At first I was content with such approximations as his masterpieces afford. But the Ideal, like lust, makes hungry where it most satisfies, and so I began to distill in my own mind the idea of structure as pure relation, and transparency so ineffable as to be without substance, and reflections identical with their source – this architecture, as you might expect, seemed perfectly satisfying, and so I found that I no

2. Ifugao agricultural Terrace, Luzon.

Photo credit: Philippines Tourist and Travel Association

longer had need of masterpieces in the pure style.
B: So much for purity.

A: So much for the Ideal. However, you will understand that contemplation of an architecture entirely in the mind interferes with remaining alive, and besides, a certain nostalgia for the things of this world . . . we are all less than perfect. And so I resigned myself to live again in the world of contingencies, accidents, approximations – and also the world of judgments, such as good, very good, best of all, however difficult it may be to attribute stable meanings to these notions.
B: Still, this would allow you to believe that there *are* alternatives; to "save the appearances," as the theologians say.

A: So I thought; but it was too late. I no longer relished the appearances. The most marvelous inventions of Le Corbusier, the most subtle intricacies of Frank Lloyd Wright, had come to seem – I hesitate to say it – *artistic*. How I loathe that word, or rather the contortions and posturings it conjures up.
B: You protest too much. First of all, the responses you describe – artistically, if I may say so – have been elaborated all through history without noticeably diminishing the variety of art. It is always possible to abandon art in favor of theology or science, but this involves misconceptions about the nature of all three. Moreover, a distaste for a certain kind of form may be conditioned by the style of behavior associated with the devotees of that form, a style one may think reprehensible. But what difference does it make? Since you have agreed to live in this world you will have to accept artists and patrons along with the arts. And one gets used to making choices. It is best done quietly, according to convenience and taste.

A: It is true that life is complicated and things are seldom what they seem. But you have given to the Epicurean view an unusually flaccid interpretation; even for an esthete, or especially for an esthete, convenience is a dangerous guide. If one does not know how to define evil one should at least begin by acknowledging its presence. If an object is made for an evil purpose, it is hardly possible to derive esthetic pleasure from it without beginning to enjoy the evil.
B: That might be true for the guillotine or the electric chair, but few useful objects are so unequivocal. If the use to which an object is put determines its beauty, you would have to admit that a jet bomber becomes beautiful when it is used to deliver medicine. I don't see what is to be gained by confusing esthetics with the consequences of anti-social behavior.

A: Sophisticated opinion would agree, having been persuaded that a careful separation of form from function allows us to enjoy the form without taking responsibility for the function. And yet the same opinion accepts the idea that beauty inevitably results when form and function, so far from being separated, are one – or at least so finely attuned as to make a harmonic chord. That is what most people suppose, and like them I have often found immense pleasure in form inseparable from its purpose. Partly for this reason it was a relief to turn from architecture to engineering – from the consciously artistic to the inadvertently beautiful. I mean inadvertent, not fortuitous: the New York skyline seen from the Long Island Expressway at fifty miles an hour is to me not beautiful; it is merely a striking image of disorder, like a photograph of cancer cells in all their splendid havoc. Accidental charm does of course exist, but one should avoid the accident that kills. Dams and highways and bridges often seem beautiful by virtue of a kind of harmless negligence, which is not quite the same as accident. We assume the engineers were thinking about practical problems, and their solutions are taken as proof that the rational mind can discover, and maintain, the exact affinities between forms and functions. And yet the forms of dams, highways and bridges are conditioned by choices subjectively defined and subjectively made, although engineers like to ennoble the shapes they prefer by pretending that they themselves did not make them: necessity did, as mathematics can be made to demonstrate. But even the choice of a simple dimension is tied to subjective preferences. If you ask an engineer to adjust a particular balance between size and strength – for example, to strengthen a concrete slab without thickening its section – you discover quickly enough what latitude necessity tolerates, and how ambiguous are the techniques of both structure and calculation. No, it is not a perfect correspondence between form and function – imagined or real – that makes much work by engineers so beautiful, but rather a grandeur inherent in the problems they solve. Some problems are truly fundamental and therefore worth solving. A beautiful dam is beautiful not only because of the way it is built, but for what it is – for the grandeur of its purpose, which is to manage the earth.
B: Fortunate engineers! What architect would not like to build in the grand scale? A building five miles long . . .

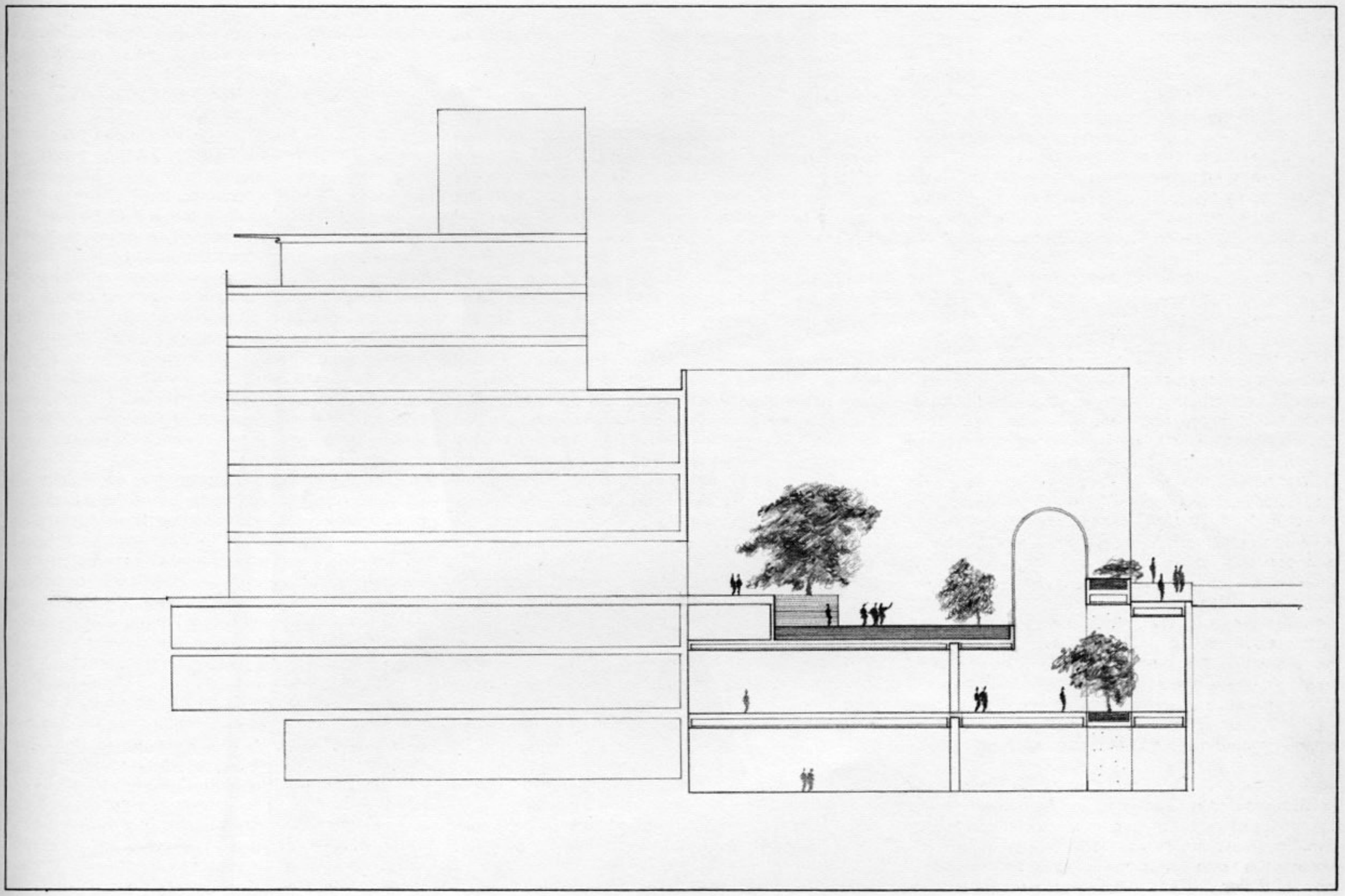
A: Neither is it the size alone of such constructions that makes them so exhilarating. A building five miles long would be merely a long building; better, perhaps, than ten short ones, but not inherently better. Long or short it would still be a building, and its beauty is not to be separated from the functions that call it into being. And these functions include, first of all, precisely the function of being a building.
B: You seem to be saying that buildings are inherently unsatisfactory because they are buildings . . .

A: Exactly. Architecture is still thought to be a matter of buildings, when it ought to be something else. And replacing small buildings with big ones is perhaps temporarily useful, but only because it leads to the next step. Our notion of buildings-in-themselves is changing. We now think of buildings as useful objects, as artifacts which take up more or less valuable space while performing some service, usually economic. When their usefulness is outlived there is no reason to preserve them, all the preservation societies to the contrary, because such artifacts were never really meant to be more than a means to an end. Lever House, for example, is a good *product,* but it is not architecture in the older sense – that is, an end in itself, to which one adapts other things. This change is not a condition to be deplored: specific effects are perhaps deplorable, but that buildings are still regarded as ends in themselves by the unobservant, or by those architects, including the good ones, who know they are fighting a losing battle, does not prevent the change from accelerating. In this matter industrial designers and technicians are perhaps more candid than architects. They know that technology began by multiplying useful objects beyond reason, and that it will continue by diminishing those objects – by withdrawing or subsuming them, so to speak. The designer's problem is the design of the process that makes the objects, at least as much as it is the design of the objects themselves. If buildings are subject to the logic of technology – and even those architects who now cultivate forms in contradiction to that logic must still cope with it – then buildings as objects must ultimately yield to the same process of reduction: what Buckminster Fuller sees in terms of technological dematerialization: "from wire to wireless," in the case of communications.

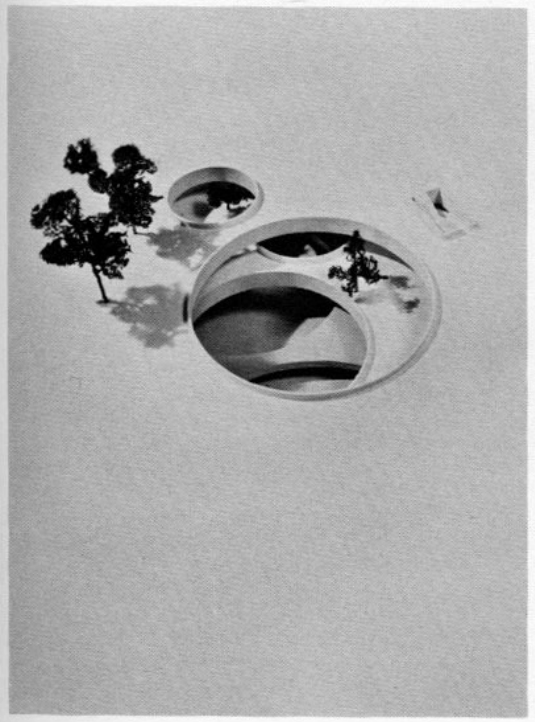
Try to imagine the future of architecture. What will we build on the moon? On Mars? High rise or low rise? Regularly arranged in rows or scattered in friendly disorder? Massive sculptural form and lacerating texture, suggesting the will to endure? Tile grilles to relieve the tedium of an airless sky? How bizarre it will seem: the circumlocutions of modern historicism, if historicism is still in fashion, transported by rocket to defend a waste of craters. The Russians can no longer be counted on to bring marble and chandeliers; probably we will all make do with a utilitarian style at once playful and grim: pavilions of wire and plastic, industrial artifacts to be consumed in use – eaten, perhaps. If it all seems hopelessly beside the point, is that only because it will be done on – or to – the moon? Why is it less foolish now, on earth?

All of our buildings are designed as large useful objects. Each year we put up thousands of warehouses and factories, for example, that have no business existing as objects at all. They are services, means to an end. Architects want the telephone company to conceal its cables, and the electricians to conceal their wiring, and we have all long ago got over the naive notion that exposed plumbing was somehow "honest." But factories and warehouses are in the same category; why are they not concealed? Why should we pretend that they can or should be in the realm of Architecture as an Art, as an end in itself, when we have already seen that they are not even appropriately designed as useful objects if that means allowing them to intrude on the landscape? Such services belong in the ground, along with pipes and wires. From this point of view the conservationists are no wiser than the people they contend with. When Con Ed proposes to deface a beautiful landscape the appropriate response is not to chase them away, or, failing that, persuade them to put up a "beautiful" power station. It is instead to insist that whatever is required be *invisible,* not beautiful.
B: The disappearance of a few thousand utilitarian structures would not be deplored, but in itself it hardly constitutes a program for achitects. If we are no longer to think of buildings as objects, how should we think of them – I mean those you have not already buried in the ground?

