Anamorphosis and the Eccentric Observer (parts 1 and 2)


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**Hans Holbein the Younger** (1497/8-1543), Dutch
'The Ambassadors'
Jean de Dinteville and Georges de Selve, 1536

notes: The figure floating in the foreground of the main painting is an anamorphic projection of a skull. The "corrected" image of the skull (image at right) can be seen by positioning yourself at an oblique angle relative to the right side of the picture plane.

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an-a-mor-pho-sis: 1. a drawing presenting a distorted image which appears in natural form under certain conditions, as when viewed at a raking angle or reflected from a curved mirror. 2. the method of producing such a drawing. 3. Zoology, Entomology. the gradual change in form from one type to another during the evolution of a group of plants or animals 4. (in certain arthropods) metamorphosis in which body parts or segments are added to those already present.

--from Random House Dictionary

_In vain your image comes to meet me_
And does not enter me where I am who only shows it
Turning towards me you can find
On the wall of my gaze only your dreamt-of shadow

I am that wretch comparable with mirrors
Than can reflect but cannot see
Like them my eye is empty and like them inhabited
By your absence which makes them blind. [1]

--Contre–chant, Louis Aragon

The spectator makes the picture.
--Marcel Duchamp

Abstract

The process known as anamorphosis or anamorphic projection in art is at once a confirmation and a challenge to the rules of linear perspective and the conventions of representation. Discovered in the late fifteenth century, the effect is generally associated with a decentering of the rational subject/object relationship posited by "classical" linear perspective. However, the appearance of the term in recent art historical and psychoanalytic literature suggests a role beyond perspective theory. Used traditionally to depict aesthetic subjects one was reluctant to represent directly—the erotic, the scatalogical, the occult, the religious, and the philosophically abstruse—this "inverted use of perspective" is of interest today both for its metaphorical significance and the insights it provides concerning the recent literature on the construction of the "gaze." In the essay following, particular emphasis is placed upon the role of the viewing subject actively observing the anamorphosis to introduce what the author describes as the "eccentric observer." The range and variety of anamorphoses in art is discussed using both historical and contemporary examples— as well as artwork by the author.

Historical and theoretical background

The appearance of anamorphosis as a consciously applied technique in the history of art is nearly simultaneous with the invention of linear perspective. The early fifteenth century saw both the discovery of linear or "classical" perspective by early Renaissance artists and architects such as Filippo Brunelleschi and Leonbattista Alberti, and, subsequently, a variety of alternatives and challenges to the careful mathematical order posited by such systems of representation. In the case of anamorphosis, its curious effects were first understood and explored by Leonardo Da Vinci who included anamorphic drawings of a child's head in his
Anamorphic projection seeks to deny the usual conventions of "looking" where an observer views an image frontally from a limited range of viewing angles. It is a technique of disruption, distortion, and "eccentric" viewing. However, any explanation of its mechanisms necessarily begins with a discussion of classical perspective. It is an effect that is explained by--but seeks to undermine--classical methods of perspectival representation. An image subjected to this class of perspectival distortion still depends upon a classical (Euclidean) paradigm: light travels in straight lines; when light reflected from an object intersects a planar surface--be it a pane of glass or Alberti's gridded "velo"--an accurate representation of the source object can be described. The crucial difference from classical perspective is that an observer positioned to receive the undistorted view of an anamorphic image would be at a radically oblique angle to the picture plane--and, not incidentally, have one eye shut to overcome the corrective effects of binocular vision. This monocular, self-conscious gaze--exaggerated proof of the "cone of vision" that explains classical perspective--presumes a subjective, eccentric view point that reinscribes the source of vision in the physical body.

The Eccentric Observer and Subjective Viewing

The gymnastics necessary for the successful apprehension of the anamorphic image casts the observer in an active role in which the conventional relationship to the object of vision is literally thrown "off-center." To observe anamorphic images, one must be an "eccentric observer," that is, an observer who is not only a bit "eccentric" in the usual sense of the term (i.e. "strange")--but an observer who is willing to sacrifice a "centric" vantage point for the possibility of catching a glimpse of the "uncanny" from a position off-axis. While the term "eccentric observer" could be viewed as an elision of Arnheim's terms "eccentric" and "centric" (which he employs to describe "compositional forces" at work in visual art), I am suggesting the "eccentric observer" as, simply, an alternative to the usual model of a viewer occupying a central position with respect to the material world. An eccentric observer is exactly the observer of the anamorphosis, an observer who literally "stands apart" and is self-aware of the process of seeing. The vantage point of the eccentric observer is not a refutation of a "centric" viewing position--in point of fact, it is its shadow. It is the flip-side of the classical construction of vision in which the viewing subject stands at the node of a homolographic, mathematically coherent universe. The traditional "centric" view is represented by Arnheim who writes in The Power of the Center:

Perceptually a person is a viewer, who sees himself at the center of the world surrounding him. As he moves, the center of the world stays with him. Considering himself the primary center, he sees the world populated with secondary objects, eccentric to him. Looking at a sculpture means sending out a vector toward that object: seeing is a manipulation of the object on the part of the viewer. But here again the dynamics of any center operates reciprocally, in both outer-directed and inner-directed ways. The work of art sends out its own vectors, attracting and affecting the viewer. In fact, the power of the work can become so strong that it is no longer simply an eccentric target. It takes over as the primary center, seemingly governing its own structure, independent of the viewer, who has become immersed in the object, oblivious of his own outer
While not eager to contradict Arnheim, I would suggest, at the moment that the artwork or object of vision "takes over as the primary center," the person viewing is no longer the center of the world. An observer "oblivious of his own outer existence" is neither an observer "at the center" nor an observer who is a participant in the construction of meaning. My use of the term "eccentric observer" suggests a viewing subject who not only acknowledges the oblique and contingent nature her "point of view", but who also realizes that the full appreciation of aesthetic objects stems not from "oblivion" (that is, literally, a "forgetting") but from playing an active role in the "creation" of the aesthetic object. This issue will be addressed in due course.

In viewing anamorphic images, the mechanics of vision become foregrounded in a subject/object relation that is no longer bounded by typical conventions of "looking." The eccentric observer takes up a position that is at odds with the usual perpendicular station-point; a comfortable binocular world view is traded in for a "cyclopean" view; and, in the case of two-dimensional anamorphoses, the sanctity of the picture plane (that window on the painter's universe) with its precise (usually rectilinear) edges and controlled depth-of-field is reduced to a fuzzy trapezoid. To view an anamorphic image is to attempt to transform an oblique or non-uniform focal plane into a coherent, two-dimensional image. By virtue of a certain willingness to take risks coupled with the necessity of observing one's own internal processes at work, the eccentric observer--as well as the act of viewing itself--become implicated in the dynamics of the art work. Viewing anamorphic images reasserts that the construction of vision is a dynamic, reflexive, and self-critical operation.

These observations concerning anamorphic projection and its appreciation find echoes in the somewhat limited literature on the subject. In the introduction to the catalog of an important exhibition entitled Anamorphoses: Games of Perception and Illusion in Art (1975), the curators write: "Anamorphoses are an extreme example of (a) subjectivization of the viewing process. The observer is first deceived by a barely recognizable image, and is then directed to a view-point dictated by the formal construction of the painting." The etymological origin of the word--from the Greek ana (again/against), morphe (shape/form) suggests to the authors that "the spectator must play a part and re-form the picture himself." [5]

The particulars of vision at work in the apprehension of anamorphic images, I would submit, fall under the larger heading of "subjective vision"--an argument that takes into account the pyscho–physiological make–up of the observing subject. The notion of subjective vision was explored by many nineteenth century theorists such as Goethe and Schopenhauer, but a number of recent theorists have given it renewed attention. Columbia art historian Jonathan Crary writes in his recent work on the nineteenth century observer, for example: "subjective vision is distinctly temporal, an unfolding of processes within the body, thus undoing notions of a direct correspondence between perception and object." [6] Subjective vision and the notion of the eccentric observer might also serve to expand the definition of the "gaze" (i.e., visual desire) beyond the contemporary understanding of its use as an instrument for (male) control and possession. Craig Owens's discussion of Barbara Kruger's photo–montage, Your Gaze Hits the Side
of My Face, 1981 (in which the title is collaged over an image culled from a '50s photo-anual of a stone female bust) exemplifies this linkage of the gaze to questions of male identity and behavior. Owens asks the question: "...is she not speaking...of the masculinity of the look, the ways in which it objectifies and masters?" [7] Owens's query is timely and appropriate, but it begs the question of what role the gaze and subjective vision play when the viewing subject is redefined as eccentric, mobile, and possibly female. Subjective vision reacts against diagrams of the gaze that map the spatial logic of the world, but exclude the body of the observer. Kruger and Owens succeed in naming the viewing subject. The project now becomes one of redefining who does the viewing. The history of art is full of examples that empower particular viewing subjects at the exclusion of others. What ostensibly began as an attempt to render the perfect perspective of an unseen creator may have been, in point of fact, an elegant method for endorsing particular visions of power and prestige. In discussing the "Cartesian perspectivalist tradition" inherited from Alberti and other renaissance theorists, for example, U.C. Berkeley historian Martin Jay writes:

> The moment of erotic projection in vision—what St. Augustine had anxiously condemned as "ocular desire"—was lost as the bodies of the painter and viewer were forgotten in the name of an allegedly disincarnated, absolute eye. Although such a gaze could, of course still fall on objects of desire—think, for example, of the female nude in Durer's famous print of a draftsman drawing her through a screen of perspectival threads—it did so largely in the service of a reifying male look that turned its targets into stone. [8]

Part of the attraction of anamorphosis is precisely its ability to bind the viewing subject to the object of the gaze. Ironically, the eccentric observer, immersed in the subjective autonomy of her own body, perceives a virtual object that insists upon invading the space of the viewer. This is the inverse of classical perspective where rays emanating from a (usually) "disembodied" eye define the space of the painting, ultimately converging at one or more vanishing points.

