

DUERERSERIES ~~OF~~ SOME REMARKS
ON THE CONTINUING PROCESS
OF VISUAL EVOLUTION

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Abstract

This thesis consists of:

1. a twenty minute black and white half inch video tape;
2. six black and white photographs (with a prefacing page);
3. the following written essay, including some photographic illustrations.

This framing essay puts into perspective certain developments in Western art which in Europe during the fifteenth century led to the discovery of the principles of projection and the geometrical properties of sight. It then takes the suggestion of one of the earliest printed publications on that subject, the last page woodcut of the (1525 edition of Albrecht Duerer, Underweysung der messung mit dem zirckel un richtscheyt¹ and adapts it, explaining how projection and the picture plane work. I built the instruments suggested by the woodcut to make three basic and inter-related points: (1) the art-historical development of the unified projective space of painting and drawing and its prevalence today through the technological development of still camera, movie camera, photo reproduction and television; (2) using these latter technologies, I make an art proposition by selecting six photographs taken from the eye/viewpoint;² and finally (3) by using the instruments with my students, I teach and we understand how projection works, i.e., a paedagogical proposition (the video tape).

1. Albrecht Duerer, Underweysung der messung mit dem zirckel un richtscheyt (Nueremberg: 1525), limited facsimili edition by Josef Stoeker-Schmid, Dietikon-Zuerich: Eidgenoessische Technische Hochschule, 1966.

2. This photographic sequence was exhibited in the groupshow 'Camerart' in 1974 in Montreal, London, and Paris. Catalogue for the exhibition: Camerart (Montreal, Galerie Optica: 1974), pp. 30-31.

ACKNOWLEDGEMENT

The idea to demonstrate to my students simply and convincingly the adjustments we make between what we 'see' and what we 'know' (or between the conflict of our muscular/tactile and our ocular/visual experience of the world) has always intrigued me. The students' continuous quest of "show me!", inspired the actual building of the instruments as suggested by Duerer's woodcut illustration to be gratified by the "I-see-what-you-mean" acknowledgement of the intimate unity between knowing and seeing and the success of having induced understanding by actual experience and not just explanation. Apart from the students in general, I would like to thank here those three who helped in the actualization of the video tape: Ilana Isahayek, Phyllis Kalichman, and Richard Langlais.

While we worked in front of the camera, someone obviously had to be behind it: Peter Grahame helped not only with his technical know-how, but also his personal enthusiasm for my idea to get this thesis on tape. Gabor Szilasi used his 4x5 camera and, more important, his exacting skill as a photographer to help me photograph the still sequence. Last not least, I would like to thank Greta Nemiroff for her support and many helpful critical suggestions.

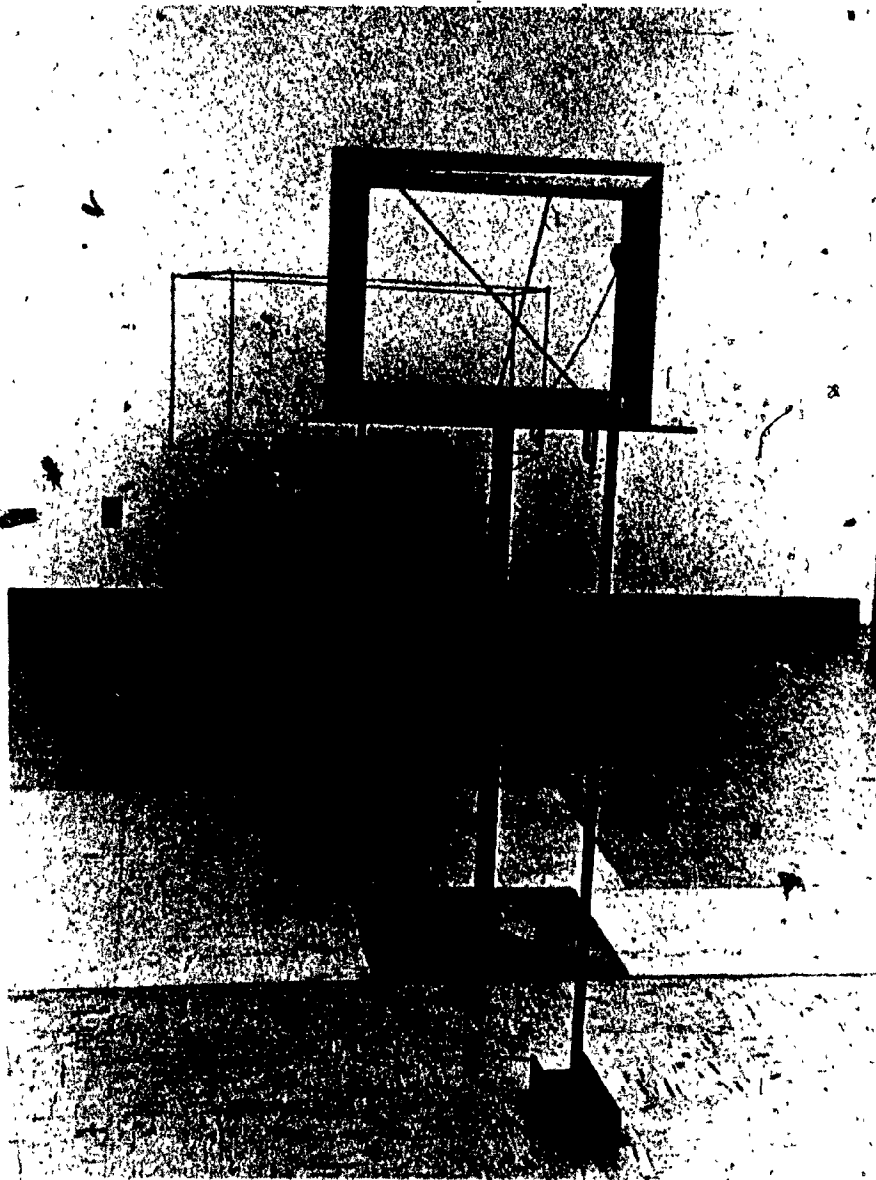
Faced with the occasional German Umlaut (those two little dots on top of some vowels) and not having an adequate one on my typewriter, I opted for the very same original form which Duerer himself employed in his Unterweisung der Messung: I rendered them simply "ae", "oe" or "ue" wherever necessary.