A: Imagine that in some remote future the earth has been enveloped by a dozen concentric layers of habitable space. Architecture would have become the task of finishing the world. Significant places, rather than buildings, would occur as local variations in a continuous fabric. The architect would be an ecologist with a special capacity for revealing and articulating the nature of a place, not for making things. This might be literally so, because structure would no longer be thought of as something that exists in opposition to the earth: so much building, so much less land; land or building, but not both. "Buildings" would not destroy their sites; on the contrary, to build would be to make artificial land. And these layers of artificial land, these man-made strata, would yield forms difficult to imagine except by extrapolation from contemporary engineering. The mathematics of topology, with all its wonderful and mystifying transformations, might become at least as relevant to the architect as is the discipline of more familiar



3. Arthur Drexler: Garden wing for the Museum of Modern Art. Project, 1960.



4. Arthur Drexler: Water garden for the Chase Manhattan Bank, New York World's Fair. Project, 1960.

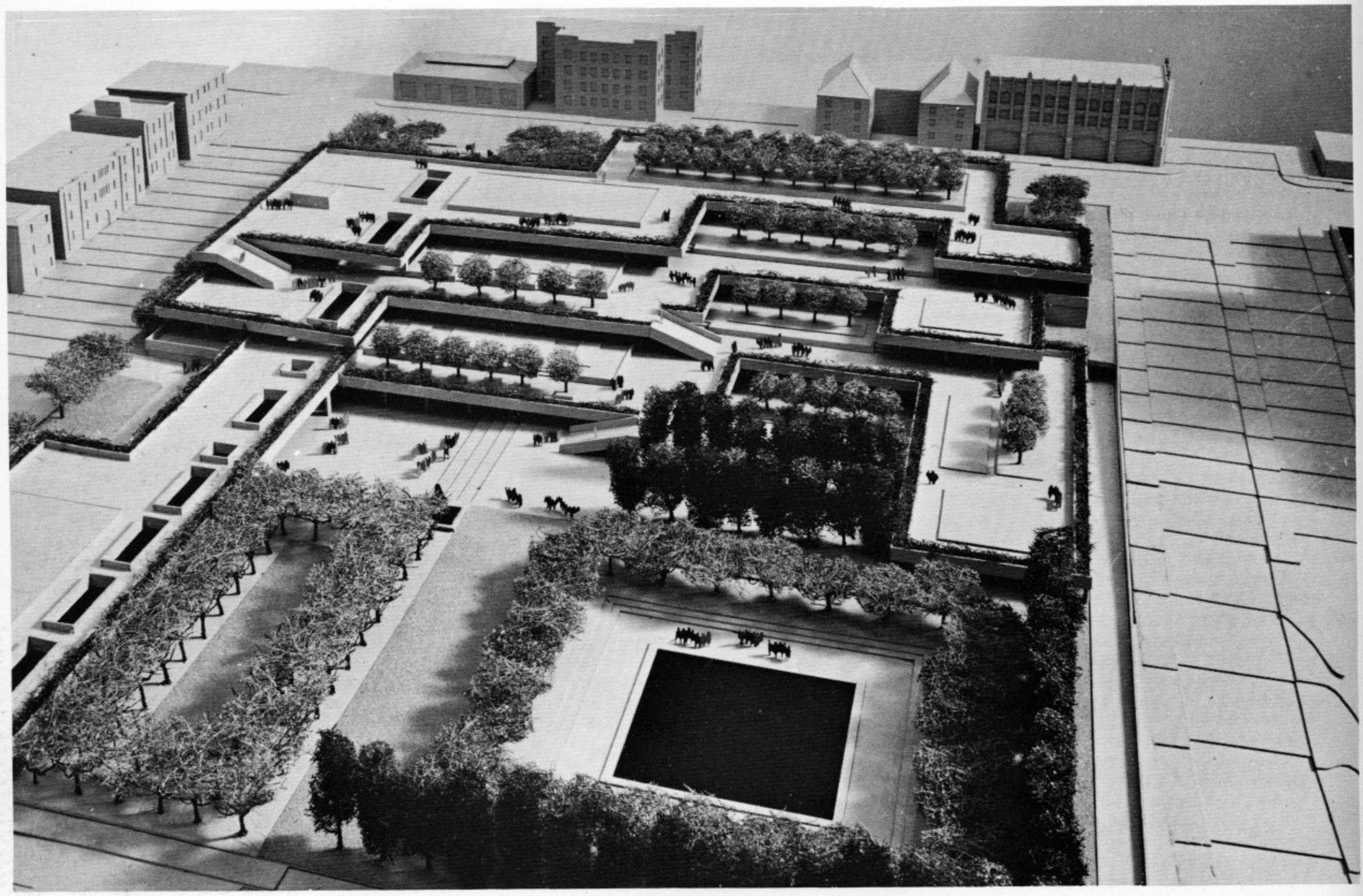


Photo credit: Museum Of Modern Art

5. *Kevin Roche: Oakland Museum, California. 1962. In construction.*

6. *Bernard Zehrfuss: UNESCO annex, Paris. 1964.*

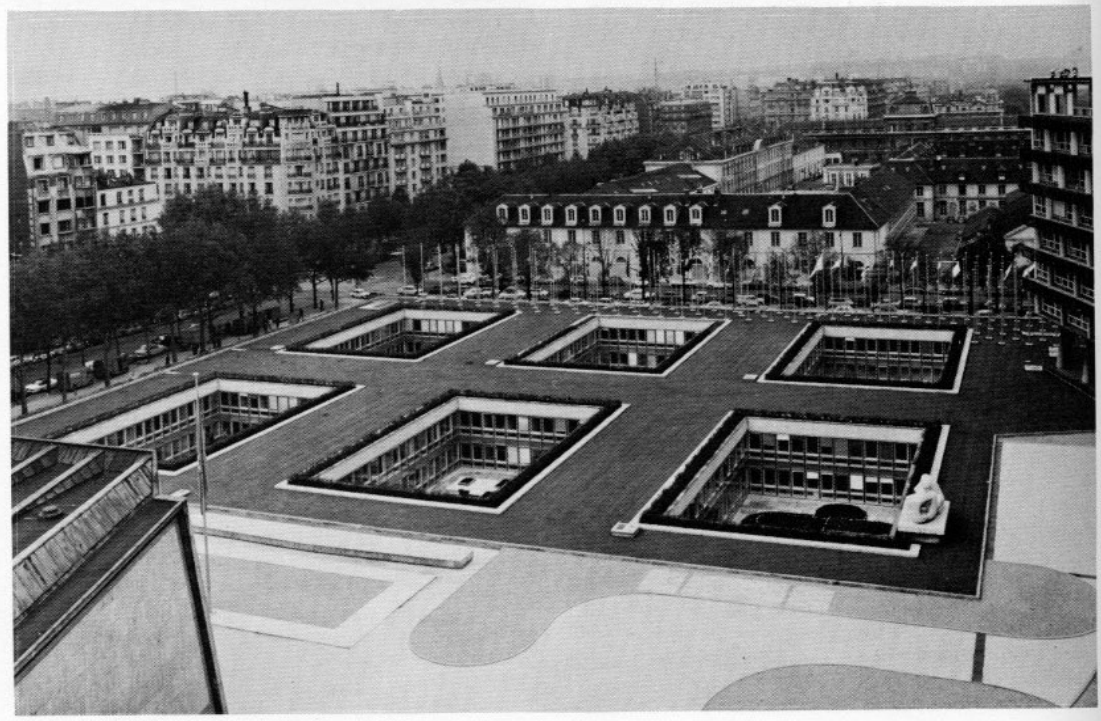


Photo credit: UNESCO/R. Lasage

geometry. There is also the accumulated example of those agricultural societies which for centuries have carved up the earth to make terraced plantations. The Ifugao, in Luzon, have terraced some 400 square miles, and their achievement is at least as spectacular as those examples drawn from modern technology, such as the Bingham copper mine in Utah.

In 1960 I was much preoccupied with these ideas, because the Museum of Modern Art was in the midst of planning its new galleries. It seemed to me that neither the city nor the Museum needed yet another loft structure, with or without glass walls, and that it might be possible, even on the most awkward and limiting site, to produce at least a miniature *place* – in this case a kind of multilevel garden. If one imagined the Museum's existing sculpture garden with two floors of gallery space below it, the amount of uninterrupted gallery space achieved on two levels exceeded what could be built on three levels in smaller wings. Moreover, it seemed to me that the chief problem for all museums is not how to exhibit works of art but rather how to cope with great numbers of visitors. So I imagined that part of the total garden area could be most useful throughout the year if it were indoors, arranged as a promenade some 300 feet long, protected by a glass barrel vault through which one could see the other garden on the roof above. Like a forum or a stoa, the indoor promenade garden would have accommodated large sculpture, fountains, and a place to sit and talk with one's friends: I thought of it as a kind of park flanked by galleries. Apart from the glass vault and the adjoining structures, all that one would have seen of a "building" was the rim of a concrete tray carrying the roof garden. In a sense there was no building at all, or at least there was as little as possible. The idea of architecture as artificial land seemed to emerge with some clarity, although its form was heavily conditioned by the existence of other buildings to which, of course, it had to relate.

In 1960 the Chase Manhattan Bank was considering an exhibition pavilion at the New York World's Fair. The exhibition was to have consisted of rare coins from the bank's Money Museum. Nothing in this program seemed to me to require another exercise in architectural noise-making, and the possibility of building artificial land was not hampered by existing structures. So I began by imagining that there were four strata available to me, including ground level, and that all I had to do was cut holes into them so that I could see through to the bottom. The holes were of different sizes – 100 feet in diameter for the largest; 30 feet for the smallest – and I imagined that the appropriate design discipline would be to subject each stratum to the abstract, man-made equivalent of a geological upheaval; that is, they were made to slide apart, so that the holes no longer lined up. The interstice between ground level and the next layer accommodated a large garden and ample sheltered space for the exhibition. Below were the two remaining strata, given over to pools and fountains from which mist and cool air would rise through the flowering trees and scent gardens above. The only visible elements of construction, apart from the perimeter wall, were the solid parapets; and these I imagined as metaphors for the polished ledges of rock one might see in the desert: fire-glazed, perhaps, like celadon or *sang-de-boeuf* porcelain. And looking down on these gardens and pools, I thought, one would believe that the place was implied by the earth itself; that it had always been there, and that it had been *revealed* rather than built.