To dwell in the body of the eccentric observer is to participate in a subtle kind of phenomenology. Certainly "to observe" is to privilege the human apparatus of vision, the eye. But how easy it is to forget that the eye is embedded in a complex array of sensation and feeling called the human body. This body proceeds by a logic of its own—responding to touch, temperatures, olfactory and gustatory invitations, sounds, and, most importantly, kinesthetics. It is this latter process—an inspired response to the inertia of the earth-bound self which could only be called a love of movement—that characterizes the human species and guarantees the ceaseless shifts in our point of view. Sight then is never context free. Even before confronting the multiple horizons constantly presented to the gaze, the eye is conditioned by the emotional balance, the mental state, and the relative fatigue or energy of the observer.

Still, it is the eye of the eccentric observer, while skewed with respect to the picture plane, that becomes the primary nexus through which the perspectival lines of construction pass on their way to the brain. Arnheim is sensitive to the problems of vision encountered when an observer does not occupy a perpendicular position with respect to the object of the gaze. He touches upon the
"difficulty" of this dynamic in a discussion of sight lines in traditional theater and painting:

The difficulty is caused by the disconcerting fact that we look at our world sideways. Instead of facing it as detached viewers, we are in it and of it, and we therefore see it partially and from a private perspective. Our view interprets but also misinterprets our position in the world, a dilemma resulting from the ambiguous function of the human mind. In a typically and perhaps exclusively human way we participate actively in our world while at the same time trying to view it with the noninvolvement of an observer. [9]

Besides accurately characterizing the ambivalence that every observer must feel when confronted with an (aesthetic) object, the statement alludes to problems that have been confronted by theorists from linguistics and literary criticism—namely, the "divided" nature of "reading" an aesthetic experience.

The Eccentric Observer as "Reader"

Consider for a moment a typical subject/object relation where the role of the observer is constructed as follows: the observer's (the subject's) gaze (that invisible connection between an observer and the observed) is directed—or rather focused—upon a given object (an apple or a painting—it doesn't matter). The observer, in focusing the gaze upon the object, "creates" the object—or, at least, renders it visible. The object becomes a kind of repository for the gaze—or what Jacques Lacan calls "a trap for the eye." Still, there is no guarantee that the object will feature as the locus of attention. There is not any determinate or obvious connection between the "object of the gaze" and the chaos of images that fill an attentive mind.

After a certain relationship between the observer and the object has been framed, the observer still occupies an elastic position with respect to the object. The seductiveness of an image (in a painting, for example) would cause the traditional observer "to lose" herself to the demands of "an aesthetic experience." For the "eccentric" observer, however, certain associations or body-felt realities registered by the observer have the potential of shifting the "subject" of the exchange to the identity of the observer. (One could argue in such cases that the observer, not the object, is undergoing change—in a phrase, coming into being.)

It may be instructive to turn briefly to an analogy from literary theory where the relation of "reader" (an analog to our "observer") to a given "text" (the "object" of attention) has stirred considerable debate. Jonathan Culler posits a kind of guarded dualism between the reader and the text in his book On Deconstruction:

For the reader the work is not partially created but, on the one hand, already complete and inexhaustible—one can read and reread without ever grasping completely what has already been made—and, on the other hand, still to be created in the process of reading without which it is only black marks on paper. The attempt to produce compromise formulations fails to capture this essential, divided quality of reading. [10]
And, quoting, Sartre, Culler instructs us that "for the reader everything is to be done and everything is already done." [11] Roland Barthes goes a step farther and declares "The Death of the Author." While I would pull back short of such pronouncements, the contributions of Roland Barthes to an understanding of the dynamic role the "reader" plays in the construction of a work can not be underestimated. Barthes, in discussing "the total existence of writing" issues a polemic:

A text is made of multiple writings, drawn from many cultures and entering into mutual relations of dialogue, parody, contestation, but there is one place where this multiplicity is focused and that place is the reader, not, as was hitherto said, the author. The reader is the space on which all the quotations that make up a writing are inscribed without any of them being lost; a text's unity lies not in its origin but in its destination. [12]

If our analogy to reading holds, any engagement of the senses--particularly the sense of sight upon which we are focusing here--would require an active response from the percipient to be registered as significant. In the act of observing works of art (or any other class of objects worthy of our attention) it would seem essential to acknowledge that the observer not only "creates" the object by virtue of her directed gaze, but creates the "self" by virtue of engaging, what for the observer, are "significant" objects. Art Historian Donald Preziosi has commented on the necessity of a viewing Subject who engages a process of differentiation in order to locate the self in a "signifying practice." He writes in his recent book, *Rethinking Art History*:

The process (of differentiation) consists of marking out separations between (the Subject) and his surroundings so that he may find himself a place in the signifying chain. In Short, the Subject must recognize himself in the organizing structures of the signifying chain. The place one assigns oneself in knowledge is what makes possible communication and meaning. [13]

Understanding this experience is dependent upon a variety of considerations, e.g., assumptions concerning the "authority" of the object or the message it contains; the capacity of the observer to "read" either the significance of the object in question or to bring an interpretative richness to the experience; the constantly shifting character of both the "state" of the object (as well as its context) and the "status" of the observer, any or all of which may be used to argue the dominant or subservient role played by any aspect of the subject/object relation.

Let us telescope the problem into a couple of examples. Consider for a moment the role of the object if defined as a simple mirror. The gaze of the observer in this case will seldom settle upon the mirror as object, for the simple reason that the mirror acts to reproduce (albeit virtually) the observer. Its action upon the observer constitutes an invisible intervention in which an equivalence is posited between the observer and the image of the observer. In such cases of "invisible intervention" (any instantaneous one-to-one correspondence between an observer and her image could qualify as such), the object is rendered "absent" and the identity of the observer is multiplied. Hence the attraction of mirrors: they render
the observer as subject even while deflecting attention from their own "mirrorness" or objecthood. [14]

Conversely, imagine the richness and complexity of the altar of a baroque cathedral. Here, the seduction and authority of this particular combination of objects necessarily places the observer in a subservient position. The "subject" of such an exchange, for the believer, can only be the didactic and normative messages encoded in the object of her gaze. Critical interpretation is neither encouraged nor warranted. For the observer to enter into an analysis of what she is experiencing, or to allow the self or the relationship of self to Other to become the "object of attention" is to explode the intentionality of the altar and the larger experience of the architecture. Martin Jay, in discussing "baroque vision", tells us that "we might wonder about the celebration of ocular madness, which may produce ecstasy in some, but bewilderment and confusion in others....(The) phantasmagoria of baroque spectacle was easily used to manipulate those who were subjected to it." [15]

While it is indeed attractive to embrace a hypothesis that states unequivocally that "a text's unity lies not in its origin but in its destination" (Barthes), it is also important to recognize the inertia still extant in certain dynamics between "an observer and the objects of her gaze." A deep investment in a particular way of seeing---resulting in the "single 'theological' meaning (the 'message' of the Author–God) discussed by Barthes--- will not go away simply because we declare it obsolete. A process of critical engagement by active observers will, on the other hand, help to begin the difficult project of deconstructing those one-eyed regimes built upon singular assumptions about the proper "point of view."

Beyond the attractions of mirrors, altars and semiotic theory, the problem for certain artists (those dreaded "authors" who continue to make work despite their demise in the late sixties...) has been how to reinforce the identity of the observer while encoding observer-directed messages (celebratory, critical, propagandistic) in the form of an object that is very much "present." One solution was arrived at by Minimalist sculptors who managed to suppress the referential and informational aspects of the object to such a point that the question of "what is it?" (the usual perceptual trap) was replaced by "what am I seeing/experiencing?" Such a tactic re-focused attention away from the object-qua-object and towards the relationship of the observer to the object. It is in this new-found relationship that issues such as observer position, context, and the phenomenology of materials become foregrounded in considerations as to what an object might "mean."