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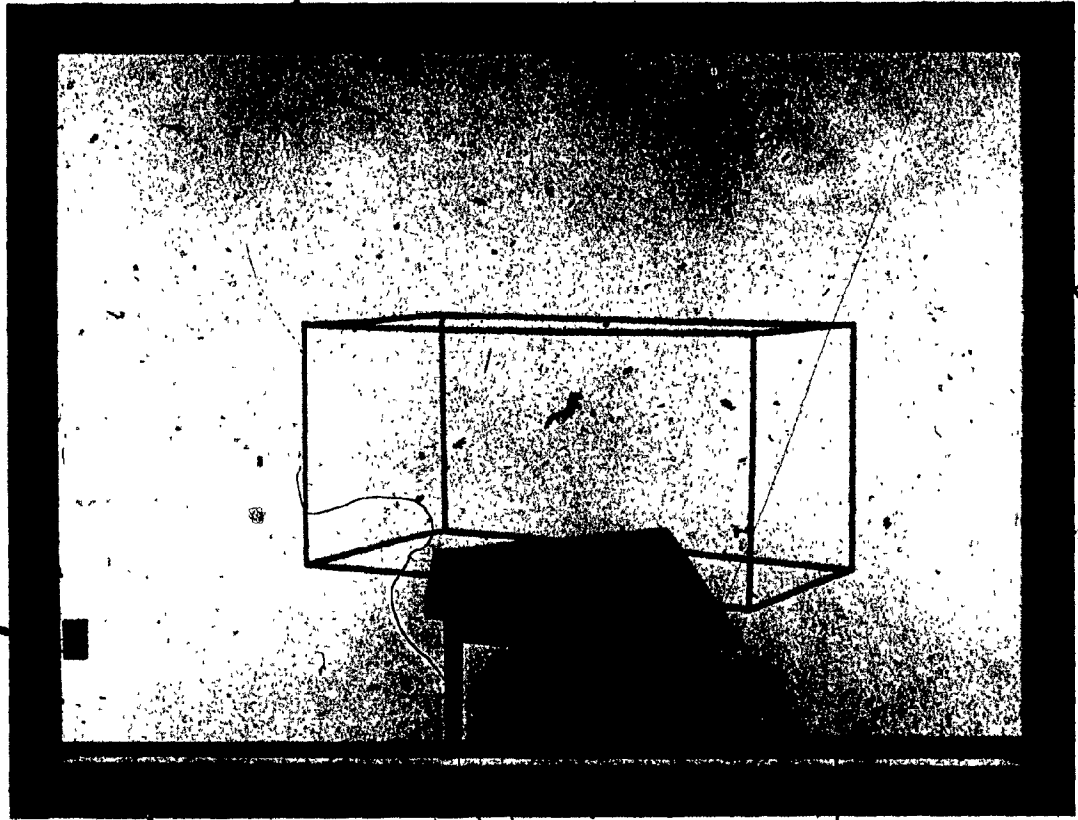
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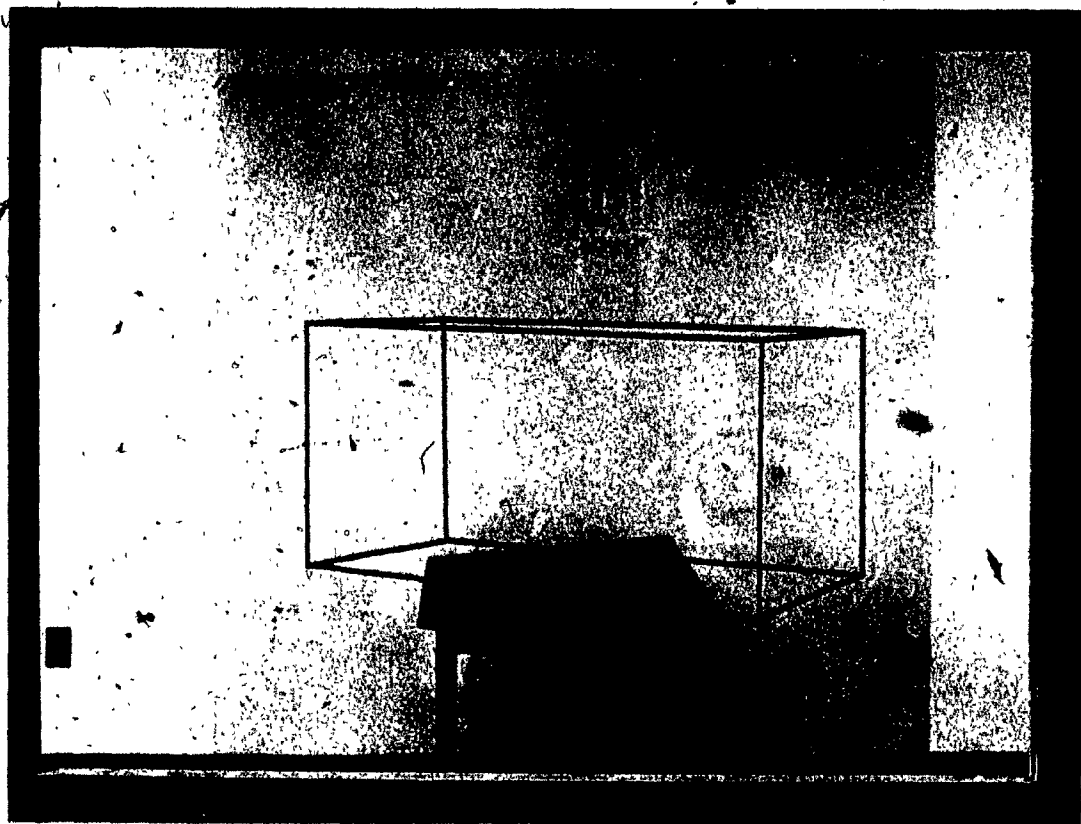