Neither of these proposals ever got off the ground –

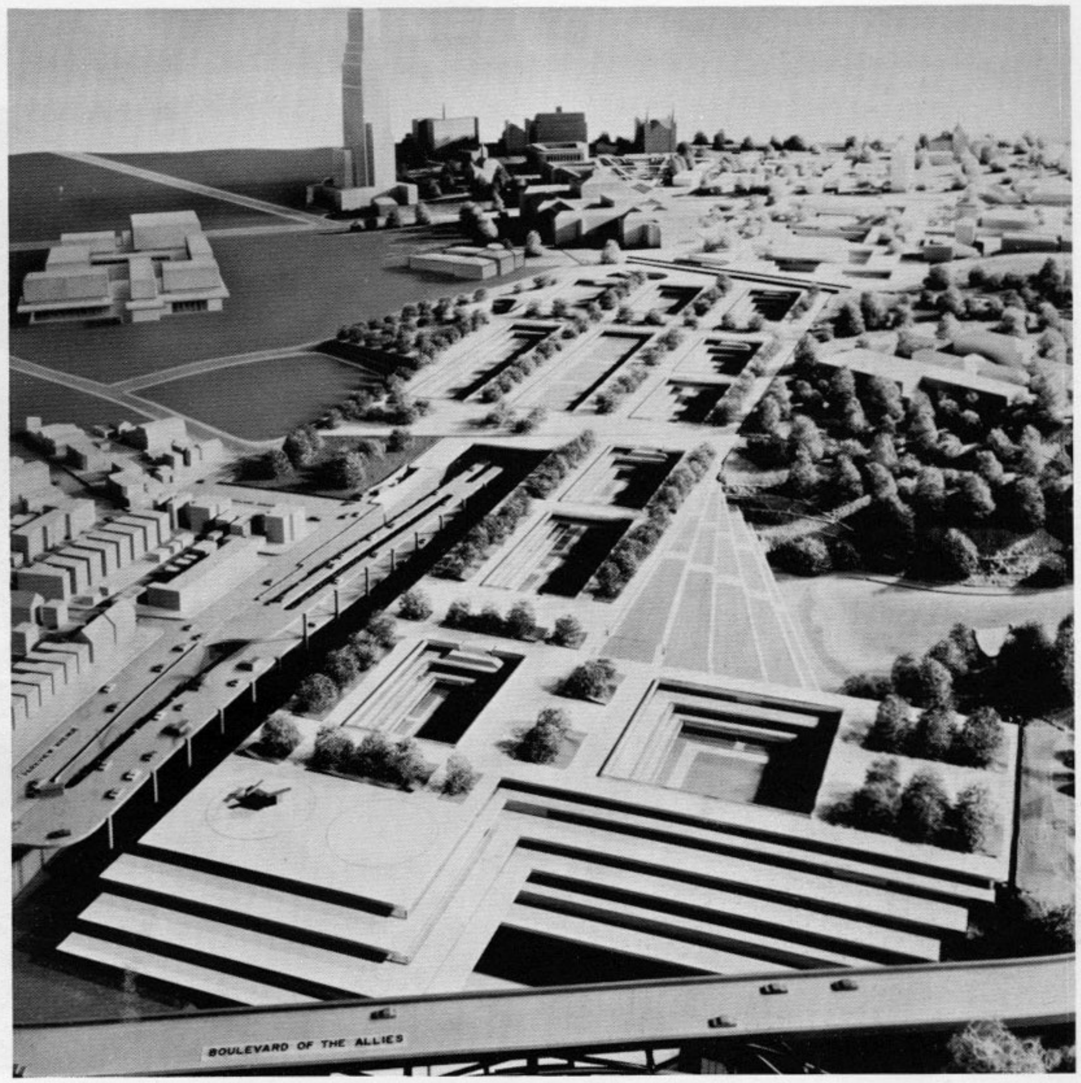


Photo credit: Museum Of Modern Art

7. *Max Abramovitz: Panther Hollow Center, Pittsburgh. Project, 1963.*

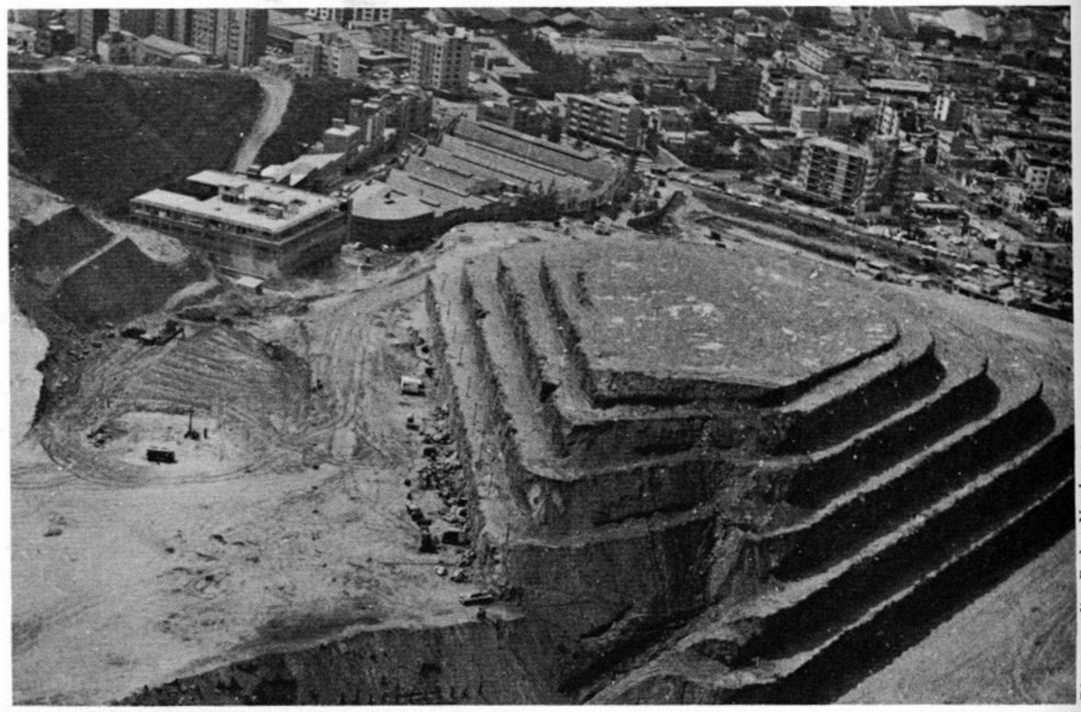


Photo credit: Pedro Neuberger

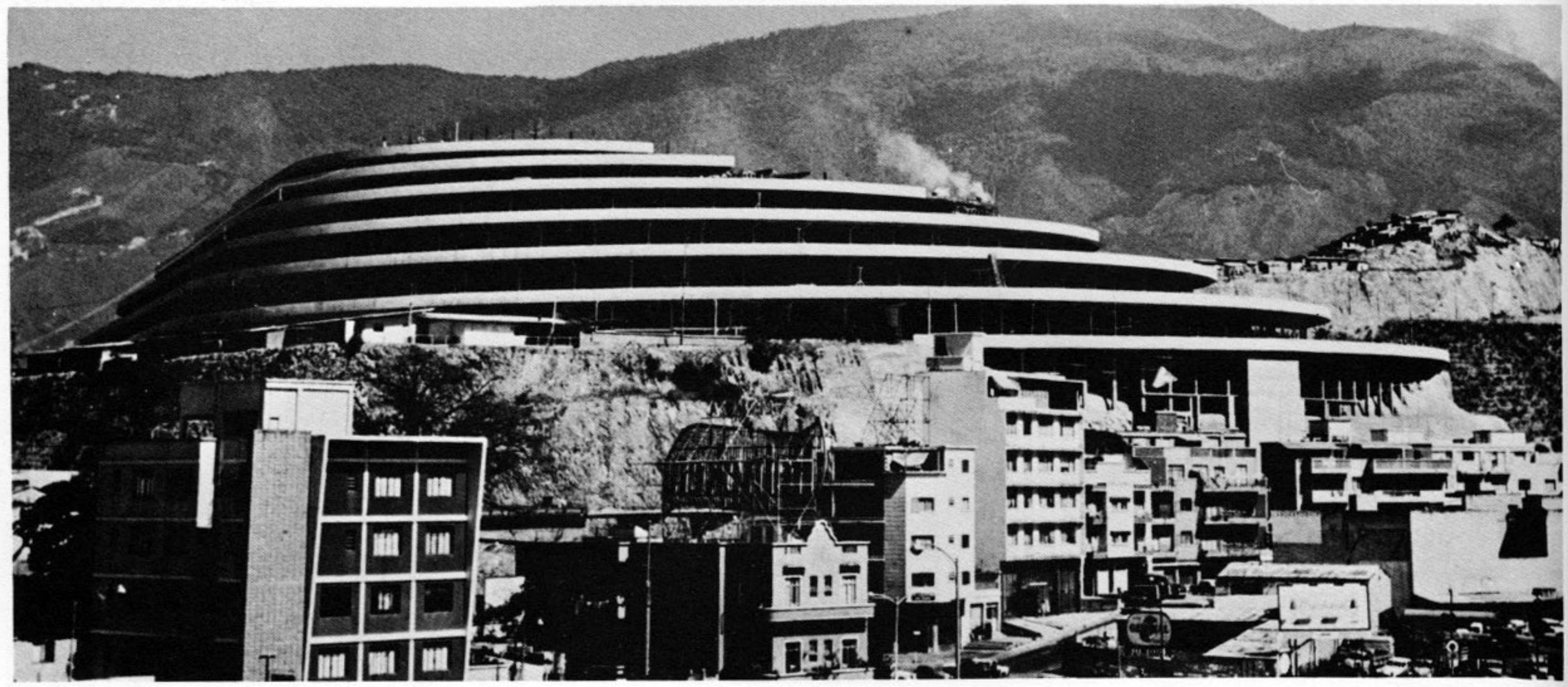


Photo credit: Pedro Neuberger

8, 9, 10. *Jorge Romero Gutierrez: Shopping center (Helicoide de la Roca Tarpeya), Caracas. Begun 1960.*

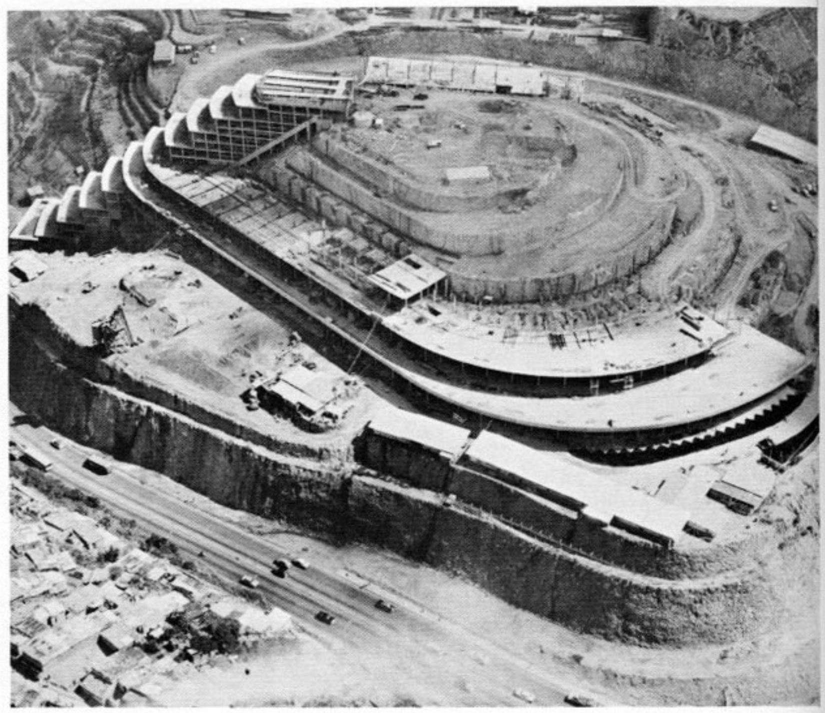


Photo credit: Pedro Neuberger

or into it – for reasons having little to do with architecture. Between them I succeeded in transforming only myself: I no longer thought architecture was a matter of choice among equally viable alternatives.

B: But that is what it continues to be in fact.

A: In fact one discovers that if architecture at its most conspicuous continues to be a question of interesting shapes, with interest shifting every few years to a different chapter of history, there is also a long line of thought that has considered architecture as a matter of manipulating the site rather than proliferating large-scale objects. Sant Elia's most interesting idea was not his avowed translation into architecture of machine-age frenzy, but rather his observation that buildings could (and do) extend into the ground on which they only appear to stand, and that in fact the "ground" is quite often the roof of a concealed building. Both Wright and Le Corbusier explored the implications of architecture at engineering scale, though only Wright in certain projects came close to abandoning the building as artifact. I suppose the first unequivocal statement of the idea is Bruno Taut's fantasia on "Alpine Architecture," wherein Switzerland is carved and polished into a sculpture more satisfying than nature provided. In the United States Paolo Soleri's studies for a city in the mesa have approached the intensity of Taut's inspiration, but although both men have explored the uses of the earth, neither of them has quite wished to relinquish the individual building as the unique, or at least the most obvious, manifestation of architectural intelligence. What seems to me remarkable is that this final step has been tentatively taken in reality almost before it has been clarified in theory – but perhaps that is the way important developments always occur. I am thinking not only of those underground structures produced and guarded by the military, and bomb shelters by interior decorators (which serve only to color the idea with disagreeable overtones), but more importantly of a handful of buildings produced by practical architects for practical purposes. For example, Kevin Roche's Oakland Museum, designed in 1962 and now in construction, is conceived as the architectural terracing of an existing park. At the highest part of the site the "building" can be entered from its roof, which is one of three landscaped terraces with exterior stairs descending to gardens below. The community has wisely refused to replace a park with a building: instead, they are improving their park by rendering sections of it habitable. How successful the final design will be remains to be seen, but photographs of the model make the architect's intention perfectly clear.

Max Abramovitz's 1963 project for the University of Pittsburgh and the Oakland Corporation, called Panther Hollow Center, is designed to fill a mile-long ravine with a single, continuous structure for offices and research laboratories. It would also incorporate transportation facilities. Parts of this structure would rise above the ravine to appear as conventional buildings; but by far the most interesting sections are those which merge most completely with adjacent ground. The development of the interior cloister-like gardens, and certain other details of composition, are perhaps more relevant to just that kind of building the architect is here trying to overcome, but these very defects help to make clear what might be done with architecture regarded as the improvement of the earth. The lesson is drawn even more pointedly by Bernard Zehrfuss's recent underground annex to the Unesco building in Paris. The architect is to be congratulated for his reticence, but one cannot help observing that he has denied himself precisely the advantages of the solution he has chosen: surely those courts could have been made to yield a more beguiling landscape.

One other project deserves thoughtful consideration: the Helicoide de la Roca Tarpeya in Caracas, by Jorge Romero Gutierrez. Begun in 1960, and now standing unfinished because money gave out, this project is in my opinion the most significant architectural enterprise attempted in this hemisphere since World War II. That is a grandiose statement, and I admit that I am moved to make it partly because one of our farsighted diplomats has described it to Washington as an example of Latin American extravagance hardly worth our interest, much less financial support. The mountain that divides Caracas was selected by the architect, who also functioned as entrepreneur, as a good site for a shopping center, since it is equally accessible from all parts of the city by a main highway. His "building" is simply an extension of that highway, the road being wrapped around the mountain in a double spiral which reverses at the top. Progress photographs show the mountain first being carved into broad terraces exactly as Bruno Taut suggested for certain mountain sites in Switzerland. In the second phase one sees various levels of the road in simultaneous construction; the last photograph shows the almost completed structure as it stands now. Had it been finished, visitors would have driven up the road to park alongside one of the small stores lining the way. A dome at the top would have housed an exhibition hall; hotel facilities and additional parking were to be in adjacent structures hooked onto the spiral. Planting would have varied the contours of the parapets, restoring the structure to the mountain from which it derives. Whether or not this astonishing transformation would have produced a perfectly functional shopping center is perhaps beside the point: what is important is the architect's effort to take one of the more destructive elements of the modern environment – the highway – and place it at the service of the landscape, so that by its own act, so to speak, it reveals what there is of architecture implicit in the features of the earth. During the decade of the 'sixties the United States will spend sixty-six billion dollars defacing cities and landscapes alike with highways planned by people to whom this possibility has never occurred. Gutierrez's experiment is cheap, and ought to be completed; and there are more than enough opportunities for experiment in the United States. Consider the famous Carquinez Bridge approach in California: beautiful concrete and steel ribbons weaving through air, and destroying the community they might have enhanced; they might have *become* the community: imagine the cluster of hideous frame buildings immediately to the right of the highway, in the construction photograph, replaced by a continuation of the road itself in the manner Gutierrez has suggested.