**The Illicit Key-hole**

The absolute specificity of the position of the observer (or mediating device) necessary for the appreciation of anamorphic projections privileges a single viewpoint—a view point that is "special", fleeting, and perhaps difficult to attain. This is not the stuff of mass media. Nor, given the inherent awkwardness of viewer position, does anamorphosis lend itself readily to casual contemplation, let alone meditation. It is not the kind of image you can dwell upon; rather, it is like something seen out of the corner of the eye, or glimpsed at high speed, or seen through a key-hole. As a result, any content or image buried in the anamorphosis seems (to borrow another word from recent literary criticism) "uncanny," perhaps even illicit.
The effect has been widely used to surreptitiously depict "subjects" one might otherwise be reluctant to represent: the erotic, the scatological, the occult, the religious, the politically controversial, and the philosophically abstruse. [16] While the use of anamorphosis for more conventional subjects is well documented (see Balthrusitis et al), this "secret discourse" is ideally suited for the depiction of difficult or illicit subject matter. [17] The fact that the anamorphosis is hidden, only occasionally revealed—the unexpected view of something private from an unwittingly privileged point-of-view—places it a category of experience that is at once magical and taboo. Why magical? Because magic is but the power to control one's perception of events—now you see it, now you don't. And why taboo? Because there are few models of vision that explicitly place the percipient in the role of creating her own experience. Such a case stands outside of the "normal" ways art events are received in which the percipient is implicitly defined as a passive consumer of a fully articulated aesthetic object. Marcel Duchamp certainly understood the perverse excitement (and the boredom) of the eccentric observer and the frisson generated by the privileged view: Consider his last, great work, Given: 1. The Waterfall, 2. The Illuminating Gas (1946–66) in which an eroticized, mildly anamorphic and androgynous nude can be seen only through peep holes cut into a crude doorway. In this work the viewer occupies the vantage point of a "voyeur" who must commit (to) the act of seeing. [18]

The taboos on sensory indulgence cut across the entire sensory apparatus and are one of many ways we unconsciously animate everyday speech. One steals a glance, sneaks a kiss, cops a feel, catches a whiff, overhears a remark—all for what? To heighten the effect of sensory experience. The classic example, of course, is that of the voyeur who actively seeks an illicit point-of-view in order to heighten sexual experience. More interesting perhaps is Roland Barthes' notion of a "gape in the garment"—that which, for an instant, frames a view that is similarly illicit, slightly taboo, and, therefore, completely erotic. Barthes writes in The Pleasure of the Text (1975):

Is not the most erotic portion of a body where the garment gapes?...it is intermittence, as psychoanalysis has so rightly stated, which is erotic: the intermittence of skin flashing between two articles of clothing... [19]

In his Structuralism and Semiotics (1977), Terence Hawkes offers an outline of Barthes distinction between the "writerly text" and the "readerly text" that gives an idea of the active role Barthes envisioned for the reader. The "writerly text," according to Hawkes, "gives the reader a role, a function, a contribution to make; the "readerly text renders the reader idle or redundant, 'left with no more than the poor freedom either to accept or reject the text' (Barthes, S/Z, p. 4) thereby reducing him "to that apt but impotent symbol of the bourgeois world, an inert consumer to the author's role as producer." [20] Hawkes goes on to quote Barthes's description of the "writerly text" at length—a text we shall see involves "two kinds of pleasure":

Text of pleasure: the text that contents, fills, grants euphoria; the text that comes from culture and does not break with it, is linked to a comfortable practice of reading.

Text of bliss: the text that imposes a state of loss, the text that
discomforts (perhaps to the point of a certain boredom), unsettles the reader's historical, cultural, psychological assumptions, the consistency of his tastes, values, memories, brings to a crisis his relation with language. [21]

Do not certain sensory events—apart from language—produce similar effects? Couldn't we speak of the "image" or the "taste" or the "smell" or the "sound" that "contents, fills, grants euphoria" or "imposes a state of loss," etc.? More specifically, is not the experience of an anamorphic projection a kind of "text of bliss"—an image that literally requires the "loss" of the previous reading to be seen; an image that physically discomforts the viewer by the awkwardness of its vantage point; an image that flies in the face of conventional rules of taste and design; and finally an image that ignores the usual assumptions about perception and appreciation and "brings to a crisis" a viewer's relationship with the art experience? Though nothing more than a tool for the artist, anamorphosis can provide the impetus for precisely this kind of rupture in the "text" and lend to the reader/observer a special role, an active function—in a word, an identity.

Peeling the Anamorphic Onion

Admittedly, this "identity" may be only a projection of the artist. Still, we can ask the question (tongue in cheek): "what do observers want?" Given the fact that one set of operations (e.g., paint spread upon a support) can lead to quite different interpretative ends, the question of a hierarchy of interpretation is raised. Is one "reading" more accurate, more astute, more desirable? If the "text" really is "a tissue of quotations drawn from the innumerable centres of culture" (as Barthes declares) our observer has her work cut out for her. Certainly, if an observer failed to "find" the iconic rendering buried within the distorted lines of the anamorphosis, the possible interpretations become limited to the metaphorical meanderings possible from half the information. Assuming an observer unlocks the various possible ways of engaging the piece—materially, symbolically, metaphorically, etc.—is it fair to say that to glimpse the image behind the distorted projection is to render other meanings secondary? It is true that the anamorphic image, seen only obliquely and through one eye, tends to elevate every distortion, every abstracted, non-objective gesture to a new plane—one in which meaning is not merely a function of interpretation but hinges upon, literally, point-of-view. (Of course, to question the viability of one's vantage point is to already function beyond simple interpretation. One needn't become involved with anamorphosis to understand this…) But as we have suggested the process is a dynamic and ever-changing one. One doesn't leave the room with one idea—rather, one leaves the room (perhaps repeatedly) with many ideas, some of which are in conflict. In discussing the "anamorphic" qualities of the Athenian akropolis, Donald Preziosi writes:

Any articulated intervention into a given visual environment induces altered relationships among such elements, causing them to be re-narrativized or reread: to be seen differently. What results is a picture of a visual environment as a dynamically unfolding, fluid, rhetorical stage, filled with revelations and occlusions, lucidities and undecidabilities. All tableaux are momentary and transitory; any genius loci is migratory, always subject to critique. Meaning is continually subject to displacement and deferral, and subjects are always subject
to such displacements and migratory fixities: subjectivity, like objecthood, is a fictitious fact; a dialectical and ideological negotiation, a provisional homestead. [22]

Preziosi’s remarks notwithstanding, it may well be important to consider whether the extended range of possibility offered by the use of anamorphosis—or any other technique that addresses the dynamic and subjective character of the Subject—is sufficient to justify re-thinking the way in which works of art are encountered. The importance of recognizing the processes involved in perception and appreciation is discussed by Arnheim in his seminal work Visual Thinking (1967) in which he considers the viewing subject’s ability to find "the appropriate range of a problem as almost tantamount to finding its solution." [23]

What status do our conventional categories of observer and object possess when applied to anamorphic projection? As the question of "what is it?" is only answered by occupying a particular vantage point, the usual leap into the seduction of recognizable imagery or narrative concern is deferred. The observer must necessarily encounter the anamorphosis as something elemental—materials on a surface, a skin perhaps. These materials strain in the mind's eye to engender meaning—but if anything presents itself, beyond paint and process, it is usually a kind of abstracted metaphor or symbol. It is only when the observer occupies the "correct" position relative to the anamorphosis—peeling back that final layer—that the "secret" identity of the object is learned. This sequence of perception, in effect, reverses the pattern of "reading" a conventional representational work of art where the recognition of an image is followed first by a consideration of metaphorical or symbolic intention and finally by an analysis of the materials and processes employed by the artist. This is not to suggest that perceiving and appreciating works of art can be reduced to a linear procedure. In fact, there is a cycle of reading that often occurs when encountering works of anamorphic art that involves a return to the "traditional" vantage point. This return is enriched by the journey of the observer through a range of (either) actual or metaphorical repositionings in which multiple and conflicting views concatenate to create a larger effect. This is not unrelated, I expect, to how other "tricks" employed by artists—anthropomorphism for example—operate to complicate and deepen the reading of the work. The appreciation of anamorphosis in art is also akin to works of art involving extreme degrees of abstraction in which materials, techniques, or formal devices dominate the initial reading of the work. This analogy holds despite the fact that the anamorphosis may contain highly specific representational imagery. If I look at a traditional representational painting—a still-life painting by Chardin, for example—in all likelihood I will perceive the objects being represented by the artist before attending to the qualities of paint or the formal devices that organize the picture. Typically, in approaching an anamorphic projection, an observer will have already considered the metaphoric and material aspects of an image previous to "closing down" before any particular recognized image. While it is clear enough that appreciating any work of art can not be boiled down to a predictive sequence, it needs to be acknowledged that works involving anamorphosis necessitate a surprising—and perhaps broader—range of responses from the observer.

As a case in point, consider this lively description offered by Lacan regarding the process of discerning the anamorphosis (a distorted skull) in Holbein’s famous
painting The Ambassadors (see figures 1 and 2) [24]:

What, then, before this display of the domain of appearance in all its most fascinating forms, is this object, which from some angles appears to be flying through the air, at others to be tilted? You cannot know--for you turn away, thus escaping the fascination of the picture.

Begin by walking out of the room in which no doubt it has long held your attention. It is then that, turning around as you leave--as the author of the Anamorphoses describes it--you apprehend in this form....What? A skull.

This is not how it is presented at first--that figure, which the author compares to a cuttlebone and which for me suggests rather that loaf composed of two books which Dali was once pleased to place on the head of an old woman, chosen deliberately for her wretched, filthy appearance and, indeed, because she seems to be unaware of the fact, or, again, Dali's soft watches, whose signification is obviously less phallic than that of the object depicted in a flying position in the foreground of this picture. [25]

This is a process that demands an active (yes, and eccentric) observer. By actively engaging in this (hermeneutical) process, in which the subject stands on par with the object, the identity of the viewing subject is reinforced and reaffirmed. Far from "losing" herself in the art experience, the observer of the anamorphosis---or, more exactly, the participation of the viewer---becomes a significant feature of the exchange. What is the nature of this "participation" and why should it interest us?