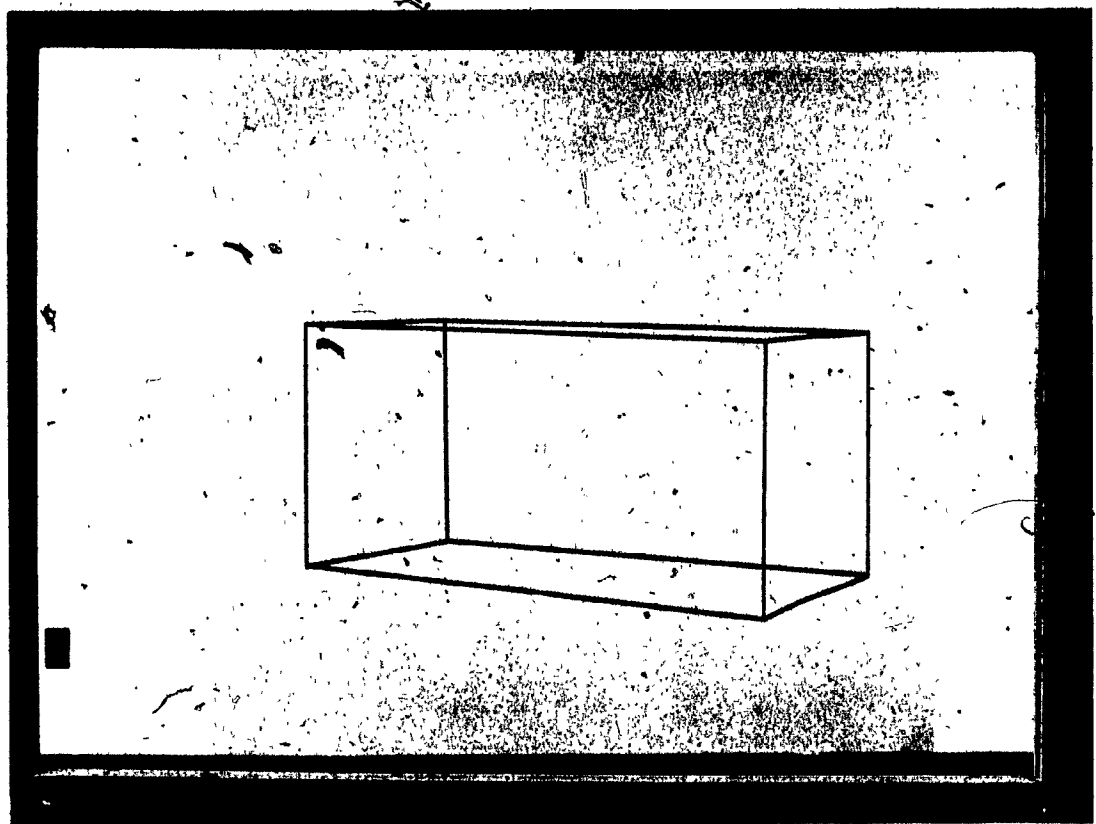
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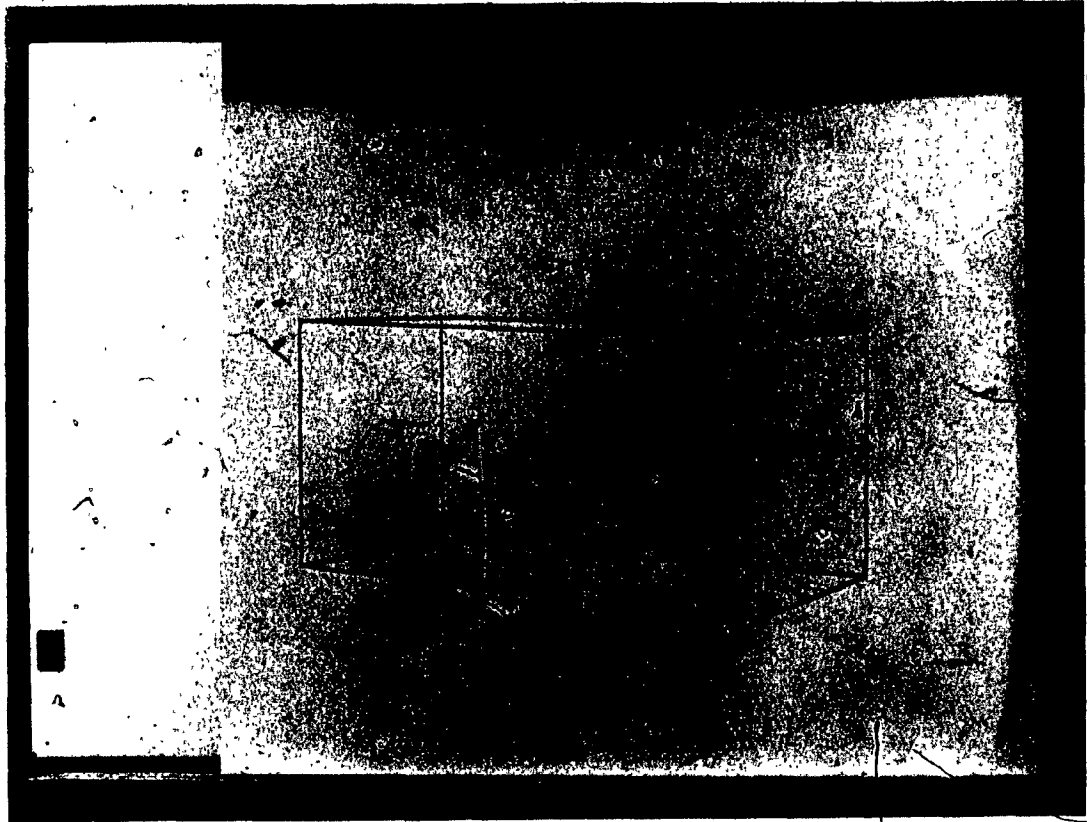
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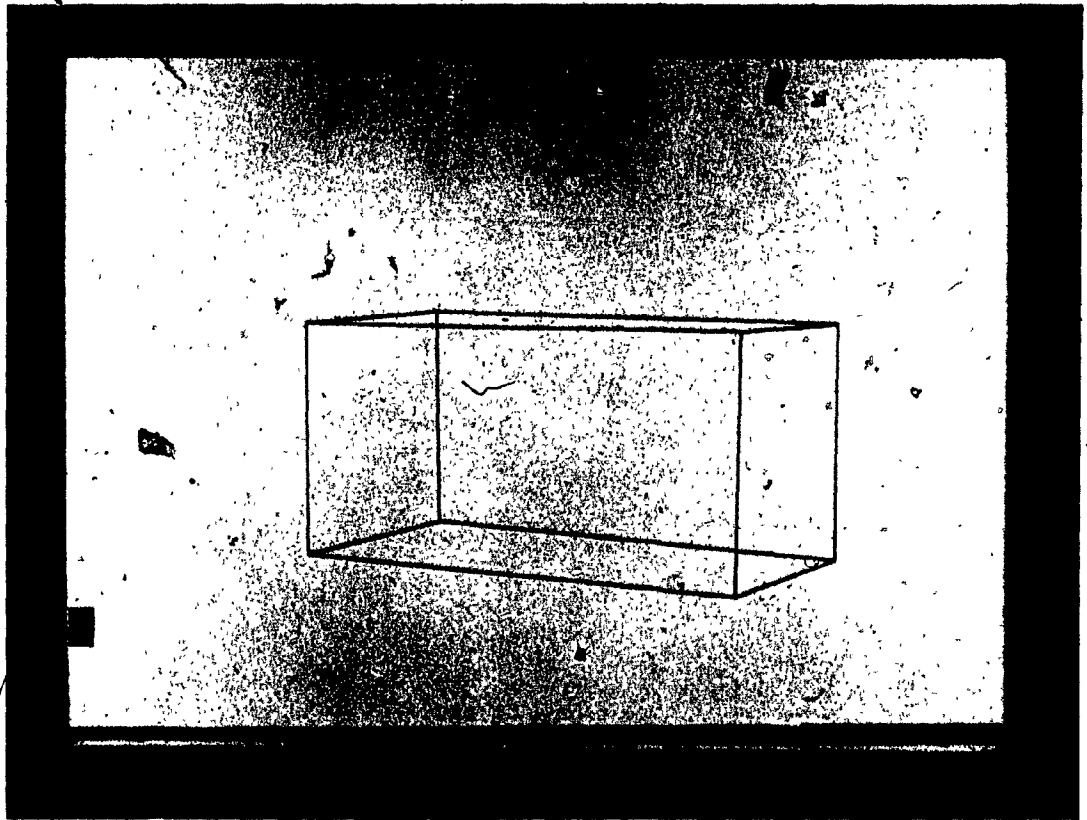
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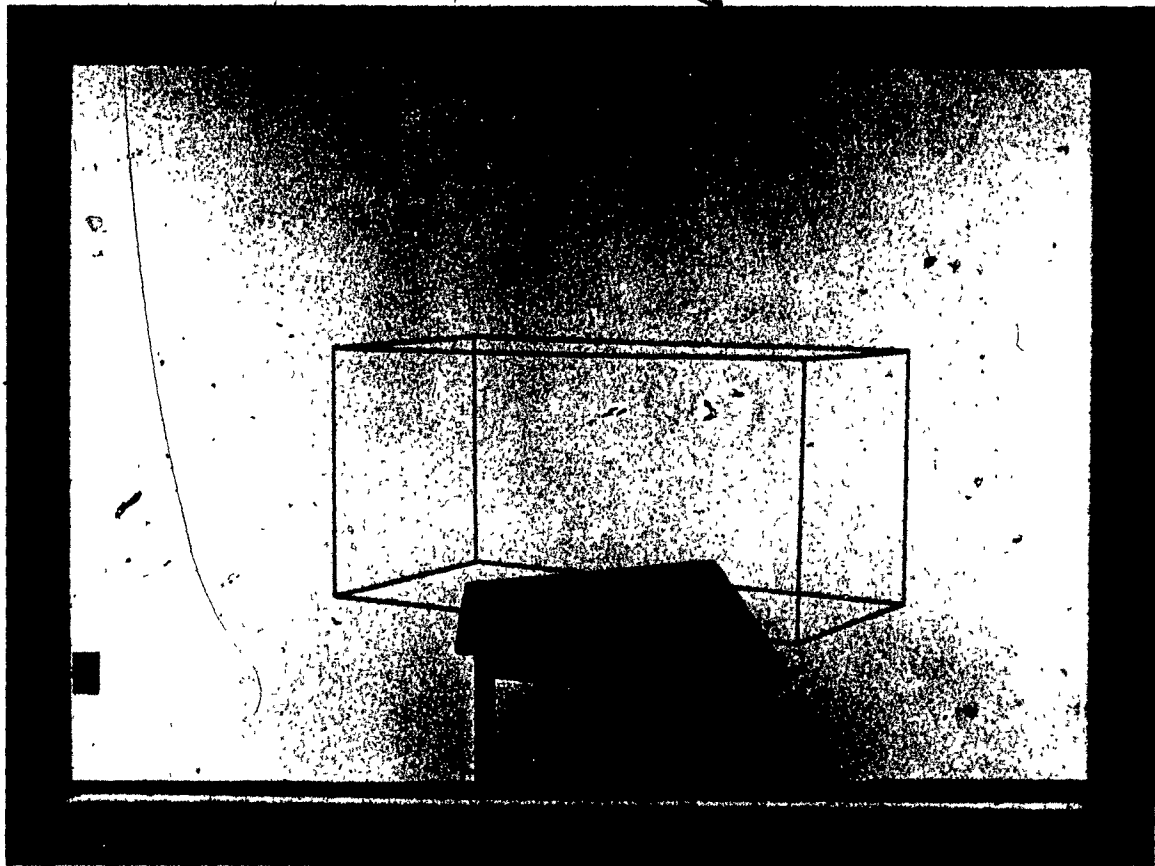












I.

Spatial projection is the tangible, logical link between the three-dimensional world of matter and our experience of the visible aspect of that world through our sense of sight. Light rays reflected from the edges and surfaces of stationary and moving objects converge to the lens of our eye(s) and form a projection onto the back of our retinas. The three-dimensional world thus becomes a small two-dimensional reflection of what lies within our visual field, to be converted into electro-chemical stimuli which, via the optical nerves, are conveyed to the brain and the central nervous system.