Enough. I know quite well such things are not practical, in the way that an investment of millions to test a new bomber is unquestionably practical.

B: Such experiments may yet prove practical, or at least respectable, when economic pressures become great enough. You might have cited Bertrand Goldberg's 1965 study for the Affiliated Hospitals Center in Boston, whereby six hospitals would combine in one centrally located complex. Goldberg proposes to fill the entire site with four or five underground levels given over to every hospital function but one: the patients' bedrooms, which he places in four slender towers. He concludes that it is tedious to make incinerators, kitchens, laboratories, laundries, and a hundred other service spaces into Great Architecture; it is also impossibly expensive. That fact is reason enough for building loft-space underground, and if reason prevails we may yet see an intelligent application of these ideas introduced to a city already overwrought with artistic manifestations.

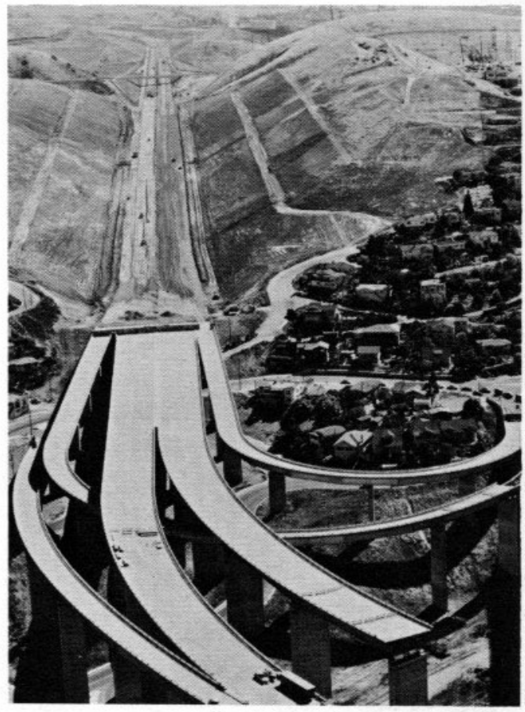


Photo credit: California Division of Highways

11. *Carquinez bridge approach, California. 1958.*

A: You seem almost enthusiastic about ideas I had thought you would reject, or at least question severely. Surely you have reservations? You think it is all too much removed from the realities of life, including the lives of architects; or that it postpones the possibility of more modest solutions to urban problems by suggesting something impossible to achieve in the foreseeable future? Whenever I describe all this to friends there comes, at a certain point, the nervous glance that suggests fear – fear that I have become perhaps just a bit eccentric about this subject. Why not say it?

B: Oh, come now – the possibilities you raise are not all that original. It is best not to shout, of course, and one has no choice but to go on sorting out decent achievement in the old-fashioned art of architecture. Conventional excellence is not so commonplace that one can afford to ignore it, much less denigrate it. Your real problems, I suspect, need not involve paranoia. You should resolve your own vague apprehensions of moral or ethical content in an architecture such as you describe; and come to terms with the past. Why, after all, are we discussing this in The Cloisters, of all places?

A: Because, for me, in this peculiar and beautiful refuge conflicts are held in abeyance. The wreckage of the past is reassembled with skill and love; inventions of the present are disposed with such discretion that the result is a welcome silence. It is from here that the brave new world seems neither horrible nor comic, but merely inane.

B: And in this eclectic frame you find the courage to accept a quietism you would elsewhere disown. How strange that one needs to have the world arranged in a certain way before one feels free to withdraw from it.

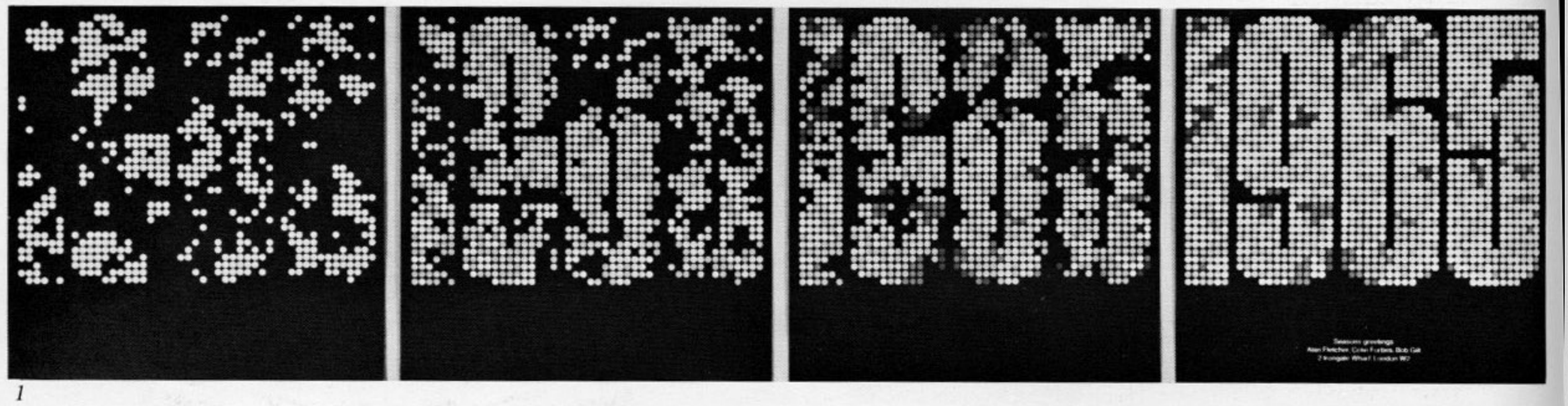
Greetings

1. Crosby, Fletcher, Forbes, and Gill
2. Giorgio Soavi
3. Barbara Gould
4. Joseph del Gaudio
5. Josef Albers
6. Herbert Migdoll
7. Max Bill

These greetings from one human being to another may be considered as corroborating evidence for McLuhan's thesis about our changing modes of awareness. While they are visual, they are not discursive as a letter would be. In most cases they depend for their effectiveness on a common background of understanding between the sender and the receiver. A subtle but pervasive vocabulary of awarenesses is used.

In most cases, these are not part of any program; they are not didactic. They have none of the philosophical dogmatism of the Bauhaus or the Dada posters, drawings, and exercises. There is nothing of the manifesto about these absurdities and reminiscences, except a very general admonition to enjoy absurdity for what it is. "It may not be as serious as you think!" Within this attitude there is room for all sorts of structural, typographic, historical, cultural, and visual jokes.

All of the greetings have been selected from a collection which is now being exhibited at the Museum of Modern Art.


1965
Seasons greetings
Alan Fletcher Colin Forbes Bob Gill

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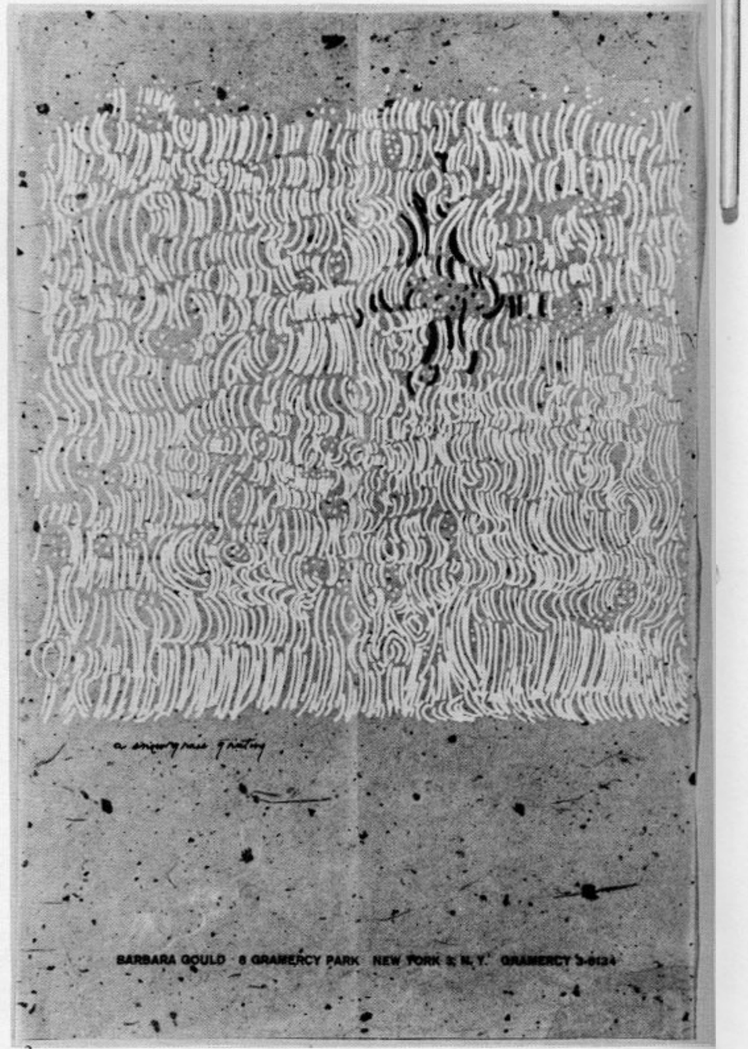

BARBARA GOULD 8 GRAMERCY PARK NEW YORK 3, N.Y. GRAMERCY 3-8124

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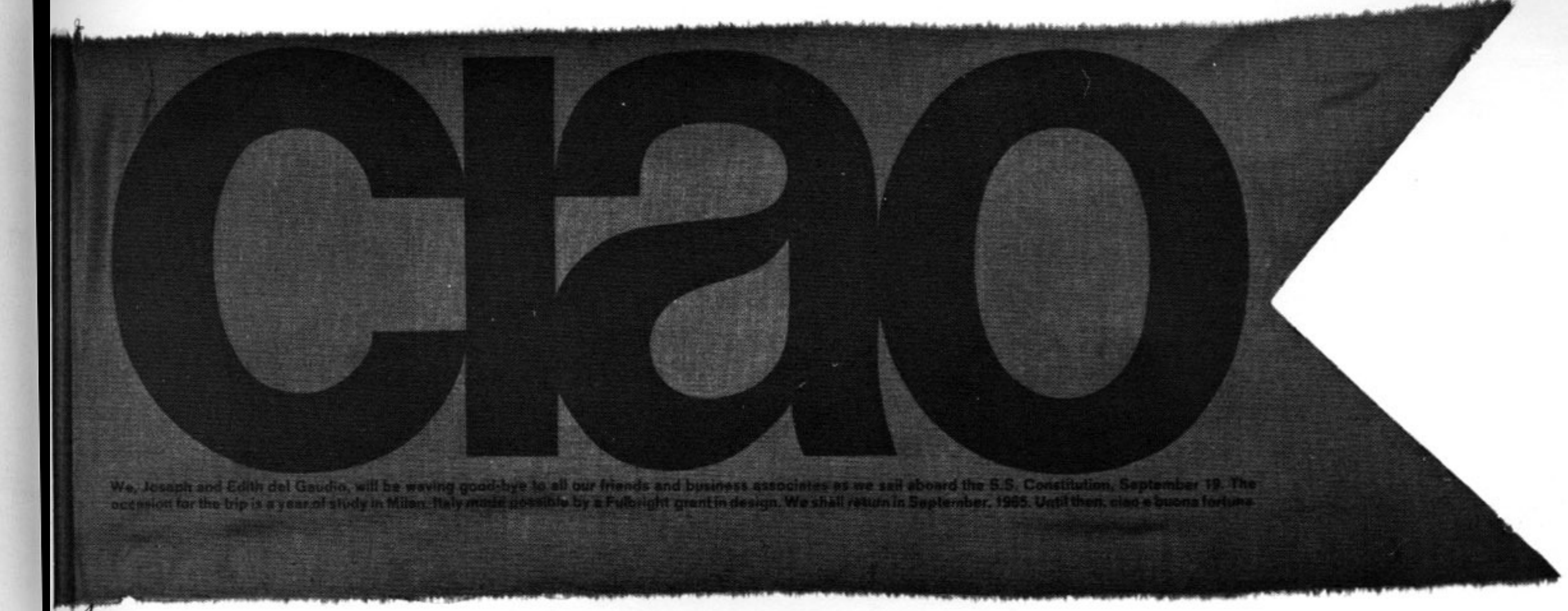
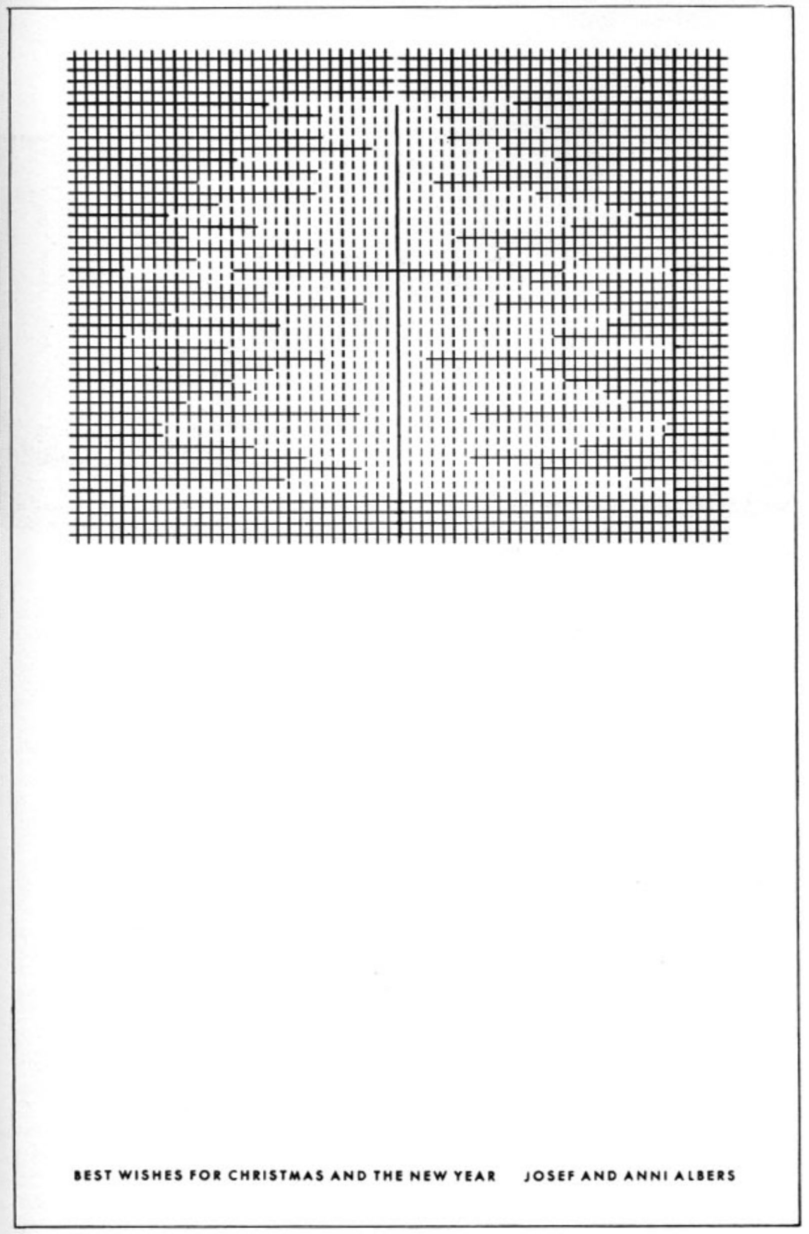