An Oblique Look at Jacques Lacan and Psycholanalytic Theory

There is a reason for introducing psychoanalytic theory at this point in the argument. But let us quickly retrace our steps: I began by briefly describing classical perspective theory which posits a symmetrical relationship between the observing subject and the object of the gaze. I then argued for the primacy of an observing subject (in my terminology, the eccentric observer) rooted in a "subjective vision" of the world. Proceeding from theories of vision, an analogy between visual perception and reading was made. Here the "divided" character of reading described by Sartre and others was invoked to suggest that visual appreciation depends upon active "observing" (a kind of "reading") rather than passive "looking." If one agrees that the problem of viewing (aesthetic) objects ultimately hinges upon the role played by the observing subject (a particular "point of view"), one may conclude that the literature of psychoanalysis would be of some interest. In the work of the French neo-Freudian, Jacques Lacan, several of these diverse threads come together (or perhaps unravel...).

Jacques Lacan in The Four Fundamentals of Psycholanalysis interprets the anamorphosis in The Ambassadors first as a phallic image (when encountered head-on), then as a skull (the image "buried" in the anamorphosis), and finally as "a trap for the gaze" in which the observer "apprehends" herself--that is, sees herself seeing herself. He likens this self-reflexive act to the turning inside-out of the finger of a winter glove, in which the fur that was once the exterior surface

What this suggests—and what the experience of anamorphic projections (and certain other "classes" of perceptual illusion) tends to bring out—is that the functions of perception are never simply about negotiating the physical world; rather, they are about the apprehension—and the making—of the self. When an observer gazes upon the world of things, the "self" of the observer is not "lost" in the construction of the object; instead, the observer is brought into being as a function of the gaze.

Lacan sees the viewing Subject—our observer—as simultaneously negotiating an outside world structured as a system of signs and an inside world controlled by certain primordial anxieties. "The unconscious is structured like a language," says Jacques Lacan, at the beginning of one of his "Seminars." "Language" for Lacan becomes a metaphor useful in revealing the psychological processes of the Subject.

Lacan's contribution to psychoanalytic theory exists less as a series of clinical "proofs" (though he was a practicing psychoanalyst throughout his career) than as a "philosophy" of psychoanalysis. His most revolutionary insights concern how meaning is produced. According to Ellie Ragland-Sullivan, a Lacanian scholar at the University of Illinois, "he taught us that consciousness is not consciousness of something, but is a mode of perception that negotiates unconscious desire and repression by substitutions...: one substitution being language itself, and another being meaning.

A "neo-Freudian" (with certain major provisos), Lacan's project involved reinterpreting Freud's four fundamental concepts of psychoanalysis. Drive appears in Lacan as a combination of need, desire, and demand. The unconscious becomes the "discourse" and desire of the other. Repetition is a key to personal "identity." Transference sets the unconscious in motion through "specular" relations.

The starting point for Lacan is the mother-infant dyad. Up until the about the eighteenth month the identity of the baby is still inextricably linked—is at one—with the mother, the primary provider of physical and psychic sustenance. In this pre-literate stage the baby has not yet experienced the apprehension of self—the dawn of independent consciousness—that will allow it—require it—to acknowledge a difference between the self and the Other (in this case, the mother). The unity of the self at this stage, for Lacan, is symbolically represented by the Phallic signifier. At the moment the baby achieves a sense of self—a complex process of self-awareness that Lacan discusses in the pre-mirror stage and the mirror-stage—the Phallic signifier (the baby, irrespective of gender) is symbolically Castrated, that is, literally and figuratively split from its unifying sense of self. In the ensuing efforts to re-gain the paradise lost at the breast of the mother, the infant substitutes symbolic and cultural functions (such as language) in compensation for the loss of the primary, unitary self.

Ragland-Sullivan writes: "Lacan has argued that the body experiences the psychic pain of division and alienation (which the impact of separation first caused) as Castration or primordial anxiety. This drama gives rise to the use of language as..."
substitutive energy (secondary libido), in compensation for repressing a primordial Desire for constancy or Oneness (primary libido).” [32] Elsewhere she writes, "...the phallic injunction to separation or differentiation creates repression by pushing an infant into the world of language." [33]

Let us return to the anamorphosis in the Holbein painting. For Lacan, the glimpse of "death's head" in the painting would be more than simply a "secret perspective" revealing a (clitched) momento mori; rather, it would be a mnemonic device providing insights into the primordial realm. Witnessing the anamorphosis, several "readings" occur simultaneously: the memory of the phallic signifier; the dislocation or removal of the self from the "proper" viewing position at stage center—that is, a re-enactment of the primordial anxiety of Castration; and finally a view of the void, that is, of death itself. But the special excitement created in the apprehension of this death's head is the knowledge that only one very much alive could unpeel these multiple layers.

Lacan's theories are, needless to say, controversial. In recent years his work has come increasingly under attack by everyone from strict Freudians to radical feminists. Still, even his detractors would admit that his project does build a kind of bridge between, say, a phenomenology of the body (e.g., the "lived body" of Maurice Merleau-Ponty) and the dis-embodied abstractions of linguistic theory. The central roles he affords the terms "phallic signifier" and "castration" may be off-putting until one understands the multiple significances of such terminology; it is really in between the layers of reference that the spirit of his work resides.

Lacan writes in his essay, "The Freudian Thing":

A truth, it must be admitted, is not easy to recognize, once it has become accepted. Not that there are established truths, but they then become so easily confused with the reality that surrounds them that no other artifice has yet been found to distinguish them from it than to mark them with the sign of the spirit, to pay them homage, to regard them as coming from another world." [34]

Irrespective of the reception of Lacan's larger theoretical position, his treatment of anamorphosis as an attempt to explain the complex relationship of the observer to the problems of vision, specifically in the construction of the gaze, has stimulated discussion by several authors since the first version of this essay in 1987. I need to stress that with Lacan we have left the "perceptualism" of classical modern art history (Gombrich, Arnheim et al--See Norman Bryson here in his book Vision and Painting) and are looking at anamorphosis as a kind of metaphor for the de-centering of the self through the experience of art (or, in the case of Lacan, psychoanalysis). Norman Bryson, in discussing the anamorphic skull which cuts across and disrupts the logical field occupied by Holbein's ambassadors, makes a clean analogy between the visual world of painting and the language of Lacanian psychoanalysis:

The effect of this insertion of the screen, or skull, or scotoma, is that the subject who sees is no more the center of the visual experience than the subject of language is at the center of speech. . . . It may be the case that I feel myself to inhabit some kind of center in my speech, but what decenters me is the network of language. . . Psychoanalysis is that experience of speaking on the field of the
other. The analysand does not stand at the center of control over these motions of the signifier; he or she is more like their bewildered observer. Lacan's analysis of vision unfolds in the same terms: the viewing subject does not stand at the center of a perceptual horizon, and cannot command the chains and series of signifiers passing across the visual domain. Vision unfolds to the side of, in tangent to, the field of the other. And to that form of seeing Lacan gives a name: seeing on the field of the other, seeing under the Gaze. [35]

While Bryson finds Lacan's account of visuality as "historically extremely important" he is also disturbed by what he terms "a certain paranoid coloration." He writes: "Let us say that it is a bit easier, since Lacan, to think of visuality as something built cooperatively, over time; that we are therefore reponsible for it, ethically accountable. Yet Lacan seems to me, at least, to view the subject's entry into the social arena of visuality as intrinsically disastrous: the vocabulary is one of capture, annexation, death." [36]

In contrast to Lacan's inherently dark world in which a "protest" is mounted to the de-centering of the Subject, Bryson offers the alternative of "acceptance." Using examples drawn from Eastern philosophy and painting, Bryson suggests that beyond the partial displacement of the Subject that occurs in work of Lacan (and of Sartre), a certain strain of thought in the work of the Japanese philosopher Nishida and his follower Nishitani represents a much more radical de-centering of the Subject. Based in the concept of "sunyata"---translated as "emptiness," "radical impermanence," "blankness," and "nihility"--- this conception maintains that the framing processes endemic to Western accounts of perception are artificially imposed and bound up in static readings of culture and history. If visuality in the West is, as Bryson argues, "preserved by an optic that casts around each entity a perceptual frame that makes a cut from the field and immobilizes the cut within the static framework," then this Eastern conception would characterize the object as existing "as part of a mobile continuum that cannot be cut anywhere." [37]

Coda

Anamorphosis serves to throw into relief the perceptual and psychological matrix surrounding works of art. This 'secret perspective' should be viewed less as an assault on the field of vision than as a supplement--a series of oblique nuances, mind-bending vistas, and disturbing cuts in the otherwise uniform, homogenous pattern (of behavior) that we carry both as a comfort and as a burden. It is in these 'wrinkles in the field' that an opportunity for giving expression to those things that stand to the side, that have been literally and figuratively 'marginalized' is found. Anamorphosis is a technique for bringing what still remains outside the field of the gaze into the line of sight and into consciousness.