It is my thesis that projection is, and always has been, the predominant logical link between the external world of matter and its visual equivalent representation on a two-dimensional surface. Observation of shadows cast by sun or fire onto corresponding surfaces of cliffs and cave walls might have been the first discovery of a projection which reliably transformed the complex physical world of appearances into the abstract man-made and separate reality of two-dimensional representation.¹

However, the three-dimensional world exists in space and time and hence permits movement. Thus we experience continuous changing projections of forms which by our muscular-tactile experience we know to have constant properties. We accommodate this dichotomy through various stabilizing mechanisms of experience; foremost among them the psychological phenomena of constancy of size, shape, and colour.

1. Fred Dubery and John Willats, Drawing Systems (London: Studio Vista, 1972), p. 10. An excellent, but perhaps too concise account of the various projection and drawing systems in Western history.

The search to translate the world as it appears to us three-dimensionally and everchanging in space and time to the stasis of the two-dimensional surface forms an essential content of the history of all visual representation. As such, that part of the history of art which deals with drawing and painting has to be seen, in one of its functions at least, as a documentation of the search to develop a reliable and appropriate syntax to order spatially our making and seeing of images.

II.

The first sovereign solution to the problem was the manner in which Egyptian social and religious thinking ordered plastic organization in a highly convincing paradigmatic manner. Choosing the most complete and representative common denominative viewpoint of a form, it created the convention of a synthetic and systematically unified whole.¹ Aegean pre-Christian cultures give us through their geographical and chronological proximity the historical link to the Egyptian civilization and its peculiar plastic achievements. Regardless to what extent the actual connection has been proven archeologically, there is no denial that Greek representational art in its pre-Classical period shared some essential features of the Egyptian syntax. Yet it was in the work and development of painters in classical Greece " ... that the absolute dominion of the flat, pictorial surface was, for the first time, seriously challenged".²

Full fruition of the Greek departure from the oriental hierarchical pictorial organization was diluted by the Roman conquest. Admiration led to adaptation of Greek ideas to Roman needs and catalyzed the process of pictorial representation to the point that Pompeian painting in the first century before Christ had discovered and used one-point

1. An aspect which is in quite some measure phylogenetically retained and very evident at some stage in the representational drawings and paintings of children. It also informs to a degree the guiding schemata of most of our 'seeing' as adults, i.e., why adults can't or have difficulty drawing 'correctly' representationally, even so most adults have on the average at least 75% visual acuity and the astonishing degree of manual dexterity (acquired mainly through learning to write) to control the placement and extent of making meaningful marks on paper. The roots to this common solution might lie in the dichotomy between the muscular-tactile and the ocular-visual experience of the world.

2. John White, The Birth and Rebirth of Pictorial Space (Second Edition; Boston: Boston Book and Art Shop, 1967), p. 236.

vanishing perspective,¹ however intermittent and tenuously. But there were two major, and to my mind, inter-related developments which deferred the complete and consequential formation of a theory of projection as an organizing principle of sight at the time. This was the intimate connection between the increasing use of the written word and the rise of monotheistic Hebraic and Christian religions.

While Egyptian plastic theory was for centuries ordering its image-making with little deviation from the traditional norms, it increasingly condensed, abbreviated, and adapted isolated drawings. Augmented by and eventually merged with similar developments in other near-Eastern ancient civilizations flourishing during these millennia, this process laid the foundation to writing systems. These reductions, which eventually cryptically substituted sound for sight, formed the base for the hegemony of the written word instead of the picture as the major means of dealing with physical and meta-physical matters.

In the West this hegemony of writing over drawing - or language over picture - was reinforced by a monotheistic system of beliefs which, using the written word, attributed the Creation to the word: "... and God said, let there be light".² Further this hegemony of the word was developed in Christianity as we see in the Revelation of John: "In the Beginning was the Word",³ and finally incorporated into the Mass.

This preference of 'logos'⁴ over picture was a clear bias of the ancient Hebrews who recorded the injunction of God against Graven Images;⁵ it

1. White, 249.

2. Genesis, 1:3-26.

3. John, 1:1. The original Latin In Principio erat verbum expresses this point even stronger in its reference to 'principally' meaning first, foremost.

4. Today's popularity of the logos as a heraldic devise for business rests on the powerful synthesis between the expressive and immediate function of its pictorial analogous component and the encoded digital one which utilizes the unmatched statement function of language references. As such it represents a going back in time when picture and word fulfilled similar needs and came out of the same source.

5. Exodus, 20:1-6.

even precedes the Ten Commandments. With the development of a dualistic conception of the nature of existence, any representation of physical reality in pictures blatantly affirmed, precisely by its analogous link through projection, physicality, and hence negated the original emphasis on spiritual and non-material values.

Original hesitation of breaking these commandments gave gradually way, particularly after Gregory the Great declared around the year 600 A.D.: " ... what those who can read learn by means of writing, that do the uneducated learn by looking at a picture".¹ While this was to remain the authoritative statement for the Roman Catholic church, it took 116 years of bloody battles between East Byzantine armies to settle that controversy. Only the slow resolution following these iconoclastic wars of the eighth and ninth centuries allowed for the serious re-introduction of pictorial language as a means of teaching the illiterate. Early Christian medieval art met this fundamental demand with a variety of plastic devices often incorporating through native talent the barbarian traditions of the North, while clinging to successive abstract stylizations of traditional Greek and Roman forms in the South, i.e., the Byzantine tradition.

The rift between the (Western) Roman Catholic and the (Eastern) Greek Orthodox churches widened even after the resolution of the iconoclastic controversy to be irrevocably confirmed by the sacking of Constantinople in 1204 by the Fourth crusaders. A period of relative stability following the Viking, Norman, and Islamic incursions into Central Europe allowed for the rise of trade and arts in the wake of the stimulating aspects of the crusades. The result was a gradual disintegration of feudal society and the concomitant rise of cities and with it alternative social structures.

These conditions favoured during the fourteenth and fifteenth century in some parts of Europe, particularly in the rich wool-trading centers in Flanders and the prosperous city states in upper Italy the development of a uniquely unified pictorial syntax which would be congruous with and expressive of evolving social and philosophical values. The

1. "Iconoclasts," Encyclopaedia Britannica, 11th ed., vol. XIV, p.279.

naturalizing tendencies begun in the Gothic period with the gradual supplanting of the golden background in altarpieces in favour of landscapes; the introduction of elementary forms from actual observation of nature; and culminated in the cult of Mary, i.e., the Madonna as the behavioural model for women of this age.

This development found also its expression in smaller and portable panel paintings; an emergent preference of using oil instead of tempera as a medium; and the gradual condensation of a picture to a plane representing an event in one space at one time. All were the result of a growing and gradual secularization of images and hence represent a shift away from the traditional concerns of painting, which seem to have by this time outgrown the uneasy compromise between the needs of the Church to fulfill its catholic, all-embracing claim and the strictures of the second commandment. Particularly the use of glazes which the medium of oil painting permitted, favoured the representation of all the tangible qualities of appearances, thus not only making visual concessions to our tactile experience of the world, but also affirming the daily and more often worldly experiences of bankers, traders, and craftsmen, who became new patrons of the artist.

All of the foregoing characteristics favoured the logical and rational ordering of these diverse elements by seeing a painting like a magical or illusionary window in the wall. In fact the Latin perspicere means 'to pierce through'¹ and forms the basis of our word 'perspective'. This window-pane metaphor is based on the very real observation that when the eye assumes the condition of the picture, i.e., one moment arrested in space and time, then the visual cone which is formed by all the light rays converging from all the objects in front of it towards the eye are intersected by a (framed) window pane.² A very patient point-by-point equivalent marking on the pane should, if done with

1. "Perspective," Encyclopaedia Britannica, 11th ed., vol. XXI, p. 257.