We, Joseph and Edith del Gaudio, will be waving good-bye to all our friends and business associates as we sail aboard the S.S. Constitution, September 19. The occasion for the trip is a year of study in Milan, Italy made possible by a Fulbright grant in design. We shall return in September, 1965. Until then, ciao e buona fortuna.

4



BEST WISHES FOR CHRISTMAS AND THE NEW YEAR JOSEF AND ANNI ALBERS

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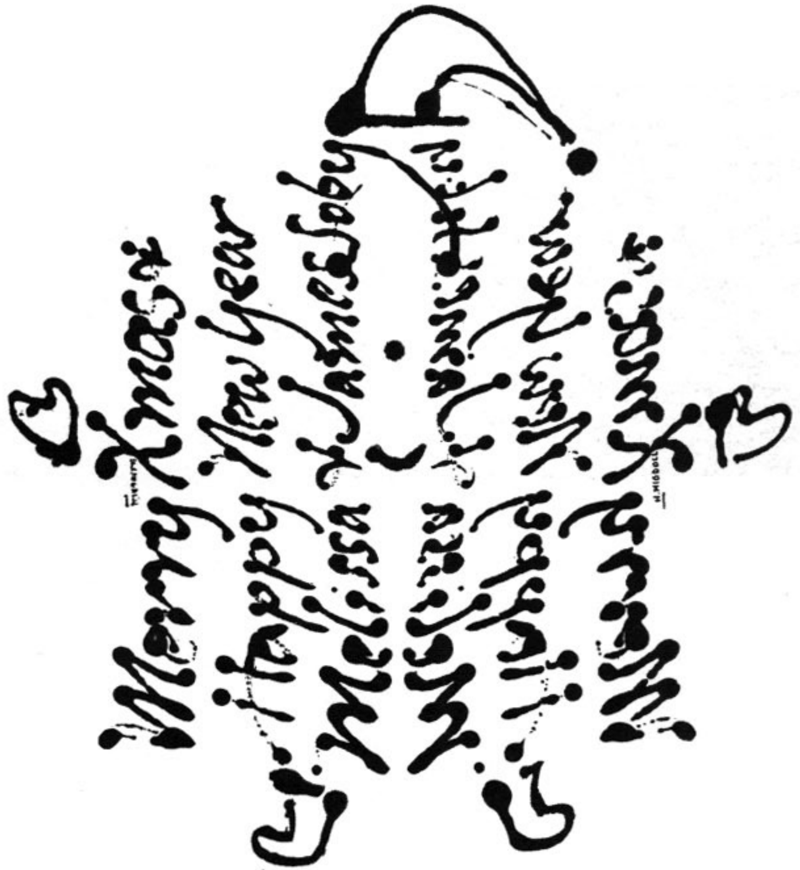

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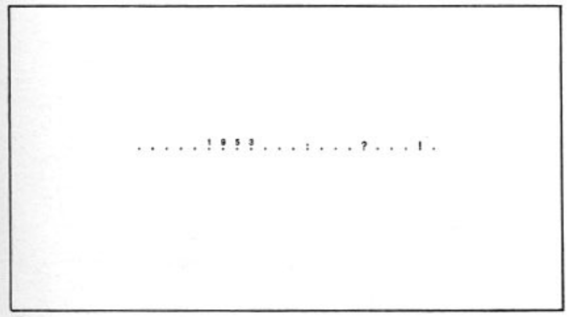

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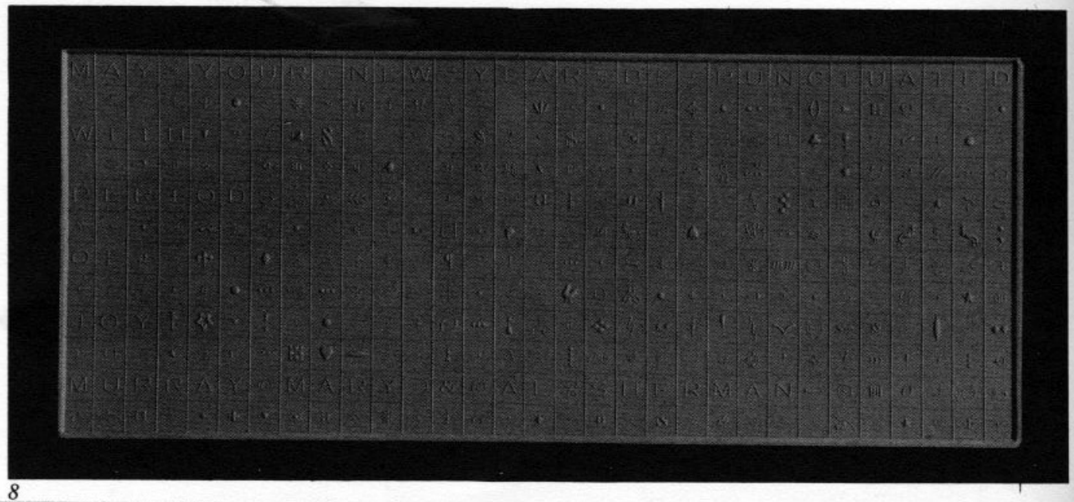
8. Al Sherman
9. Paul Mayen
10. Al Zalon
11. Louis Golumb
12. Felix Augenfeld
13. Roy Litchtenstein
14. Ornella Noorda
15. Ward & Saks


MAY YOUR NEW YEAR BE PUNCTUATED
WITH
PERIODS
OF
JOY
MURRAY MARY & AL SHERMAN

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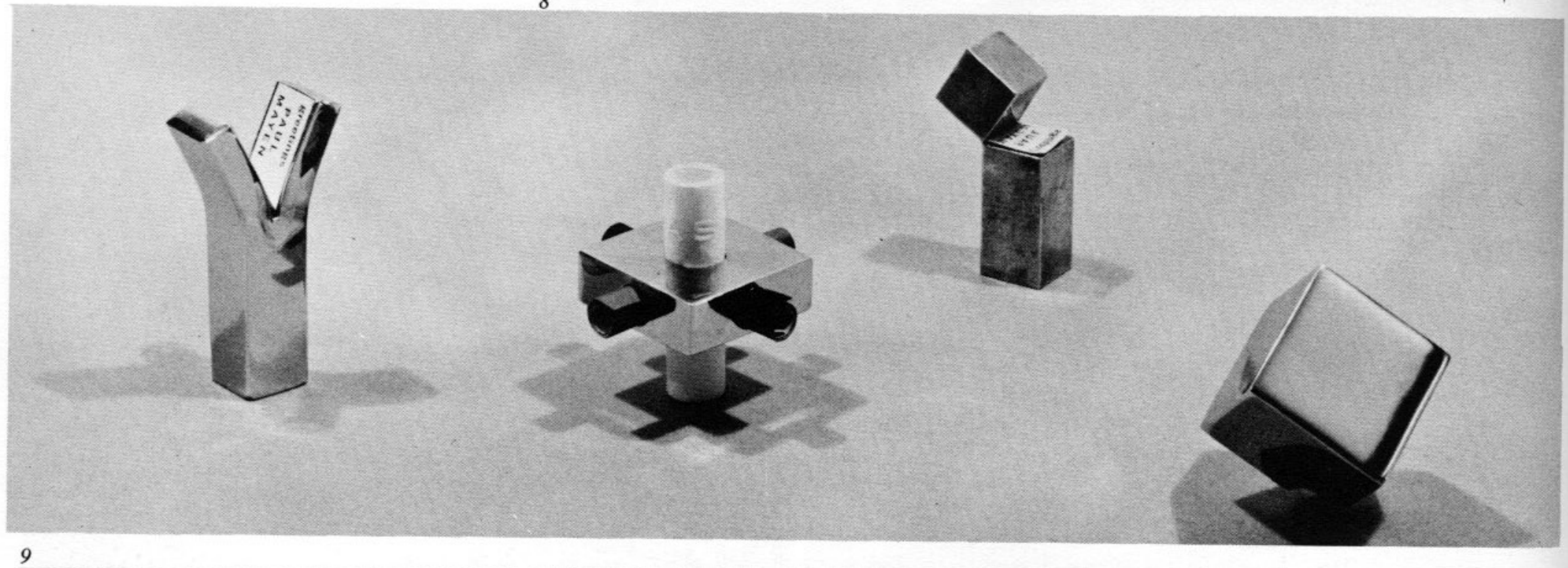

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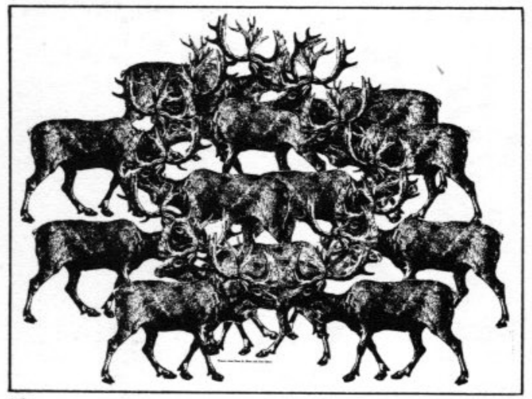

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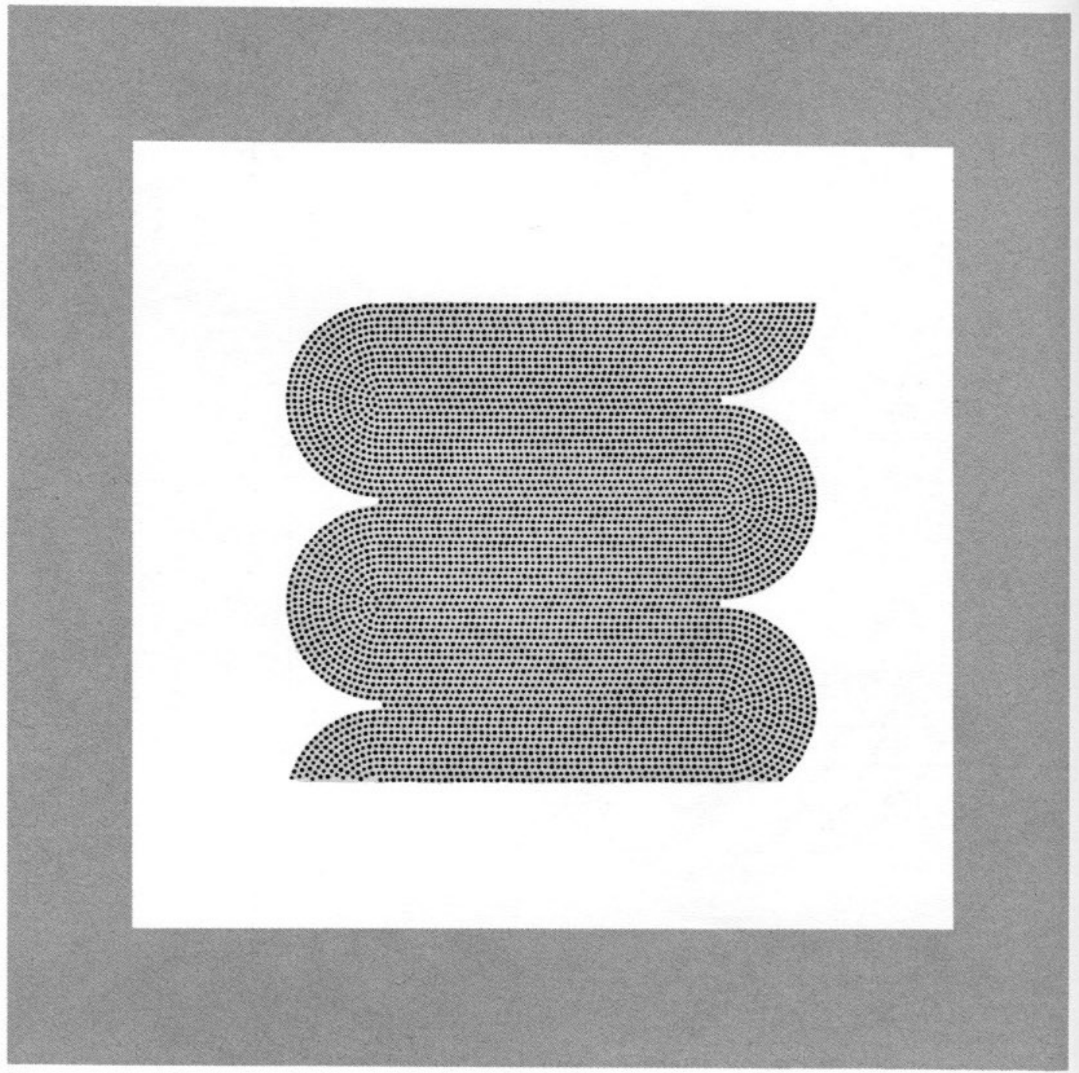