In part two of this paper, I will trace the modern uses of anamorphosis ranging from the invention of anamorphic (concave sphero-cylindrical) lenses in the early 19th century to contemporary, computer-based anamorphic applications. A range of "anamorphic effects" in the works of contemporary artists—including examples by the author—will be illustrated and discussed.
Title: Anamorphosis and the Eccentric Observer (PART II): History, Technique, and Current Practice

Abstract: for Part II (includes note about Part I of article)

The process known in art as anamorphosis or anamorphic projection is at once a confirmation of and a challenge to the rules of linear perspective and the conventions of representation. In part one of this two-part article, the author reviewed the discovery of anamorphic projection in the late fifteenth century and traced its oblique relationship to problems of "subjective viewing," semiotics, and psychoanalytic theory. Particular attention was given to a discussion of the viewing subject -- an "eccentric observer" -- who, the author argues, must take an active role in the observation of anamorphic projections. In part two of this article, the author discusses various technical applications of anamorphosis as well as the current uses of anamorphosis in the works of several contemporary artists, including himself.

Glossary:

Anamorphosis: For the purposes of this discussion, the effect known as "anamorphosis" refers to any distorted image -- pictorial, sculptural, or technology-based -- which appears "correct" or "normal" only when viewed from an oblique angle or with the aid of some mediating device such as a mirror, lens, or computer.

Anamorphic lens: Any concave sphero-cylindrical lens. Such lenses have been used widely in the film industry to compress and decompress wide-screen images.

Catoptric anamorphosis: Anamorphic images which are reconstituted on a reflective convex surface. Catoptric anamorphoses usually require a polished cylinder or cone to correct the distortion.

Linear (or direct) anamorphosis: Anamorphic images distorted along a single axis.

Morph rays: Construction lines used to determine the vantage point for an observer positioned to see the "normal" view of a three-dimensional anamorphosis. (Term coined by Robb Lovell, a computer specialist at Arizona State University)

Panopticon: A vantage point permitting the unencumbered surveillance of a given object or person. The term finds its origins in "Bentham's Panopticon" -- a late eighteenth century prison design. Donald Preziosi writes (see op. cit., p. 194): "The subject of Bentham's Panopticon has been treated in many writings over the past decade and extensively in Foucault's Discipline and Punish. As Foucault astutely demonstrates, the panoptic model served as one of the important bases for the conceptualization of the new disciplines of knowledge arising during and after the Enlightenment."

Three-dimensional anamorphosis (or anamorphic sculpture): A class of abstracted three-dimensional objects which may be rectified from one or more vantage points to produce recognizable two-dimensional images.
Modern Uses of Anamorphosis

It should be stated from the outset that the appearance of anamorphosis in the work of certain 20th century artist/researchers can not be understood only as a response to new technologies—such as computers or various photographic equipment. Neither can its use be explained as a reaction to or critique of classical perspective—as was at least partially the case with its discovery in the 15th century. Rather, I think the current interest by artists (and certain scientists) in anamorphosis is driven by a search for new metaphors and methods of expression that stand outside of traditional categories. Of course, one could say the same for anything "new" in the arts and sciences. The fact remains, though hardly a "new" effect, anamorphosis still has the capability of making the familiar "strange." For many contemporary artists, myself included, the largely discredited nature of anamorphosis is enough to pique the curiosity. Combine this rather perverse attraction with the recent resurgence of interest in problems of vision—with its implicit goals of dissecting the subtle ideological processes at work in the construction of the gaze—and I think sufficient explanation as to why certain artists are attracted to its effects has been made.

While the use of anamorphosis probably reached its zenith in the 17th and 18th centuries, its uses in serious art has really languished since the early 19th century, by which time it was more likely to be found illustrating cheap publications (Baltrusaitis, p. 127) than gracing the halls of kings. Doubtless, its charms were seen to be of a class with other popular perceptual oddities—such as kaleidoscopes, or the magic-lantern "phantasmagoria" popular in the late 1700's and early 1800's. [38]

While graphic anamorphosis was on the wane in the nineteenth century, the ability to construct optical systems that would re-produce its odd asymmetries was just coming into being. The general science of optics—a discipline which connects the concerns of astronomy, ophthalmology, photography, perceptual psychology and filmmaking (to name but a few)—has been influenced by anamorphosis. While the use of magnifying lenses is thought to date back as far as 700 B.C, it wasn't until 1825 that the astronomer Sir George B. Airy used a concave spherocylindrical lens—an anamorphic lens—to correct for his own myopic astigmatism. While this was probably the first time that astigmatism had been corrected, it was only upon the release of a 1862 publication by the Dutchman Franciscus Cornelius Donders (1818–1889) on cylindrical lenses and astigmatism that ophthalmologists adopted the method on a large scale. [40] From astronomy and ophthalmology, the technique has passed through various photographic procedures.

Certain twentieth century inventions have, apart from its appearance in art, broadened the usefulness of "anamorphosis" as a term and should be mentioned for the record. In the case of photographic practice, one finds a kind of anamorphic photography in the technical area of traditional low-level photographic reconnaissance in which aerial photographs are most often taken from an oblique angle. The resulting trapezoid-shaped photographs—anamorphic images—are then rectified so that they can be interpreted from the correct perspective. [41] Another common example of anamorphosis is the use of
"anamorphic lenses" by the motion picture industry. In 1953 Twentieth Century Fox introduced the first wide-screen motion picture, The Robe. The technology involved the use of two anamorphic lenses, each constructed to correct for the effects of the other. One lens was mounted on the camera to compress the panoramic original scene onto standard 35-mm film. The other lens was mounted on the projector to "decompress" the scene back to its original proportions. Many of the motion pictures we see today are recorded and played back using anamorphic optics. [42] What happens when wide-screen feature films are broadcast over our home television systems? The dissimilar proportions of wide screen cinema (with its aspect ratio of approximately 1:2) and conventional television (with its aspect ratio of 3:4) is overcome by either a matting of the top and bottom portions of the television image, or a kind of selective cropping in which only the most important aspects of a given scene are transferred to video tape. Hence the familiar sight on late-night television in which the opening scenes of a feature film may be distorted or otherwise altered so as not to cut off the credits at the extreme horizontal edges of the film. [43] As an increasing percentage of filmmaking is destined for the video market, filmmakers are exploring aspect ratios that make the translation from film format to video format less cumbersome.

The first half of this century saw more than a passing interest in the use of photography's inherent ability to "flatten" an otherwise patently three-dimensional scene. While never aspiring to the status of "high art", the work of Arthur S. Mole presents us with an amusing convergence of photography as both "truthful" documentation and "trompe l'oeil" effect. In his 1918 work entitled Human Liberty Bell, Mole used 25,000 officers and enlisted men to construct an anamorphically-corrected image of the Liberty Bell. To render the distinctive outlines of the Bell---complete with crack---the camera was positioned to view the carefully arranged troops from an oblique angle. [44]

The 20th century has seen interest in the properties of anamorphism in the work of certain of the dada and surrealist artists. While I have already alluded to Marcel Duchamp's interest in anamorphism in his installation Given, Salvador Dali also utilized the effect in a number of paintings. He not only used straight "linear" anamorphosis in certain works but produced an entire edition of "catoptric" anamorphoses---a technique much admired in the 17th and 18th centuries---which require the use of a cylindrical mirrors for the image to be rectified.

It is not surprising that with the rise in the use of computers---and, concomitantly, of video---one finds a corresponding exploration of these mediums' anamorphic potentials. It is in the realm of computers that anamorphosis may have the most significant impact---less as a technique for distorting form, than as a metaphor for understanding the biased methods we use for storing, processing, and retrieving information.

In the highly abstracted, binary systems of order that make computers possible, one finds a model in which the anamorphic transformation of a given field of information is the rule rather than the exception. Fundamentally, everything is reduced to a plus/minus code; there is no room for that which cannot be submitted to a binary operation. A process of compressing and subsequently de-compressing information---the digital analog to the anamorphic optical systems
discussed above---characterizes the world of computers. While the result of such processes may or may not yield a "stretched" image or be characterized by a hypostatization of one's vantage point, I would argue that the spirit of the operation is essentially "anamorphic". Such a view resonates with Donald Preziosi's use of the "panopticon" and "anamorphosis" as "guiding metaphors" for understanding how knowledge is organized and accessed: "Any form of disciplinary knowledge is a panoptic, anamorphic apparatus: what is visible is legible only from a particular perspective that both reveals objects of a domain and occludes other objects and other possible domains." [45]

Even without accepting this view of the computer as an essentially anamorphic instrument, anyone who has spent time with even the most basic graphics software would acknowledge the computer's ability to produce, replicate, and/or reconfigure images. One can easily produce anamorphic distortions simply by adjusting the relative ratio of the vertical and horizontal dimensions of a given object. Or one can "stretch" an object to correspond to an accelerated or decelerated perspectival field. More sophisticated systems have the capability of "wrapping" flat images onto virtually any three-dimensional, polyhedral object. This so-called "texture mapping" is only the latest manifestation of a long history of work in the areas of descriptive geometry and topology. A common use of this specialized knowledge involves the projecting of complex geographic and topographic information onto flat rectangles and various three-dimensional surfaces in the form of maps—a procedure which is, by definition, anamorphic. In a similar way, the graphic capabilities of the computer have demonstrated anamorphic transformations of everything from geographical diagrams graphing inequities in production and consumption to maps attempting to replicate the biased perspective one gets from particular points of view. [46]

Anamorphosis is also a term found in the natural and physical sciences. And while I will not stretch the point of such an oblique reference—which would detail the growth processes of certain insects, fungi, and primitive aquatic life as well as physical processes deep under the surface of the earth—let it be said that the metaphoric possibilities of "anamorphosis" inspired by an array of "animal, vegetable, and mineral" forms are yet to be explored. [47]

"Anamorphic" Effects in the Work of Contemporary Artists

A small number of artists have been actively using various approaches to anamorphosis in processes as distinct from one another as painting, printmaking, photography, installation, sculpture, closed-circuit video, film, computer graphics, and holography. [48]

A detailed account of the uses of anamorphosis by contemporary (since 1960) studio artists parallels in certain essential ways the larger concerns of familiar art movements. Nevertheless, anamorphosis has remained on the periphery of the larger discourse surrounding art. What follows is a partial descriptive list of contemporary artists who have used anamorphic effects. In certain cases, the use of the term "anamorphic" as far as I know, has not been used to describe their work. In others, the references to the history of anamorphic art in their work are explicit and frequent.