2. Retained still by the traditional picture frame with its moulding oriented to recess generally towards the picture plane and the mitered corners which lead the eye towards a vanishing point.

absolute precision and fidelity change the transparent glass into an opaque picture plane which should affect the eye in the very same way as the actual scene does when viewed through the pane. As Leonardo put it so succinctly: "Perspective is of such a nature that it makes what is flat appear in relief, and what is in relief appear flat".¹ One of the earliest extant works which fulfills this requirement is the Merode altar piece by the Master of Flemalle (Robert Campin?) and which was painted about 1425-28 in the city of Tournai in Flanders. This is how one art historian sums up the effect: "Here, for the first time, we have the sensation of actually looking through the surface of the panel into a spatial world that has all the essential qualities of everyday reality: unlimited depth, stability, continuity, and completeness".²

In general, this was the matrix (but not the only goal) which Flemish painters like Robert Campin and the Brothers Hubert and Jan van Eyck and others evolved to keep their pictures unified in a very logical, yet revolutionary way. Through trading links with Italian merchants and bankers these particular Northern achievements were known to their Italian colleagues.³

Yet it was in Italy that this process found its most complete practical as well as theoretical expression. Contemporaries of the Flemish painters like Masaccio, Paolo Ucello, Piero della Francesca, Brunelleschi, Alberti, Donatello and Ghiberti, systematically unified in their paintings, sculptures and writings⁴ the theoretical synthesis of Euclidian geometry and optics into an ideological paradigm of Early Renaissance ambitions.

1. quoted on p. 5 in Nigel V. Walters and John Bromhan, Principles of Perspective (London: The Architectural Press, 1970).

2. H.W. Janson, History of Art (Revised and Enlarged Fourteenth Printing; Englewood Cliffs: Prentice Hall, Inc., 1969), p. 286.

3. Attested by the many Italian patrons of Flemish painters: Arnolfini, Cardinal Niccolo Albergati, Portinari, etc.

4. Foremost here Leon Battista Alberti's 1435 Della Pittura libre tre. and Piero della Francesca's de Prospettive pingendi (between 1470-90) and the lost notebooks by Leonardo on this subject.

Together with other concerns introduced by Humanism and its search for its roots and justification in the antique civilizations of the classical Mediterranean world, this found its polished expression by the end of the fifteenth and the beginning of the sixteenth century in Italy, spreading gradually through Europe.¹

The invention of printing with movable type and its rapid spread throughout Europe at this very same time in the mid-fifteenth century once more seemed to favour the word. Yet it accelerated the printing of images from woodcuts and copperplate engravings as well, which in turn through their very standardization by mechanical repetition demanded and hence stimulated further the search for a reliable syntax to aid the exact repeatable pictorial statement.² It was inevitable that under the circumstances the discovery that physical space and our experience of that space through the sense of sight have a common mathematical denominator in projection, thus furnishing the justification for a global standard, should triumph.

The first printed account of the theoretical framework of projection and artificial linear perspective construction is the 1505 Latin edition by the French ecclesiastic Pelerin, called the Viator. De Artificiali Perspectiva was printed in Toul, France, and illustrated with many woodcut examples.³ This edition was pirated in Nueremberg in 1509. In 1525 Duerer published in that same city his Unterweisung in der Messung mit dem Richtscheit.

1. The aim of this framing essay is not to trace in totality the exact development of the perspective convention, but rather to be a synthesis in order to place my own intentions (the demonstration as shown in the video tape) into its proper historical perspective. Literature on that subject is quite exhaustive, if not complete. The bibliography lists some key works, foremost among them John White, The Birth and Rebirth of Pictorial Space.

2. William M. Ivins, Jr., as quoted in Rudolf Arnheim, Art and Visual Perception, A Psychology of the Creative Eye (Berkeley: University of California Press, 1969), p. 279.

3. William M. Ivins, Jr., On the Rationalization of Sight (Reprint of the original essay published by the Metropolitan Museum of Art in 1938, Papers, No 8, New York: Da Capo Press, Inc., 1973) This new edition of this most inspired singular best treatment of this subject reproduces both the first edition (Toul, 1505) and the second and French edition of 1509.

III.

Alongside these developments was another more decisive one. This was the gradual split between art and science and the rapid growth of the sciences following the Counter-Reformation. While Renaissance attitudes had in general favoured inquiries in all fields of human nature, it was the consolidation of its beliefs in defining a series of dogmas that the Catholic church at the Council of Trent liberated all that which was not covered by these articles of faith and gave an unintentional impetus to the curiosity Renaissance attitudes had aroused.

In the arts particular demands by the Counter-Reformation to utilize painting to create splendors incomparable to Protestant austerity encouraged an intense investigation of illusionary paintings on curved surfaces.¹ Early suggestions for the building of instruments like those shown in Duerer's woodcuts were followed by others² to aid these investigations. Speculative developments in philosophy and mathematics enlarged the field of geometry. Descartes, Pascal, and particularly Desargues with his theorem which constituted the final proof of how predictably and unified space behaves in projection, were important in these further developments.

Encouragement in experimental approaches favoured investigations of the phenomena of the camera obscura known to the Greeks and the Middle Ages. This was the construction of a dark room with a tiny hole in a wall

1. M.H. Pirenne, Optics, Painting & Photography (Cambridge: At the University Press, 1970), chapter seven, pp. 72-94.

2. Philip Rawson, Drawing (Vol. 3 of The Appreciation of the Arts series; London: Oxford University Press, 1969) pp.216-219. and Van Deren Coke, The Painter and the Photograph, from Delacroix to Warhol (Revised and enlarged edition; Albuquerque: University of New Mexico Press, 1972), Ch.I.

which, facing a brightly lit outdoors would produce a faded but distinct and upside down projection of that scene on the wall opposite the hole. Medical curiosity and dissection made it possible to compare the eye to a miniaturized camera obscura with a lens. Experiments in this field and also ones resulting from a better theoretical understanding of the nature of light and optics¹ led to progressive and successful miniaturizations of the camera obscura as well as further adaptations into the camera lucida.²

Diderot's Encyclopédie of 1751 lists under the subject of Dessin (!) in Plates IV and V how to build those instruments.³ They show how to make them portable to facilitate augmenting ones experience of the world as well as the rendering of nature as part of the artistic lot. And while this might have been the beginning of much predictable and boring art, it was equally well used to make good art: Vermeer van Delft might be the best example here.

Meanwhile the canonization of proper vanishing perspective space construction as the only basis of all painting and drawing became the dead end of the academic artistic tradition. And while in the beginning Mannerism used the convention to exaggerate and play with it in anamorphous riddles,⁴ over the centuries under discussion, the growing notion of self-expression, as championed by romanticism and l'art-pour-l'art (as well as the changing relations between painters and patrons), led to impressionism and the gradual demise of illusionary space in favour of other explorations.

1. Notably here Leuwenhoeks application of the lens towards microscopy and Galileo's into telescoping. The theoretical base was given by Isaac Newton's work in the field of optics. In this context it might be appropriate to mention that Galileo cites Duerer's Unterweisung as one of his authoritative sources.

2. Dubery and Willats, 83.

3. Diderot and d'Alambert, Encyclopédie ou dictionnaire universel des arts et des sciences (France, 1751), section "Dessin".

4. Jurgis Baltrusaitis, Anamorphoses, ou magie artificielle des affects merveilleux (France: Olivier Perrin, 1969) and Gustave René Hooke, Die Welt als Labyrinth; Manier und Manie in der europäischen Kunst (Hamburg: Rowolt Verlag, 1957) are two major sources for anamorphic fascination of European artists.

On the technological and scientific side advances in chemistry in various places allowed by the beginning of the nineteenth century chemicals to register the image permanently on the surface on which it was projected. While early photographic cameras (German: Kammer; English: Chamber; and French: Chambre all still preserve the origin of the word 'camera') were still quite cumbersome, by the early 1930ies, thanks to American mass production techniques, they became small, portable, and cheap enough as box cameras to aid in the quests of tourism, war, and, the economic expansion of the globe. As a minor and unnoticed sideproduct it democratized imagemaking to the point that the photographically registered projective syntax became the exclusive standard of judgement for all two-dimensional space representation.¹

The application of photography to the rotary press through photogravure² increased the proliferation of images from the 1880'ies onwards. Colour-photography and colour reproduction must surely be seen as the direct inheritors of most of the traditional functions of oil paintings.³ The slide projector, the overhead transparency and the opaque projector are additional extensions (mostly institutional) of these same technologies. The movie camera added to this the extension of images in time and movement in space. Television and video carry this visual explosion even and ever further into our home and hearts. Polaroid camera and video camera have the additional advantage of instant replay. Here the immediate

1. Making anyone to an instant art critic, i.e., the "it-does-not-look-like-that" syndrome. Apart from polarizing in a very destructive anti-intellectual way the 'two cultures' further (it is for instance difficult to imagine anyone but a trained specialist in that field criticizing a public presentation of a scientific paper), this visual fundamentalism obviously serves as a base of wide-spread popular hostility to contemporary twentieth century art, and, as we know, is constantly exploited/appealed to with disastrous results by politicians of all stripes.