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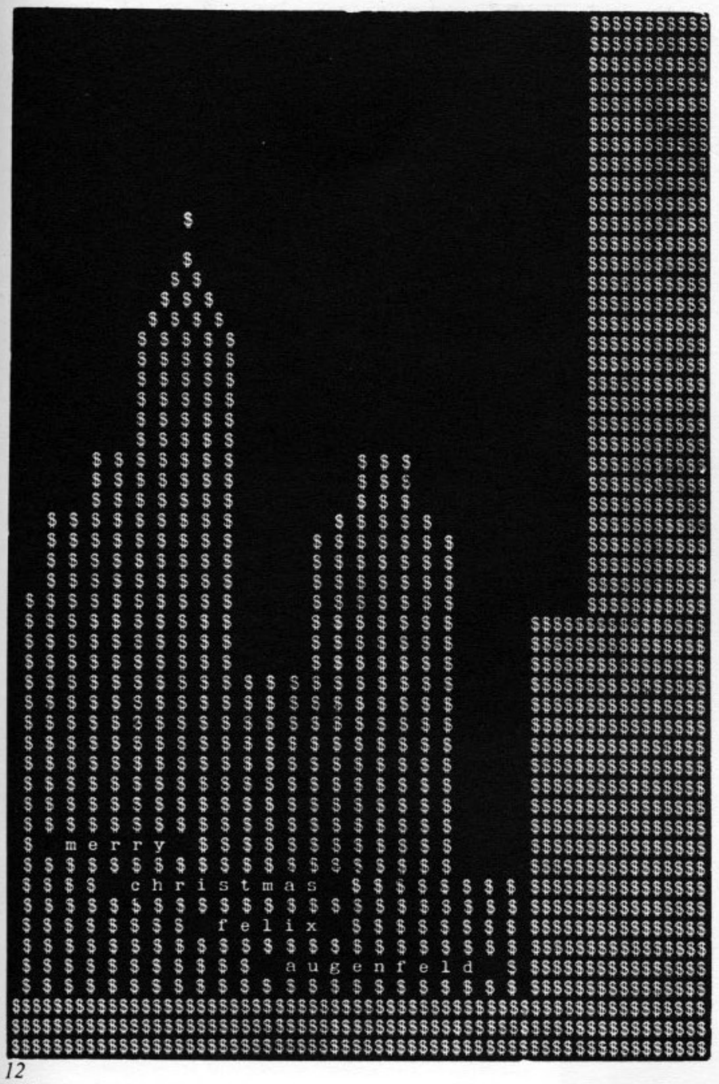
merry
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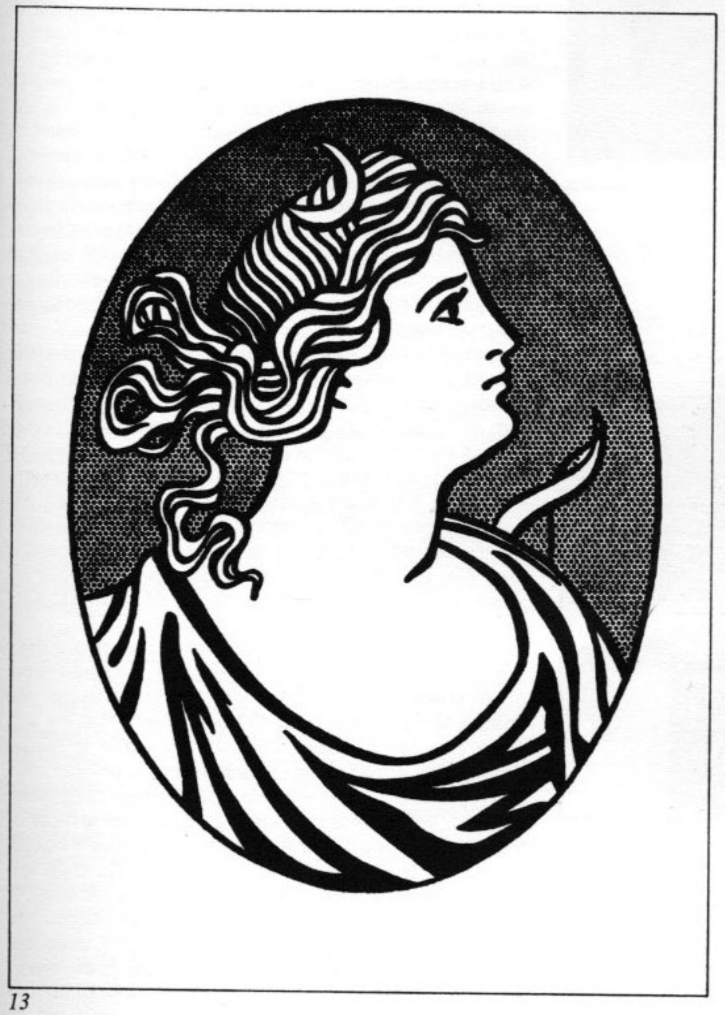

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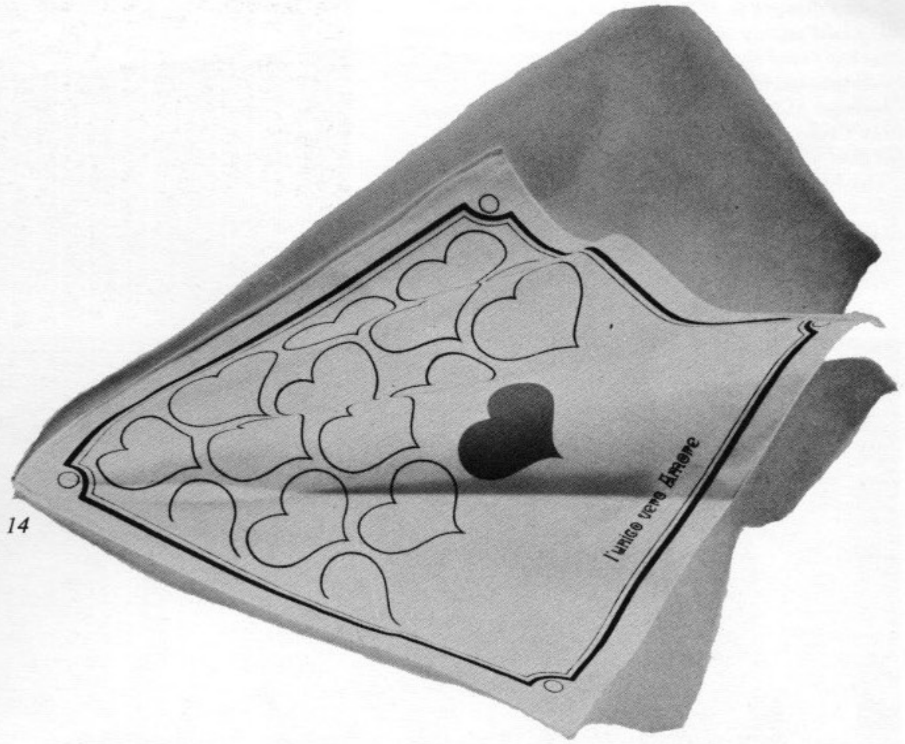
l'unico vero Amore

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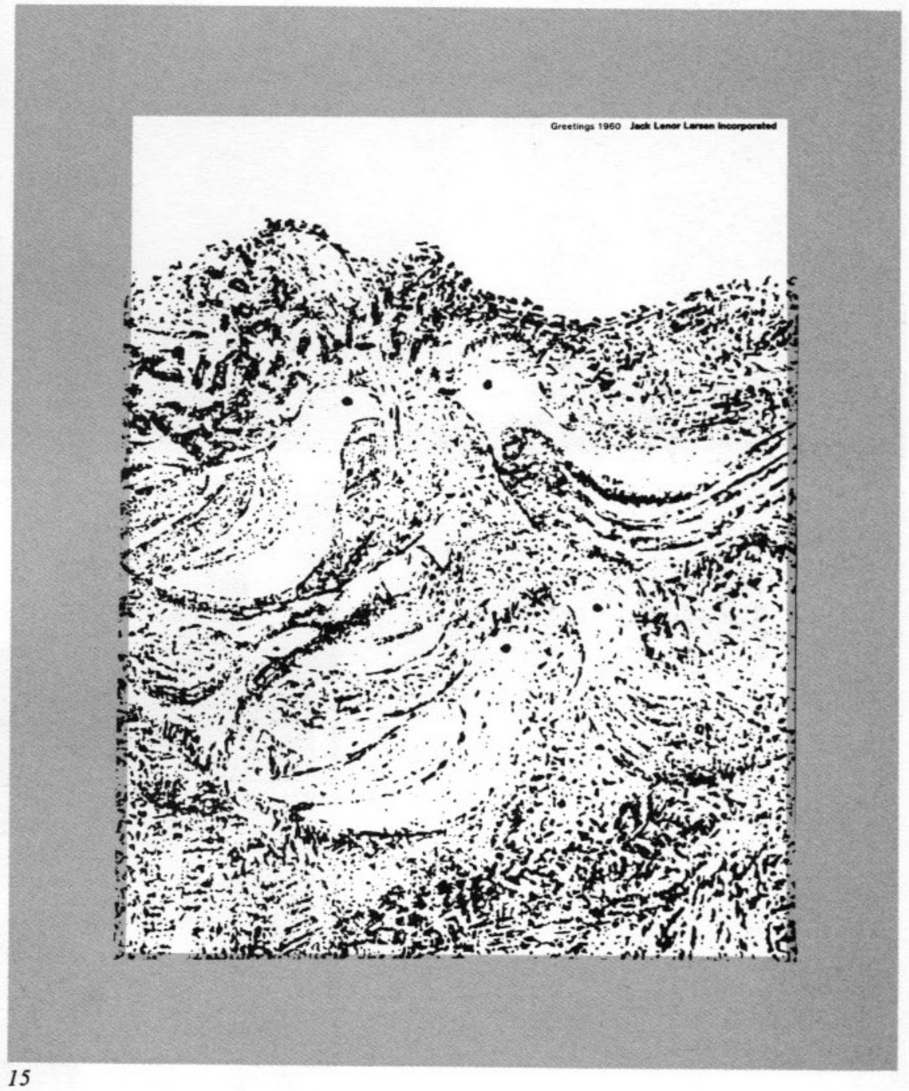
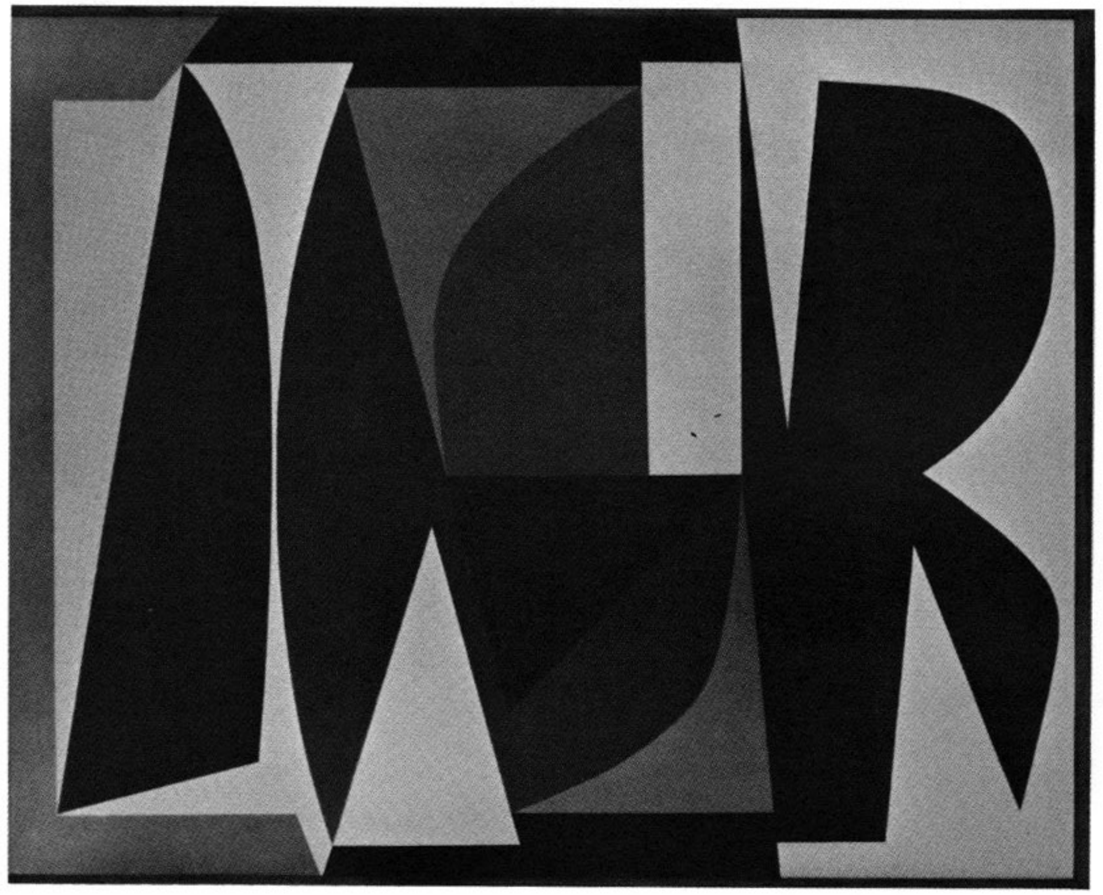