The Dutch artist Jan Dibbets, a major exponent of conceptual and minimal art,
explored anamorphic effects with his so-called "perspective corrections" dating from the late sixties and early seventies. Dibbets would create shapes on his studio wall that would resolve from particular vantage points. His best known projects have involved excavating areas of sod or staking out areas in strings in trapezoidal shapes which, when framed by the viewfinder of a camera, appear as a square. [49]

The Swiss artist Marcus Raetz has also used anamorphosis to produce spatial constructions that play tricks with perspective. The art critic Holland Carter describes one project---an outdoor anamorphic site-sculpture of enormous scale entitled Kopf:

Kopf, installed in a park in Basel, looked from street level like nothing much more than a set of limestone posts planted randomly over a patch of grass. Only when viewed from an obviously predetermined height did the bars assemble themselves into an illusionistic image, and only from a single, carefully calculated vantage point did the image take its final form as the graphically simple outline of a human face in three-quarter profile. [50]

One of the artist's earliest anamorphic works (1974) is a tiny replication of the head of Mickey Mouse constructed out of a cork, bits of wire, and metal affixed to a wooden panel. Such a work, according to Cotter, make it plausible to understand Raetz's career as "Pop transmuted through the Conceptual and Process art of the 70s." [51]

An ambitious installation by the Dutch artist Jan Beutener (b. 1932) entitled simply The Room (1975) was included in the exhibit entitled Anamorphoses: Games of Perception and Illusion in Art. It involved the construction of a full scale tableau that included an anamorphically exploded ladder and chair and an oddly suspended jacket, all of which locked into place when viewed through a peephole. [52]

Patrick Ireland has produced illusions relying on single vantage points. A project in the exhibition The Presence of Absence (1989--on-going) entitled Rear View Mirror (1986), is completed by a viewer occupying a precise vantage point. The curator for the exhibition, Nina Felshin, describes the work in the catalog to the exhibition:

A rectangle constructed from string and pushpins is delineated in a corner. Inside the rectangle a trapezoid is outlined in the same manner. Each is painted a different color. The actual configurations in the corner are two hexagons. However, when viewed from the designated spot, and with the corner evenly lit so that the seam disappears, the square and trapezoid re-establish themselves. Additional linear elements constructed in a like manner undergo a similar transformation in the eyes of the beholder. [53]

Los Angeles artist Jonathan Borofsky has also created a number of installations that include anamorphic images. Instead of the using the trial and error methods of Ireland, Borofsky projects his images with a slide or transparency projector, then traces and paints them directly onto the wall, ceiling, and floor. [see 54 for historical note on projected anamorphoses] It is only when an observer moves out
of this singular vantage point that any distortion of the image occurs. Hence, in Borofsky's installations, there are "sweet spots" in which images come into view then dissolve as an observer moves through the space. For example, as part of an installation at the Museum of Modern Art in New York in 1982, Borofsky painted the image of the head of his signature "rabbit" figure directly onto the walls and ceilings of the Museum. The process would have involved aiming a transparency projector directly at the point where the ceiling met the corner. To an observer positioned just adjacent to the corner, the resultant image would appear as nothing but a jumble of lines. But to an observer occupying the exact point from which the image was projected the image would resolve into an apparently "flat" recognizable image covering several oblique and adjacent surfaces.

The effects described above, it should be said, comprise only a fraction of Borofsky's output as an artist. As with many artists, the use of anamorphosis is just a small part of a larger vocabulary of techniques, concepts, and perceptual effects. Borofsky is probably less concerned with a critique of viewer position or anamorphosis per se than with general strategies that explode the physical constraints of the typical gallery.

Technically related to the environmental effects achieved by Borofsky are certain installation works by New York artist Justen Ladda. Going well beyond Borofsky, Ladda succeeds in completely obliterating all spatial references by re-painting not only the walls of the installation space, but every object within the installation. The process is much akin to camouflage in that the relationship between a given "figure" (the object to be disguised) and its "ground" (the background field) are made to appear as a continuous, undifferentiated field. In his installation Someone Adjusting a TV Set (1984), for example, an actual room is repainted to appear like the gigantic screen of a television set out of adjustment. A room full of actual domestic furniture, appliances, and objects---including a TV---are painted in distorted horizontal bands of acrylic paint and disappear against an identically treated background. When viewed from a position across the room, an observer is confronted with the monumentally-scaled image of a hovering television screen, its familiar bulging rectangle framing a view in which the entire room appears as a completely flattened image. The only relief from this spector of technology is a barely discernible (painted) figure who tries (in vain) to adjust the actual TV occupying the corner of the room. The work is not only a brilliant technical achievement that resonates with recent developments in painting, but also a wry commentary on the eclipse of our collective home-lives by television.

John Pfahl, a photographer who has long been admired for his eccentric interventions into otherwise conventional "straight" photographs, has generally "made a motif of the line between illusion and reality." [55] In describing Pfahl's color print, "Shed with blue dotted lines, Penland, N.C., June 1975" Andy Grundberg writes:

John Pfahl's color prints from 4 x 5 in. negatives put optical depth recession and image flatness into an explicitly ironic relationship...What Pfahl does is to apply twine, plastic tape and other materials to the scene he plans to photograph. By constantly checking his groundglass he arrives at what appear to the camera to be cubes, straight lines and other shapes; in reality, these figures from plane and solid geometry
exist only in the arena of camera vision. Often in Pfahl's work such visual conceits are overlaid on a matrix of what would be, by itself, a traditionally picturesque scene. He calls his photographs "altered landscapes." [56]

Pfahl's altered landscapes serve to critique the common equation of the camera with the eye. Most photographers seem to operate as if "beauty is in the camera of the beholder". The ubiquitousness of photographic images that assume a one-to-one relationship between the eye and the lens of the camera would suggest that photography is as convention-bound and blinded by its own practices as any other "discipline" (like painting, for instance). As we have seen, a real-life observer is only momentarily prone to deception. Incessant adjustments of the eye, the head, the body—as well as other "subjective" factors—conspire to render any "suspension of disbelief" only temporary. While most photographers are guilty of submitting to their own internal mechanisms and formal logic—a kind of aestheticized solipsism—with Pfahl the ingredients of disruption are as "present" and as necessary as the formal beauty of his photographs. In these photographs from the mid-seventies, Pfahl does not present the observer with the option of "taking up a position" relative to the photograph. Nor does he present comparisons in the form of unaltered or shifted vantage points. Any discrepancy that occurs between the illusion and reality of the photograph can only take place in the mind of the observer. In certain key ways, this method of constructing a photographic illusion is a distant echo of the dis-embodied Cartesian eye that we made reference to earlier in the essay. Its as if the shadow of Alberti's gridded "window"—that geometric apparatus through which Western artists have traditionally measured their relation to the world—has been physically de-constructed and re-mapped onto the surfaces that present themselves to the eye. The real achievement of this work is that the agents of disjuncture find their place among the formal devices of the photograph.

Several projects by Michael Heizer gain special power by privileging certain vantage points. His earth and concrete sculpture, Complex One (1972—74), a monumentally scaled artwork in the southern Nevada desert, is a construction that translates the weighty presence of architecturally-scaled elements into a painterly vision resolved from a singular vantage point. As is found in the work of Dibbets and Raetz, discrete sculptural elements lock together to produce a unitary profile—in this case a massive steel and concrete frame which defines the exterior rectangular plane of an earth-filled "mastaba." In an interview, Heizer states, "My idea with Complex One was to create an object that was essentially frontal. I thought about painting and sculpture simultaneously." [57]

Anticipating Heizer by some ten years, a steel construction by British sculptor Anthony Caro resolved complex arrangements of three-dimensional elements into flat "pictorial" solutions. In discussing his 1962 sculpture, Early One Morning, Rosalind Krauss, writes the following:

There are ...two ways of relating to Early One Morning. The first is to experience it as a physical construction...The second alternative arises from standing directly in front of the work and thereby experiencing it pictorially. The achievement of Early One Morning is not only that it provides these two possibilities but that it shows them to be mutually
incompatible. From the "side" the viewer looks down on the construction, much the way he would look down onto a table or any other article of furniture. He senses the work in terms of mass because it shares the same space that he does and clearly relates to a ground that is the same as his own. From the "front" this orientation to a horizontal ground changes completely. The work becomes a vertical assembly, and thus its space is no longer occupied by the viewer. Just as there is a gulf between a viewer's space and the space of a painting—a break between his own ground, which he sees as he looks down at his feet, and the beginning of the ground of the picture's space, which he can only see by raising his head—so the pictorialized space of Early One Morning is not only sensed as flattened but as irrevocably distanced as well. [58]

From a traditional point of view, the appreciation of sculpture—and by extension, architecture and the related "spatial" arts—implicitly endorse an observer willing to link idealized profiles of an object into a seamless and harmonious "cinematic" progression. The inverse of this idea is represented by the often cited examples of Borromini's Colonnade in the Palazzo Spada in Rome (1635) and Palladio's Teatro Olimpico in Vicenza (c. 1581–85) which are exceptional precisely for their insistence on establishing a hierarchy of views that favor specific vantage points and stand at odds—indeed, strongly undermine—"holistic" spatial appreciation. In referencing the particular projects above by contemporary artists, I am suggesting that a resistant strain of eccentric viewing is called for—indeed necessary—in order to understand and appreciate the "hidden" potentialities of certain works. In addition, the intentional disruption (the "incompatibility") existing between the various "views" presented to the eccentric observer provides a powerful metaphor for vision that (perhaps) more accurately reflects how we experience the world. Afterall, the world is not a video. It is a saccadic series of out-takes that only gains coherence in the mind of the observer.