2. William M. Ivins, Jr., Prints and Visual Communication (Cambridge: The M.I.T. Press, 1968), Chapter VII, pp. 135-157.

3. John Berger, Ways of Seeing (Harmondsworth, England: Penguin Books, 1972), a most cryptic, but very convincing argument for the continuity of the tradition of European oil painting's imagery, its content, function, and message as maintained through the camera's ability for verisimilitude in today's field of reproduction, and, more important, in advertisement.

gratification of our primitive curiosity in the magic of a picture and the advantages of the control and extent of privacy of the image have added new enticements to our making and consuming of images,¹ contributing substantially to our condition which Susan Sontag has called 'image junkies'.²

It then matters little whether the images are black and white; small and private; and inept as a family snapshot - or they are colourful, immense; highly structured, skilful, and as public and world-wide as a Coca-Cola campaign: they all share the properties of ordered spatial relations based on projection. While during the last century the plastic arts, in the West at least, have increasingly questioned the function of plastic language and the need to use the perspective projective syntax, through sheer quantity and global prevalence, projection is accepted as the central fact of ordered seeing.³

Conversely whole cultures in the past have managed very well and handsomely without the central perspective convention - and only very tenuous links to any principle of projection (Japan and China, the Islamic cultures, India, Africa and most primitive societies), but the flood of Western technology in the twentieth century has in spite of political fragmentization and independence movements (aided by cameras, of course!) prevailed. And with it, projection. This universal fact was sumptuously and poignantly illustrated to all man- and woman kind during the live transmission of the first landing on the moon. Thus the camera with its successors has brought the lens into the central position of image-making and projected space. The properties and rationale of perspective have become the matrix of seeing images and with it, and through it, 'reality' and our environment, in our time.

1. The paedagogical values and advantages of these feed-back qualities are known, however, the extent to which these peculiar qualities of these two technologies have contributed to the sexual liberation and changing social and moral attitudes have so far seemingly nowhere been assessed.

2. Susan Sontag, "Photography", The New York Review of Books, Oct. 18, 1973.

3. The obvious exception to this is twentieth century art, particularly Cubist and post-Cubist formalist painting and drawing.

IV.

Considering then the sheer quantitative prevalence of projection through technology today, which places linear perspective at the very heart of our visual culture, one has to deal, if only cursorily, with the ideological and symbolic implications.

Assuming that forms have a function and that the function of languages as well as images is to carry and communicate meaning, it is necessary

...to have some system of symbols ... and some grammar or rule by which those symbols are given logical relationships. Lacking such symbols, or a grammar for their use, the task of thinking becomes to onerous to be carried very far. A symbol that cannot be exactly duplicated, or what comes to the same thing, a symbol that of necessity undergoes fortuitous changes of meaning in the course of repetition or duplication is of very limited usefulness.¹

Once societies reach a degree of continuing evolving progress beyond the relatively stable Egyptian social organization, they have to evolve concurrently similar adequate and flexible, yet reliable, tools for communication to accommodate those expanding intellectual and technological needs, as well as to continue to insure cultural continuity and social cohesion. In the West, as I have shown, for a time the word and its written equivalent were the major tools capable of filling that need. The introduction of printing by movable type with its simple fact of mechanical repetition greatly increased the reliability² which could be placed upon the word as a carrier of meaning. Similarly the increasing

1. Ivens, On the Rationalization of Sight, p.7.

2. Particularly the translation and the printing of the Bible into the various vernaculars at this time resulted, for instance, in greater standardization of language by encouraging uniform syntax, grammar, and spelling. Sheer quantitative presence of the Bible and its use assured usually that the dialect in which the Bible was translated became the dominant language of the realm.

need for diversified uses of images¹ to aid language descriptions during this time demanded a uniform rationale to order in a reliable way the making and seeing of these images.

What is surprising is that among the many modes of projection known at that time² the particular one of linear perspective should have dominated other options especially in view of the shortcomings of the perspective syntax³ and particularly since the mechanical means of projection centering around the lens did not yet give a substantial and overwhelming rationale to this choice. One can only speculate that other factors must have been influential and were, consciously or not, decisive.

The reason why central perspective projection was chosen above others at this time and place in history must be found in the peculiar emphasis with which the Renaissance endorsed individualism⁴ and which was confirmed to Renaissance man (and ever since) by placing his individual eye at the apex of every visual cone or pyramid in pictorial representation.⁵ This reciprocity inherent in the discovery that natural perspective, i.e., how space seems to appear under certain conditions to our sense of sight, and its man-made corollary of the artificial or linear perspective construction which can duplicate some of this behaviour and hence substitute a picture for an actual sight, constantly affirmed like a mirror the existence of the spectator/viewer.

1. Plans, elevations and detailing for the building of cathedrals, palaces and fortifications; maps for the crusades, trade routes, and the voyages of explorations; recording technological advances in gun smithing and other trades; ordering scientific discoveries in biology and anatomy in herbariums and other compilations; all demanded pictorial analogous descriptions, rather than the linear digital ones of writing. Ivins, Prints and Visual Communications deals admirably with this.

2. Dubery and Willats, Ch. I.

3. It is for instance not as accurate as the first angle orthographic projection with its plan, front, and side views, and while known then, its potentials were only realized and its use became only general during the eighteenth century as the standard descriptive tool for the engineer and the architect.

4. Prototypes are Niccolò di Machiavelli Il Principe (1517), and the idea of individual genius as expressed in Vasari's Lives of the Painters. and later in the North, Shakespeare's Hamlet.

5. The visual cone becomes a pyramid through the devise of rectangular framing.

It is difficult to assess the exact extent to which this 'eye'-'I' equation contributed in the West to an exaggerated anthropocentric consciousness and to what extent this constant, if imperceptible, affirmation of the individual ego was limiting and even detrimental to human social development. Ironically this discovery, which can truly be called humanistic, in the wider sense that it was based on a physiological rational constant to the human race, really assumed a condition of seeing which only the eye of a machine can fulfill totally, and which subsequent developments, as shown, confirmed.

The limitations of the tenuousness of this assumption can easily be demonstrated by staring fixedly and focussed on one word in the center of this page (vanishing point) and then experience how quickly the visual acuity declines to the left and right, above and below, it. The visual angle of foveal vision is exceedingly small and we compensate for this limitation by a continuous and unaware moving/shifting of our eyes within the totality of our visual field, which is roughly, for binary vision, 180 degrees horizontally and about 150 degrees vertically.¹ We further extend that limitation by shifting and turning our head and moving our body (with our head and eyes) in space.²

We further and foremost experience the world visually with two eyes and the resulting different projections of a form, the so-called parallax, considerably informs us about what we are actually seeing. Parallax not only gives us an important distant clue, but also "gives bodies their plastic isolation, since they seem to move in relation to each other".³ Together with our muscular-tactile experience of the

1. James J. Gibson, The Perception of the Visual World (Boston: Houghton Mifflin Company, 1950), p. 27. The classical study in this field and to which I have to give credit in a more general sense than this single point. Also Ivins, Art and Geometry (N.Y.: Dover, 1964), p.2.

2. Experiments with fish-eye lenses confirm incidentally how much we have accepted the framed and static one-eye vanishing point perspective representation and interiorized as the 'right' and the only acceptable form. Most people feel disoriented by a fish-eye lens photograph.

3. Rawson, 217.

world we tend to make sense out of the ambiguities of two conflicting projections. Experiments to accommodate this phenomenon in the form of stereoscopic representation in still photography, so popular in the nineteenth century, and with cinemascope and hologram in the twentieth, while they should represent the height of simulated reality, have by their very decline in popularity¹ shown that our need for images is perhaps less based on the one-to-one relationship of natural space to its illusionary representation.