Greetings 1960 Jack Lenor Larsen Incorporated

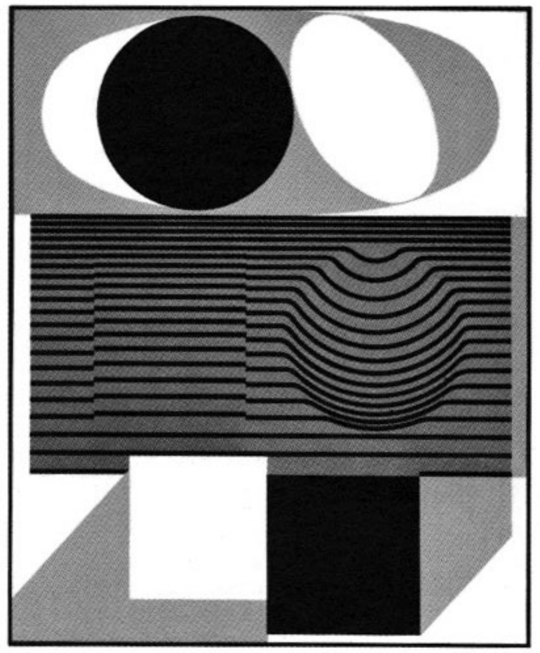
15

Douglas MacAgy came to the United States from his native Canada in 1936. Since then he has been engaged mainly in museum administration, although he has found time in addition for a wide variety of educational, research, and creative projects. He is a member of the American Society of Aesthetics, the College Art Association, and the American Association of Museums. He is the author of The Museum Looks In On T.V., *and, with Mrs. MacAgy, of* Going for a Walk With a Line *(1959). Mr. MacAgy is a regular contributor of articles and critical reviews to art publications. He has an unusually "responsive eye."*

Book Review: Vasarely

Douglas MacAgy





VASARELY, by Victor Vasarely; published in 1965 by the Swiss firm of du Griffon. 196 pages, 200 illustrations. Available in the U. S. from Wittenborn, New York. $24.50.

To many in this country, Victor Vasarely is an artist who made the grade when they were not looking. Thirteen years ago he was represented in a group show at the Guggenheim Museum called *Younger European Painters.* This spring he turned 58. Since 1949 his work has appeared here in at least fourteen group exhibitions and seven one-man shows; but the public's "responsive eye" did not seem to register or retain his image until the exhibition of that name was presented at the Museum of Modern Art. Suddenly people realized that he had been around for quite a while, that he is now older rather than younger, and that he is a seasoned expert in what has become the latest thing. They did not recognize that the personality so recently presumed to be familiar is, in fact, a deliberate stranger.

This book, which is so much more than a book, makes the distinction clear. Self-contained on other subjects, Vasarely comes out with unqualified contempt when he is up against a flimflam taste. He detests the current intrusions of faddism and finance. In these circles he sees art valued as a *list price, often egregiously exaggerated by speculation . . .* Not only *trade in art* but *snobbery and the exciting character of relations between artists and art fanciers, make of art a fashionable society game.* Most of all he is alarmed at the effect on artists. *The title "artist" is,* he says, *gratuitous, hateful, covering only appetites and thirsts. Must we have recourse to anonymity in order to rediscover the honor of our craft?*

But there is nothing anonymous about his book. It enunciates and reiterates his notions of art in society; offers an original scan of abstract art's career from the inside; and engages the outsider, with an intimacy of tact, in the artist's personal exploration of his chosen realm. Above all, the book is itself a special kind of exhibition; it is perhaps the most lucid presentation of Vasarely's work and point of view that has so far been devised.

Recently he has been devoting a lot of attention to the record of his lifework to date. A note in this volume announces the preparation of a full-length 35 mm. film in color, on *the artist's entire plastic work, conceived by him, with his own commentary and sound effects.* If the present book by no means covers Vasarely's entire production, it does handsomely reproduce nearly 200 examples and includes substantial tracts from his writing over the years. Its layout is also his. Its range is mainly restricted to about 17 years, until 1964. *The real revelation of "the abstract" came to me only in 1947,* he explains.

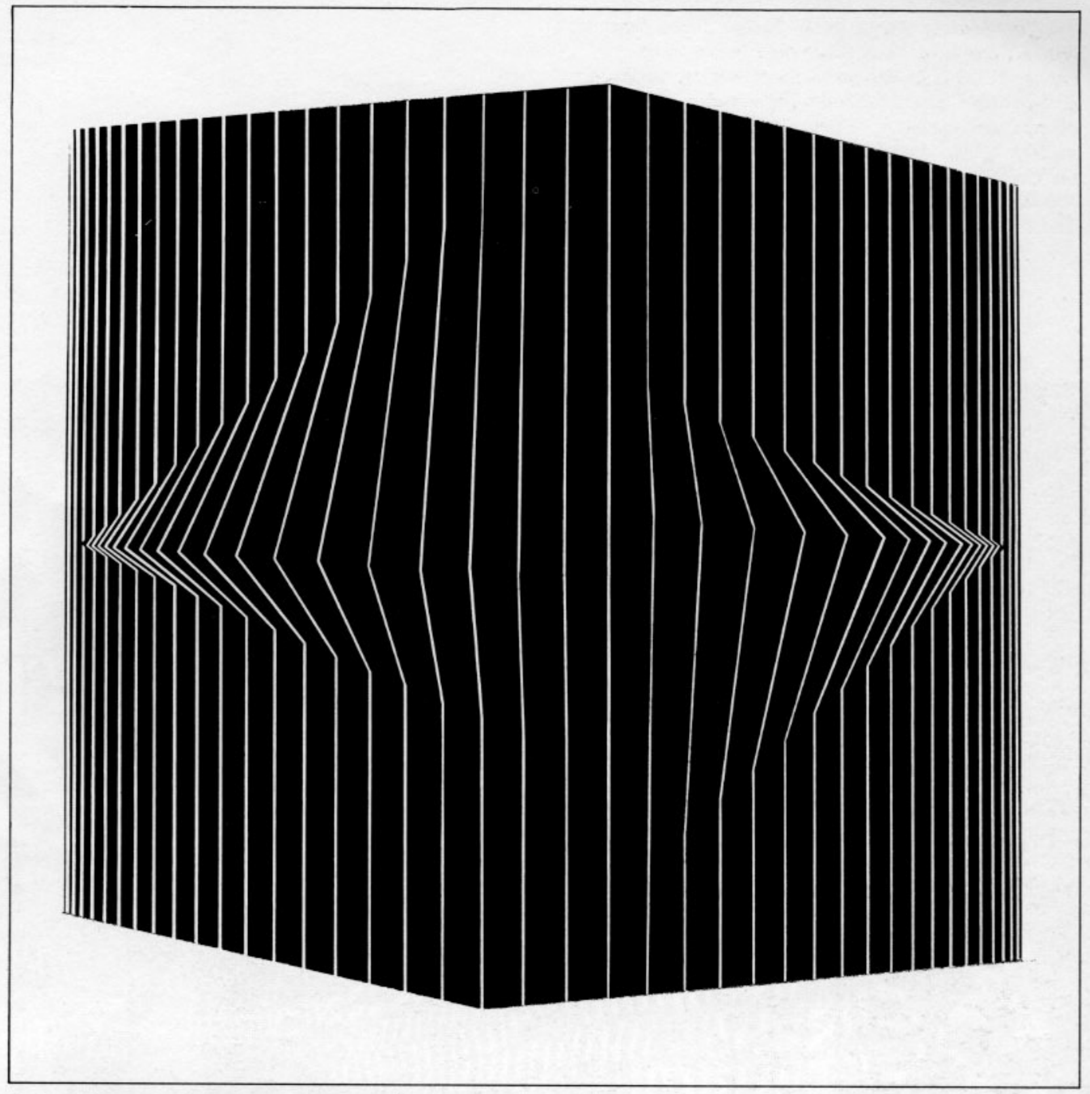
In a short introduction Marcel Joray points out that, when the book was being designed, pictures were given precedence on the page, text being fitted into spaces left. *It is the texts that are illustrative,* he advises, *not the pictures.* Visually, his point is made. Where type appears the fonts are simple, unobtrusive and legible. Once in a while legibility yields to demonstration, as when a reference to phantom effects of tracing paper is printed on a translucent sheet; but on the whole the blocks of reading matter do their job without being cute or getting in the pictures' way. If anything, by comparison with the unbooklike novelty in the make-up elsewhere, the typography becomes almost dull. It is a relief, about the middle, to encounter page sequences which reproduce holographic and typescript notes from the artist's files.

The venture in general is a little reminiscent of the films that starred Charlie Chaplin, were produced by Charlie Chaplin, directed by Charlie Chaplin, written by Charlie Chaplin. Like Charlie's, Vasarely's gifts and attitude suit his medium. Not only the star of this piece, he has produced, directed and written a one-man show in the form of a book. Its remarkable outcome is that it seems less a picture-book than a brilliant retrospective exhibition.

Its success in this unexpected guise is due to Vasarely's skill in implementing his conviction that an abstract work of high order may be adaptable to such presentation without loss. In effect, his works are designed as reproductions. A reason was given in his 1959 Manifesto. *Without repudiating the principle of oneness,* he wrote, *we choose that of multiplicity, as being more generous and more human.* For himself, he does not think of the initial singleness of a work as a unique condition. It is *only a potential thing.* What other artists have believed was an end is for him a start. *The masterpiece,* he says, *is no longer the concentration of all the qualities into one final object, but the creation of a point-of-departure-prototype, having specific qualities, perfectible in the progressive numbers.* He has worked out a prototypical scheme by which a given design event may be scaled up or down to fit a variety of possible settings without damaging its first formal integrity. In the present application a common situation is subtly altered. The dynamic content does not so much make a conventional book as it makes this book an environment.