Buky Schwartz, an Israeli artist who splits his time between New York City and Tel Aviv, is noted for his installations involving complex anamorphic imagery and closed-circuit video. Deploying large scale graphic elements and geometric objects across the space of a gallery, Schwartz constructs, via video, a series of seemingly disconnected parts into a coherent whole. In a recent catalog essay, John Hanhardt, describes Schwartz's work in the 1979 Whitney Biennial, Yellow Triangle:

In (this) work Schwartz used color for the first time to create on the video monitors the appearance of a large yellow triangle actually occupying the gallery space. From the point of view of the video camera mounted near the ceiling the space of the gallery walls and floor painted yellow becomes a "yellow triangle".

The "videoconstruction" can only be seen on the monitor while the viewer stands within the painted area. From the purity of the simple geometric form and primary color, Schwartz constructs a complex engagement of the viewer which links this piece to the temporal, real-time dimension... [59]

Much of the power of Schwartz's work is derived from the patently physical nature
of his installations. While his work has been linked to Dibbets and others involved in forms of pictorial illusion, the critic Robert Pincus-Witten argues that Schwartz's work is not "pictorial" but rather obliges the spectator to physically participate in the work---"one must be in it to get it." Pincus-Witten writes:

Schwartz's work markedly differs from Dibbets' because it deals with a process through which illusion becomes reality. In the Dibbets, and, one might say, the entire tradition of Baroque trompe l'oeil, reality becomes illusion. By contrast, the spectator, experiencing and verifying the different phases of the illusions through his or her own participation in Schwartz's work, quickly grasps that Schwartz presents no simple perceptual games. For Schwartz, participation is a function of and confirms reality. Reality for Schwartz is not wholly mental or cleverly pictorial. Mental data must be both empirically and sensorially processed. Schwartz's video possesses only scant or vestigial trompe-l'oeil properties---none anyway that can be said to derive wholly from painting, the species in which the traditions of trompe l'oeil are most fully preserved. In Schwartz's video, process denies trompe l'oeil. [60]

In my own work I have explored the problems of vantage point and the properties of anamorphosis from several "points of view". Experiments with projected shadows in which recognizable images were produced by stacks of rubble (1982) led to various techniques for controlling an observer's point of view using telescopes and other optical framing devices (1983). I eventually began using closed-circuit video (1983–84) in which sculptural and/or performance elements were presented in their "actual" and "mediated" forms. An attempt was made in virtually all of these early projects to create a "split" between the character of the source object and its representation via video in installations.

True anamorphosis appeared in my work in 1987 completely by accident. I was only vaguely aware of the technical aspects of anamorphosis, and unfamiliar with most of the work by other artists discussed above. Working on a project (which eventually became the video sculpture Virtual America), I was playing with a small b & w surveillance camera when I recognized the radical disparity between the image on the video screen and the actual source objects strewn about my studio. (Cheap b & w video systems, even more than photography and film, have a tendency to flatten images into abstract patterns of black, grey and white.) I was intrigued with the deep gulf between the compressed video image and the patently three-dimensional character of the sculptural elements. I had been mulling over the U.S. government's officially sanctioned policy of "dis-information", that is the deliberate injection of lies into the international community for strategic purposes, and it struck me that the visual effect I was experiencing first-hand was a perfect analogy to this form of political subterfuge; in short, that which constitutes an acceptable "public image" in our political system (i.e., the mediated image on the screen) is often at odds with the "real-life consequences" of American economic interests, political policies, or military interventions (i.e., the physical presence of objects in a given space).

In subsequent projects dealing with anamorphosis I have attempted to deepen the split between the actual and mediated components in order to produce a certain creative (and resistant) tension in the mind of the observer. It is in the act of
comparing the mediated qualities of the video image and the actual kinesthetic experiencing of the attendant objects and spaces that I hope an observer can uncover the skewed rules which condition (and at times determine) how we experience the world.

In addition to closed-circuit video, I have also explored such devices for "mediated" viewing as restricted station points and mirrors. However, the radical disparity between the "body-felt" presence of sculptural elements and the cool illusion afforded by the video monitor is perhaps more arresting---by virtue of extreme contrast---than these more traditional methods of reclaiming anamorphic imagery. An observer must really work to reconcile the view found in the monitor with the sculptural "facts" of the installation.

As is already clear from the wide variety of perspectival illusions and anamorphic effects discussed earlier in this essay, the range of possibilities for artists is limitless. There are any number of ways to project, alter, and reclaim the source image. In certain cases the image remains flat---a kind of graphic smear. (This would be "direct" or "linear" anamorphosis) In others, the image meets obstructions, or wraps around corners. In still others, the image is fragmented into an array of physically discrete parts. Using curved or otherwise distorted grids (or a computer), one can produce "catoptric" (mirror) anamorphoses that can be re-claimed using reflective surfaces. "By virtue of the laws of the angles of incidence of reflection," these images, according to Baltrusaitus, are "reconstituted on a convex surface which diminishes and corrects the curves." [61] Advanced computerized mapping procedures--techniques that exploit the computer's capabilities of pin-pointing and storing enormous amounts of data about complex surfaces--make it possible to plot and subsequently distort the topographic features of any three-dimensional surface.

I am currently working with Rob Lovell, a computer specialist at Arizona State University, to develop a method for mapping three dimensional anamorphic images---then subsequently "unwrapping" the skin of these objects to aid in the actual construction of complex anamorphic sculptures. These are being developed in the context of actual architectural spaces in which the viewpoint of an observer could be tracked in real time, much as is done in the "walk-through" type programs typical of architectural modeling software. Rob Lovell describes the process as follows:

Computers provide an extraordinary resource for the creation of anamorphic sculptures. Given an object defined in three dimensions made up of a series of polygons, a viewing model consisting of "at" and "from" points and an "up" vector can be used to display the object from any vantage point. Taking one of these vantage points, the object can be distorted so that it appears to be "normal" only with respect to this view. This is accomplished by defining rays ("morph rays"--see Glossary) from the eye to points on the object using the parametric form of a line and then varying the parameter of the equation. [28]

In the example illustrated (Fig. 1), the object on the upper left, a distorted "goblet" is seen from a fixed vantage point revealing its only "normal" view. In the upper right, the same object is viewed from a vantage point that has been rotated approximately 90 degrees around the y axis (green) and 40 degrees around the z
axis (blue). In the image in the lower right corner, the point where the "morph rays" converge indicate where an observer would have to be positioned in order to see the "normal" view of the goblet (seen on the upper left of the illustration).

Even without computers, it is possible to produce fully three-dimensional anamorphic sculptures that collapse into recognizable images when viewed from selected vantage points. I have used a closed-circuit video system on several projects in which I simply modeled an object "via video" (having affixed a transparency of the desired view directly onto the screen of the television). The curious distancing effect, I am told, is akin to what surgeons undergo when operating by looking at a video image of the surgical procedure taking place in real time (usually some kind of internal, micro-surgical process that could not be monitored in any other way.) As anyone who has tried to cut their own hair in a mirror would appreciate, any interventions between the human eye and the anamorphosis can complicate the experience considerably. Peepholes, mirrors of all kinds (flat, conical, cylindrical, spherical), telescopes and other "straight" optical instruments, and cameras (still, film, video) have all been used in conjunction with anamorphic images. As referenced earlier, a procedure for creating holographic anamorphoses has been developed.

The projects illustrated here were chosen for detailing a range of technical considerations rather than tracking particular themes or subject matter.

The first illustration (figure 3) shows an installation view of *Semiotics in Paradise* (1990). Essentially a graphite drawing reclaimed by a closed-circuit video camera, the anamorphosis was produced by simply projecting a slide of Durer's famous etching *The Fall of Man* (1486) from an oblique angle. The resultant image was traced and redrawn. Once completed, a video camera was positioned at exactly the same point occupied earlier by the slide projector. A monitor was placed on a wall (figure 4) such that it was impossible to view the video image and the anamorphic rendering simultaneously. Curiously, viewers would typically reintegrate the two aspects of the piece in collaborative acts (motioning to one another, yelling the length of the room, running back and forth) as a way of discovering the differences and similarities between the two components of the piece. For me, the symbolic importance of the work involves (among other things) a kind of releasing of Eve from the burden of Paradise. While her image appears intact in the virtual image produced on the video monitor, the reality of her presence is more akin to an expressionist brush stroke or a cloud existing in the actual space of the gallery. If you were to touch the wall, the silvery powdered graphite would come off on your hand.