A more detrimental and determining limitation of this prevalent form of representation is the device of the frame. Perspective construction with its straight line vanishing point holds only for a relatively small angle of vision.² This angle has to be carefully delineated to describe the field in which this projection works.³ The intimate, if discrete, collusion between the center and the periphery (after all, all images do have limits, whether framed or not) are strongly reinforcing each other in their effectiveness of addressing themselves to a specific individual viewer/ego and his receptivity to the image and its meaning/message.

Considering then our society with its voracious need and use of images and the economic fact that the more sophisticated and effective technological tools of imagemaking are expensive, this 'framing' has then

1. Even the recent flood of the relative novelty of 3-D postcards with their sugary and sometimes mildly sexual imagery found in specialty and variety stores and so seemingly limited appeal to a select audience address themselves mostly to a kind of perverted creativity which can sociologically only be explained by the phenomenon of Kitsch.

2. Although wide-angle lenses have increased the angle, they also have departed further from the 'natural' way we experience seeing things and have to be classified as optically corrected forms of partial fish-eye lens views.

3. An easy proof of this fact is to take a preferably large photograph of a modern interior with a number of rectangular pieces of furniture in it and then extend the vanishing orthogonals to their opposite side away from the vanishing point outside the picture where they diverge. With a bit of skill one can complete the scene, and, what is mathematically from the point of projection correct, becomes totally distorted and unacceptable to our perception of 'how things really are', here again in keeping with the rejection of the fish-eye lens distortion.

to be seen as part of an ideological tool as well. Framing is a device capable of excluding more than it includes and very carefully only including that which is thought to be desirable. It should be clear from our own existential experience that this dichotomy more often than not is on diametrically opposing ends of the continuum. The power to direct the visual pyramid and use its formal force of compelling the spectator to identify with the viewpoint taken and further controlling this viewpoint by editing through careful use of the limiting frame (like horse-blinders) is exercised by very few and obviously with very direct behavioural consequences and goals of social, political, and economic nature. The commission of the most prevalent and powerful images and their distribution in large quantities is ultimately in the hands of very few of these new patrons of the art of image making.

If the Madonna served for centuries as a model to women to be clean, well-dressed, chaste, and devoted to Kinder, Kirche, and Kueche, (the domestic kitchen part of the early Merode altar piece to be exchanged for the socially more aspiring goal of the palace of later Madonnas); today's models (!) stimulate our dreams and shape our needs to be rich powerful, sexually desirable, young, smooth, pleasant smelling, symmetrical, and to have the right accoutrements to appear socially acceptable in order to channel our behaviour into appropriate consumer reflexes. This holds not only for advertisement and propaganda per se, but has to be extended, with very little exceptions, to all that is today produced and presented through publishing, advertisement, cinema and television. The artificial distinction between feature or copy and advertisement is simply another framing device. Formally and content wise they are interchangeable and are often indistinguishable from each other.¹

1. A very convincing proof is to look at any issue of Vogue magazine and see how blatantly, feature for feature the same advertisers have their products 'treated' in the so-called copy part; while conversely ads will match the current style of the copy, which is inevitable, since they employ the same models and photographers (and needless to say, the same art directors, lay-out people, and printers). On television it has become second nature to show so-called features with hard drinking, hard smoking, and hard driving heroes and heroines, followed by the sponsors identical product identification. The height of this interchangeability and confusion is reached with the 'endorsement' by famous actors and public figures of specific products: Catherine Deneuve's Chanel endorsement is probably the most enduring example.

Perspective in this context becomes a symbolic form: an image showing us a beautiful young model as seen by the photographer/camera lens from the floor upwards making her appear as above our eyelevel and hence placing her on an implied pedestal to be adored and unreachable like a goddess elicits that response before others and regardless of what is actually sold. Conversely things which are represented below our eyelevel make them seem to appear within our reach; while close-ups confirm this within-our-reach, long shot vistas tend to reinforce our perennial longing for distant and exotic places.¹

At the heart of today's image making is projection, physiologically as well as psychologically, framing, and perspective. The very complex and highly sophisticated technologies make it difficult to penetrate their disguise and those in control of these devices and their uses tend to mystify picture making and obstruct understanding in order to guard their own vested interests. The printed book's primacy as a carrier of meaning was precisely challenged in the late nineteenth century when different countries in the West started to introduce the concept of general literacy in their educational legislation policies. Ironically four hundred and fifty years after the introduction of printing and precisely at the very same time when the invention of photogravure started the proliferation of images. Because of the primacy of images now, it is essential that this concept becomes enlarged into a visual literacy. What better way to start then with the simple proposition Durer made at a time when the syntax of projective space was fully discovered?

1. Berger, 138. The spirit of this critique was stimulated, among others, by Berger's excellent treatment of this subject. There is a growing awareness and critique of our visual culture using formal analysis, particularly in Germany. Indicative of this trend is Hermann K. von Ehmer (ed.), Visuelle Kommunikationen. Beitrage zur Kritik der Bewusstseins Industrie (Koeln, DuMont Aktuell, 1971).



V.

While Durer was on his second visit to Italy in 1506, he wrote from Venice to his friend Willibald Pirckheimer: "... I will have finished here in ten more days; thereafter I shall ride to Bologna for the sake of art in secret perspective which someone wants to teach me ..."¹. Nineteen years later in Nueremberg he published his Unterweisung in der Messung mit dem Richtscheit.²

Durer was the first to publish in German a comprehensive account of perspective construction. There is increasing evidence that a good deal of his calculations were not accurate and that he must have misunderstood his sources.³ This might have been due partly to the fact that the vernacular vocabulary was not sufficiently developed at that time to permit accurate and concise scientific description.⁴ His undisputed truly original contribution might very well be the instrument set-up suggested by the last woodcut in the 1525 edition (and which is reproduced on the previous page). Alberti, whose book Della Pittura Libre Tre might have been one of Durer's sources, implies that he built model rooms to test the workings of his mathematical propositions.⁵

1. Christine Papesch, Durer's Renaissance Evolution and his Theoretical Study "Unterweisung der Messung", in Stoche-Schmid, p. 204

2. It is so obvious, that it is easily forgotten: between his original investigation and final publication Durer bracketed what is one of the outstanding periods in the history of mankind. In this time the active lives of some of the most remarkable men overlapped: Leonardo da Vinci, Michelangelo, Giorgione, Titian, Raphael, Bramante, and the Bellinis in Italy; Gruenewald, Riemenschneider, Cranach, and Durer in Germany; Erasmus, Luther, Calvin, and Machiavelli, in the ideological sphere. A time which found its apogee by 1517 with the advent of the Reformation; the destruction of the Aztec Empire by Cortez; and the Sack of Rome 1525.

3. Ivins, On the Rationalization of Sight, 34. 4. Papesch, 209.

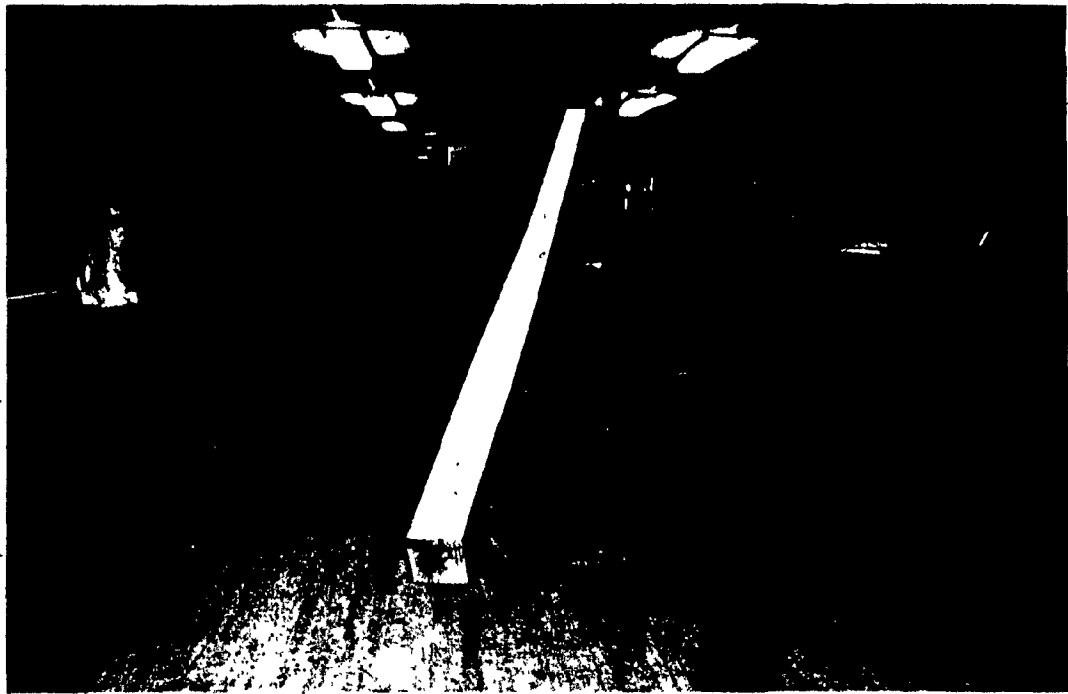
5. It was only during the finalizing of this framing essay that I came across the recent reprint of Ivins, On the Rationalization of Sight. Apart from proving that Alberti must have built working models, Ivins was the only one, to my knowledge, who also actually built scale models. But Ivins' investigations were along Alberti's suggestion of peepshow models of rooms, and not a life-size set-up as suggested by Durer's woodcut.