To accomplish this, Vasarely has had to come to terms with technics. He gives no indication that the reliance, or alliance, has in any way compromised his vision. There can be no question that the combination is responsible for the forceful visual and manipulative character of the book. The idea is inseparable from the technical production, and the idea is demanding. Excerpts from the editor's description convey the extent: *For the execution of this book we have drawn on a great range of technical resources, including offset, silk screen, typography; mat, glazed and translucent papers and transparent backings; loose sheets and folding sheets . . . In order to remain faithful to the models of flat tints, use of the screen has been avoided as much as possible. A great number of pages have accordingly been executed by one printing in black and two or three printings in different grays . . . The reproductions in color have required up to eight successive passages on the machine . . .*

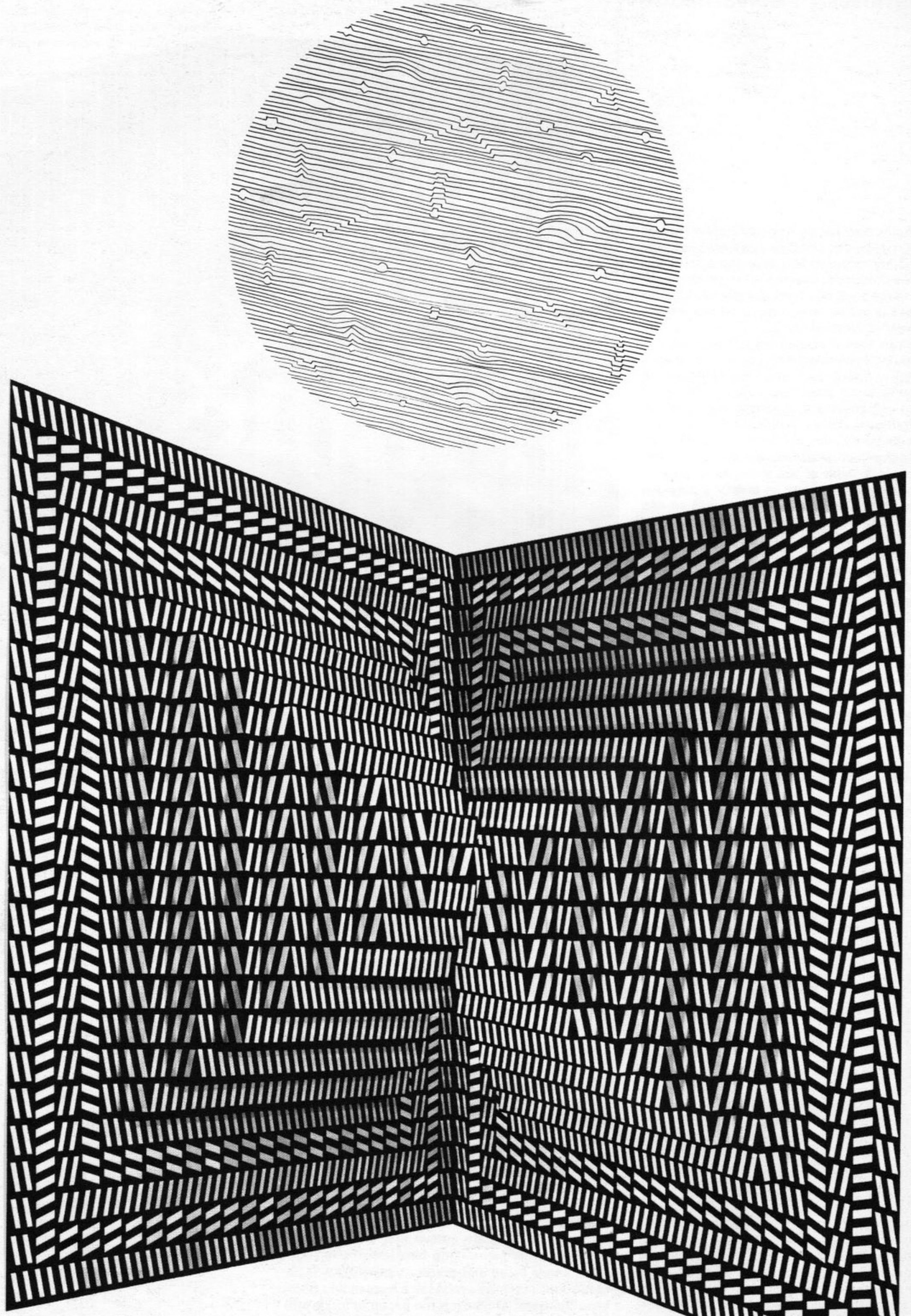
This spells money, and by ordinary standards the book has a high price tag. Yet costs must have left little if any margin of profit. It is as if the artist had insisted on the finest technical facilities obtainable, and then had pleaded for the most accessible sales charge. A copy offers a lot for the money, but the money is a lot for the people he wants to reach. Writing in 1959 of abstract art's status in the respective contexts of capitalism and socialism, he lamented the *painful contradiction that it should be tolerated here and banished there.* He had just said that *the most living forms of constructive abstraction (architectonic integration, informative arts that can be widely disseminated, and arts of synthesis) have a markedly social tendency.* But only a few years later, in connection with the publication of this book, he surprises the reader with a contradiction of his own. It is saved for the bottom of the last printed page. There one learns that this already costly publication is not only available in a *luxury* edition, but that the artist has provided a bonus for those who can afford it. He has *created twelve different metal-paintings, which he has signed and numbered, and which have been executed in seventeen copies each . . .*

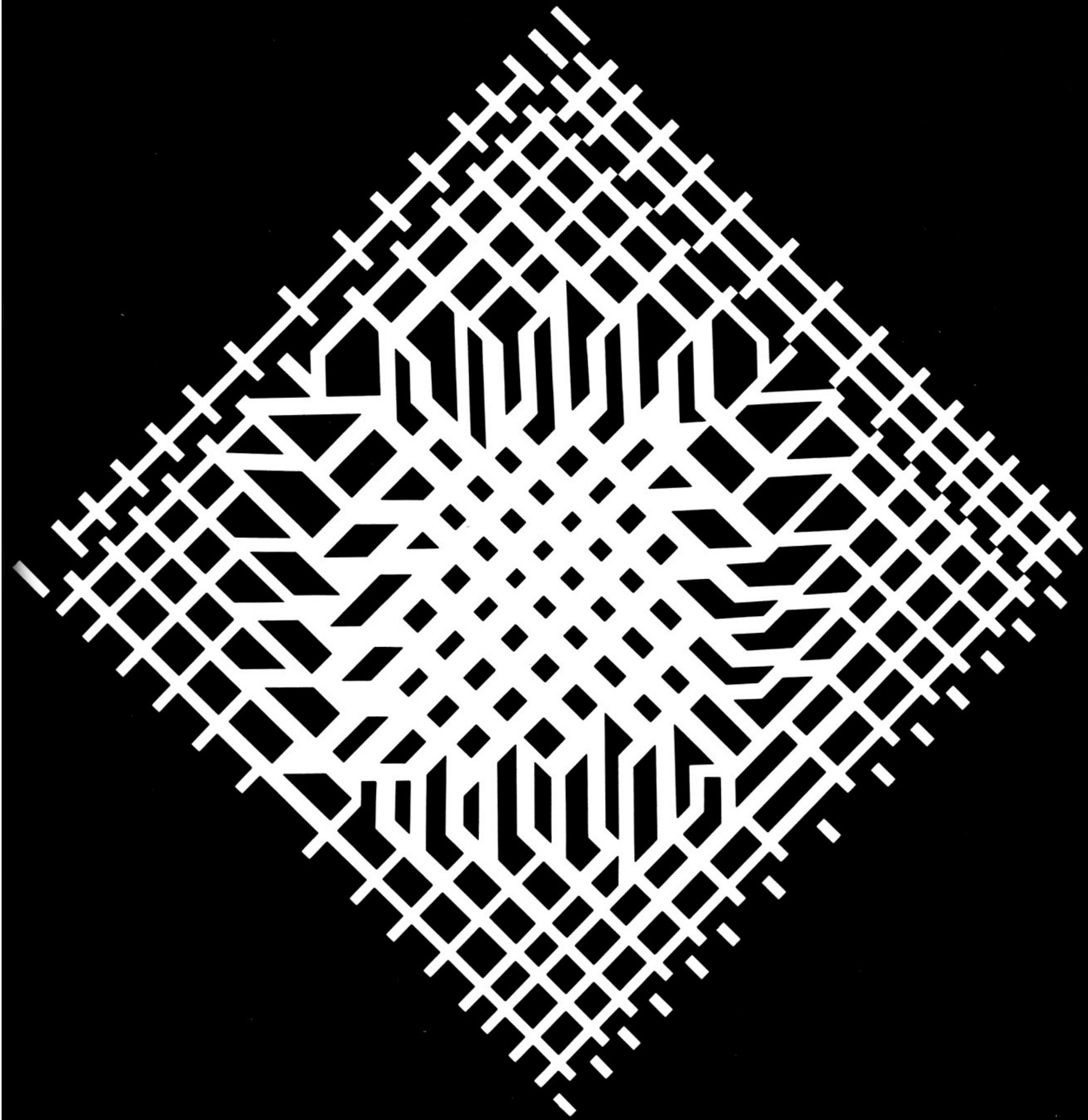


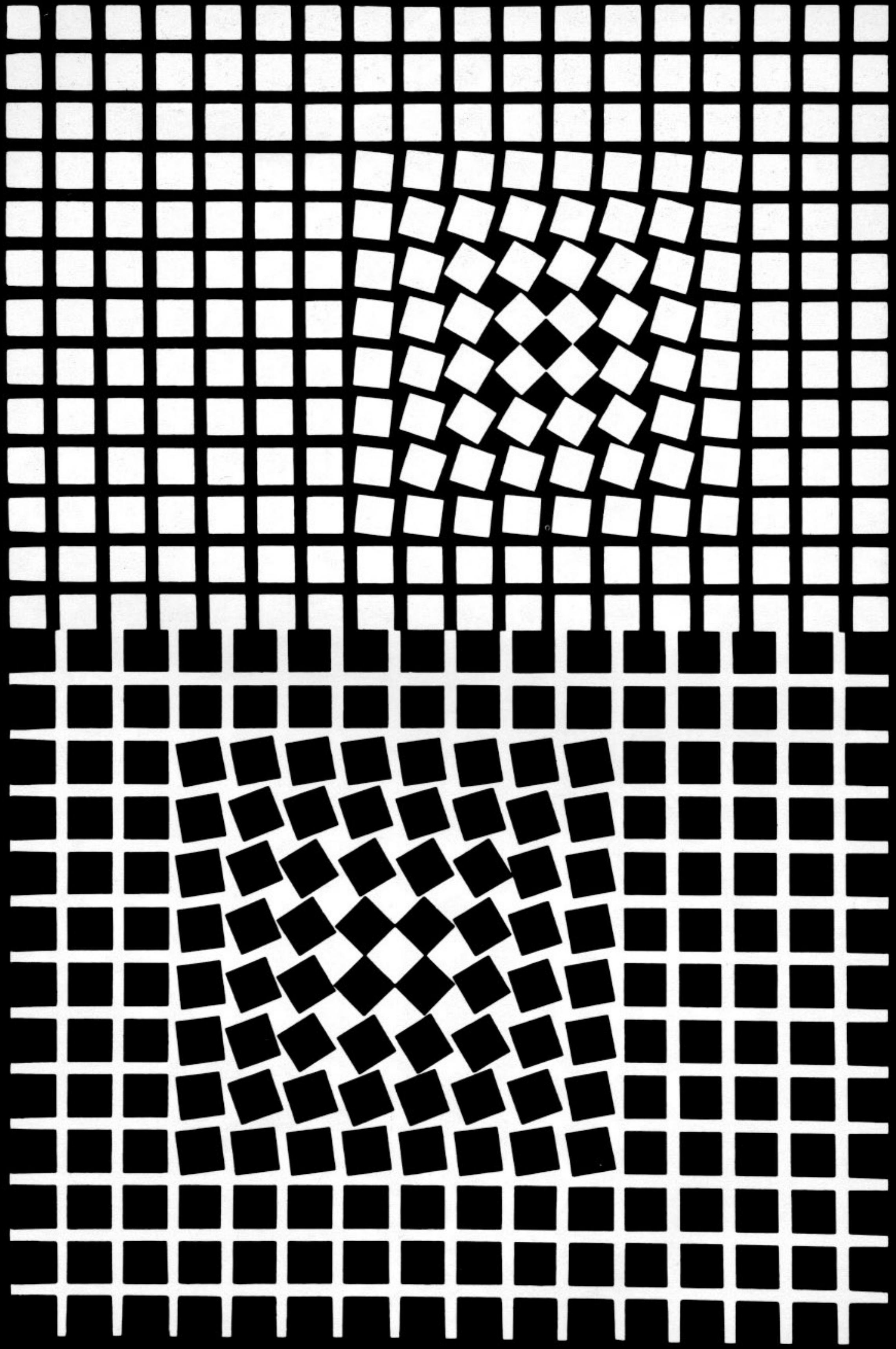
Perhaps because it is so up-to-date, this discrepancy between thought and act seems the most notable in the book. A quibbling scrutiny of the text, which reflects passing (and sometimes enduring) considerations made in notes over many years, would doubtless reveal others. Vasarely himself, for all his leaning towards tidy consistency, does not equate conviction with obstinancy. Flesh, blood, and a sometimes indeterminate susceptibility of mind, qualify his otherwise rather mechanistic view of personality in history. Sixteen years ago he wrote this note: *No matter how great the investigator's intellectual honesty, the schizophrenic or paranoiac inclinations capriciously blended in him will carry him away in spite of his vigilance.* Never embarrassing his reader by kneeling in a confessional, his notes often humbly retrace the beliefs he feels his art to reflect.

Vasarely constantly, hopefully, and often cannily, relates his role to the times. This elaborate and cogent summary of his contributions is the midway statement of a major figure in a cultural trend that is neither new nor old. Perhaps the span so far will be regarded as a beginning. To that, Vasarely has addressed an illuminating and concise review.

The range of his own development reveals not only change but also the reflexive engrossments which make his work coherent as a body. The book documents exhibitions, and includes both an exiguous biography and a useful bibliography up to 1964. The latter lists the *Yellow Manifesto* – though not by this familiar name – and prompts curiosity as to why its pertinent text was left out of the book. Minor, but perhaps of future interest, the bibliography omits reference to the Vasarely essays that were privately published in the painstaking booklets of the Yugoslavian artists Picelj and Knifer. Vasarely, his team, and his publisher have produced a resplendent book, a beautiful book. Maybe it is too beautiful for its purpose. It is elegant, and elegance dates beauty quickly. In 1954, Vasarely wrote that the artist who lets himself go *will find himself on the wrong road, which may provide a most beautiful series, nothing but beautiful . . .* The concluding dots are his.







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