Based on what I perceive as its focal importance in the understanding of the history of art and visual communications I built and adapted Durer's suggestion to my use. Naturally there is no Renaissance table. The lute I replaced with the functional skeleton of the most prevalent geometric form in today's man-made environment, that of the cube. However, I kept the essentials of the upright (picture/window) frame with its hinged door. I cut two parallel grooves into the inner circumference of the frame to permit two thin dowels to be wedged into variable positions to act as co-ordinators fixing the intersection of the individual visual ray/string as it passes through the picture plane. My major modification was the taking of the eye/hook off the wall and making it free-standing. This allows the spectator/student to experience/see the visual pyramid¹ and perceive the intersection of an object by the picture plane. Even more important, it allowed me to exchange the eye for the lens of the camera. A still camera was placed into the position of the eye piece resulted in the objectification of the six sequential photographs (presented at the beginning of this essay), similarly a television camera was so placed for the recording of that process on video tape.

1. By strict experimental standards both the set of still photographs as well as the video tape contain deviations from exactitude, which, I suspect, would normally not be acceptable. If the demonstration was correct; however, most of it simply could not be seen or understood. For instance, the relatively thick white string bends, because of its weight, into a slight, but very visible curve. By laboratory standards it should, like the visual ray it represents, be absolutely straight, in which case it would appear from the eye point view as a dot. The dot would make as little sense as a thinner string (which could be pulled tauter) since it would not show at all: neither the photographic grain nor the lines on the television screen would register any perceivable image of it.

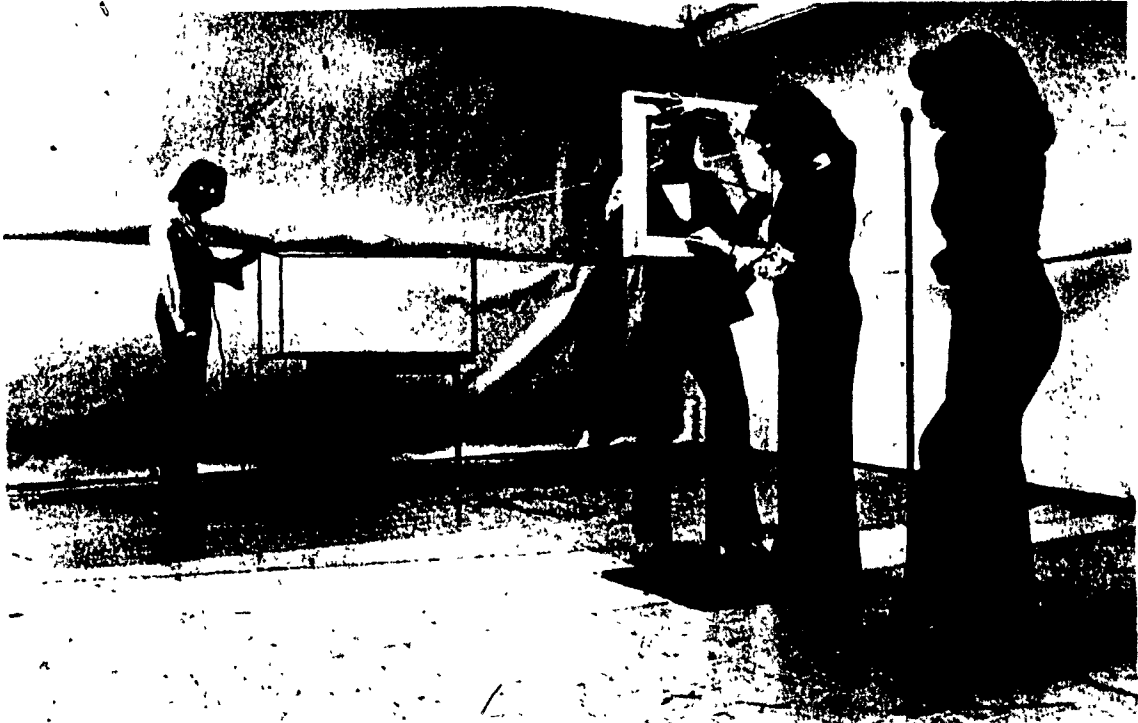
In the still photographs I likewise retained the irregularities in tone and width between the pencil line, the feltmarker, and the black tape: corresponding adjustments, while technically possible, would have prevented any 'real' reading of what was actually photographed and hence would have failed to induce understanding.

In that sense it is perhaps paradoxical to use means of projection in order to demonstrate how projection works. But then my real thesis is neither the photographs, the essay, or the videotape: like any other art form these act only as the tenuous support to the immaterial idea.

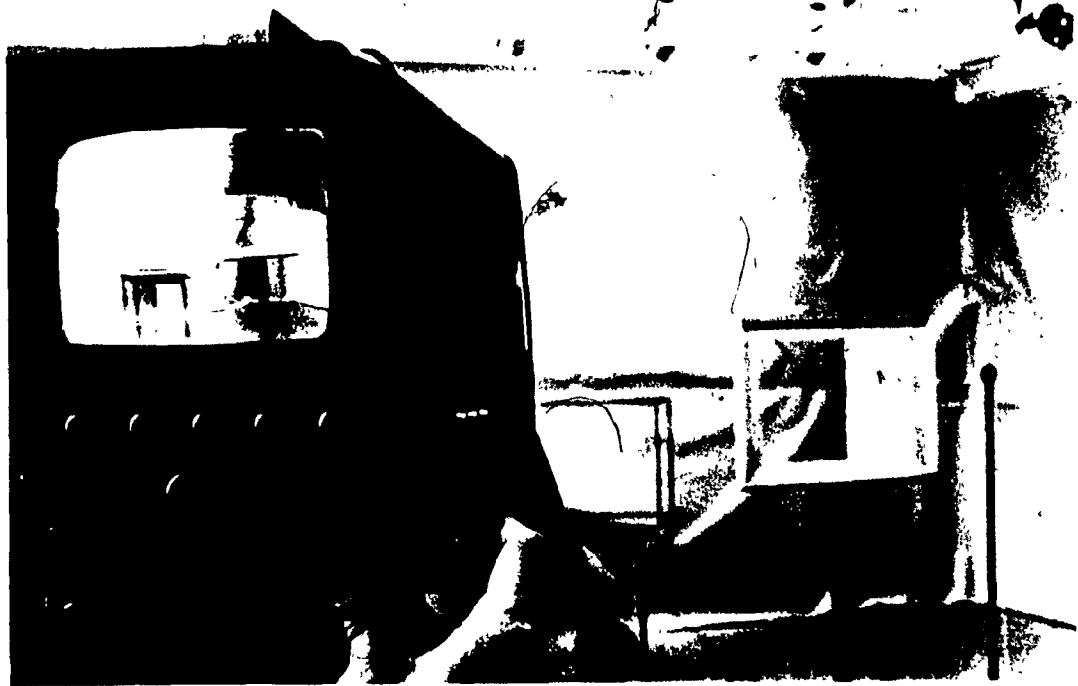












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