Very different in feeling was a project I did about the same time entitled *U2* (1990) (see figure 5). This work was born of the ease with which model builders move between differently scaled replications of the same source object. I speculated that it should be possible to simply take one piece out of several differently scaled model kits and arrange them, along a vector bisecting the video camera lens, such that they would "reassemble" as a single image on the video monitor (see figure 6).

After some casting about for appropriate subjects, I settled upon the U2 spy plane—the U.S. state of the art high flying photo reconnaissance jet used in the 50's—as a fitting subject. Not only was the U2 using surveillance techniques
(echoed by my own use of surveillance-type video equipment), but at a crucial moment in Soviet/U.S. relations a U2 was shot down (fragmented) by a Soviet surface to air missile—much to the embarrassment of the U.S. who had been denying categorically that any such flights were taking place. The split between the "official line" and actual events was too broad to cover up; this was the first time the U.S. had been caught in a bald-faced lie. The U2's pilot/spy, Francis Gary Powers, was captured, interrogated and convicted by the Soviets. The pieces of the plane were recovered and put on display in Red Square. The international scandal which ensued led to the premature abortion of peace talks in Paris—a much touted opportunity for ending the Cold War in 1960—that ended with then Soviet premier Krushchev walking out.

The video sculpture was conceived as a linear wall piece. It utilized a 16 foot long steel "rail" along which the plane fragments were arranged. A tiny video camera was positioned at one end pointed down the length of the rail. A 3 1/2 " video monitor was mounted at the opposite end. I ended up using a modified version of the infinitely adjustable magnetic milling guides used by machinists to facilitate the problem of arranging the pieces accurately in space. I also had to make the majority of the pieces from basswood as I was only able to purchase model kits of the U-2 in 1/32nd scale and 1/128th scale.

A further nuance (a stupid pun really) was the title itself, U2, which was to suggest to an observer that "you too" are implicated in this process of surveillance, disinformation, and political intrigue. In fact, when an observer approaches the tiny monitor she is pictured behind ("underimposed"??) the graphic outline of the plane; that is, she becomes part of the scene.

A final project I will discuss involves a different kind of three-dimensional anamorphosis. In my work entitled Re: St. Jerome and the Problem of Translation (1988), the central element is a wall relief that is "translated" into the image of a skull on a small video monitor (see figures 7 and 8). I produced the distorted skull using the method I described earlier—that is, modeling the form via video.

One intriguing aspect of this process is that any detail that falls behind the limited horizon observed by the video camera may be distorted or altered without appearing on the video monitor. A good example would be how a sailing ship sailing out to sea, when viewed by an observer on the shore, appears to dip below the horizon when several miles out due to the curvature of the planet. We know that the ship has not fallen off the edge of the earth, but there is no visual evidence from our limited vantage point to confirm this. This is of interest for not only what it tells us about our perception of the physical world, but for its philosophical implications. The phenomenologist Edmund Husserl in discussing "thing-perception" writes: "A certain inadequacy belongs...to the perception of things, and that too is an essential necessity". [62]

Another interest explored in this project was the attempt to strike an analogy between the physical "translation" of objects (here represented by the skull) and the textual translation of written materials (here represented by some 36 Bibles—all in different translations) Admittedly, the art historical reference is a bit arcane: the skull is often iconographically associated with the figure of St. Jerome—the patron saint (374--419) who did the definitive translation of the Hebrew and Greek scriptures that was to become the Latin Vulgate (the "official" Holy
Scriptures for the Catholic Church). I would suggest that textual translation, of which we are all so familiar but seldom question, produces a distortion of the originary source just as surely as an oblique vantage point or any other perceptual inflection. Here is yet another example—a conflation or "reading" and "seeing" to be sure—in which anamorphosis insinuates itself into realms where (it might be said) it does not belong. I should also state in passing that while the image of the distorted skull echoes Holbein's "death's head" in the Ambassadors, the credit for the thought, more correctly, belongs to Lacan. But the inspiration for actually making the sculpture comes from my father. It is to his memory that this momento mori is dedicated.

Conclusion

It is certainly possible to impune certain motives for sketching the arguments above—as well as discussing certain works and not others. While anamorphosis serves as the formal device that links a heterogenous body of material, two assumptions have guided this "eccentric observer" in the construction of art experiences which are at once "aesthetic" and critically based: first, to render an observer self-aware and conscious of the processes by which meaning is constructed; and, second, to acknowledge the central role the identity and capacities of the observer have in determining the nature of the art experience. It is to these goals that the concept of anamorphosis must be subordinated.

The importance of anamorphosis, then, is not as an alternative to the way we experience works—that is, like the latest video game or clothes for the emperor—but as a metaphor for accepting information from unfamiliar places and unexpected sources. The eccentric observer is one who acknowledges the limitations of a static, homolographic world-view and embraces instead a dynamic unfolding process encompassing a field of light and texture shot through with expressions of personality and specificity. This process could serve at least two purposes: to undermine a certain ideology of vision that continues to dominate the way we look at artwork and to celebrate (rather than suppress) the idiosyncratic nature of our own "point of view."

Notes and References


   Vainement ton image arrive a ma rencontre

   Et ne m'entre ou je suis qui seulement la montre

   Toi te tournant vers moi tu neaurais trouver

   Au mur de mon regard que on ombre revee

   Je suis ce malheureux comparable aux miroirs
Qui peuvent reflechir mais ne peuvent pas voir
Comme eux mon oeil est vide et comme eux habite
De l'absence de toi qui fait sa cecite


Certainly many examples exist from Antiquity in which the peculiarities of human vision were overcome by conscious design. Baltrusaitis references Plato in the *Sophist*: "Works which, considered from a favourable viewing-point, resemble the beautiful but which, properly examined, no longer offer the resemblance they promised, are phantoms." In the same passage Baltrusaitis goes on to discuss the Roman architect Vitruvius:

Vitruvius echoed this reasoning and drew practical conclusions from it. Since what is true appears false and things seem different from what they are, in representing them we must add or subtract. In the case of an architectural facade, this involves replacing straight lines by curves, thickening, raising, and inclining certain parts. Columns swell in the middle, their bases bulge, corner columns swell (by a fiftieth part of their diameter), architraves lean forward (by a twelfth part of their height).

While these adjustments are made "to remedy the errors of vision", it is not until the Renaissance that some effort was made to account for them mathematically. Baltrusaitis is worth quoting at length on the early history of perspective:

Two phases should be distinguished after the end of the Greco-Roman world: the abandonment and disintegration of the basic principles of perspective, and their reconstitution by various means, leading to a complex doctrine of remarkable precision. Neglected for a long period by artists, all the problems of perspective were systematically tackled again, at first by scientists.

During the Middle Ages the sciences of Antiquity were passed on through Islam. The Treatise of Alhazen (d. 1039) had wide repercussions, and even the Latin translation of Euclid was made not from the Greek but from the Arabic, by Adelard of Bath in the twelfth century. Robert Grosseteste, Bishop of Lincoln (1175–1253), Roger Bacon (c. 1270), Vitellion (c. 1270), John Peckham, Archbishop of Canterbury (c. 1280), dealt with problems of perspective based on Islamic systems. By a curious contradiction, it was the culture most hostile to vision in depth and in relief in painting and decoration that taught its principles. There was a clear division between the optical experiments in artists and scientific speculations. This clear separation was to be maintained in the Gothic West, and the first researches of artists in the realm of perspective were empirical and wholly independent. In the process of clarification in the fourteenth century, research was pursued along the same lines in the Northern Schools until a relatively late date. The meeting between the arts and sciences in fact took place in Italy in the first half of the fifteenth century (Ghiberti,
Alberti). It produced a wonderful flowering: Piero della Francesca (1469), Leonardo da Vinci (1492), Jean Pelerin, called Viator (1505), Durer (1525), Vignola (1530–40), Serlio (1545), Barbaro (1559), Cousin (1560), all of whom applied mathematical theories methodically and elaborated procedures for dealing with all possible forms.


See also Norman Bryson, Vision and Painting (New Haven: Yale University Press, 1983) for an extended discussion on the limitations of an art history based on "perceptualism." Bryson writes in his chapter entitled "The Natural Attitude": In its classical and Albertian formulation, (the) body of perception is monocular, a single eye removed from the rest of the body and suspended in diagrammatic space.


For an extended discussion of subjective vision see also: Jonathan Crary, "Subjective Vision and the Separation of the Senses," Techniques of the Observer (Cambridge, Mass.: MIT Press, 1990); and Umberto Eco, "The Poetics of the Open Work," The Open Work (Cambridge, Mass.: Harvard University Press, 1989---original, 1962). Umberto Eco, in articulating the domain of his "open work", touches upon the idea of subjective vision: "The force of the subjective element in the interpretation of a work of art (any interpretation implies an interplay between the addressee and the work as an objective fact) was noticed by classical writers, especially when they set themselves to consider the figurative arts. In the Sophist Plato observes that painters suggest proportions not by following some objective canon but by judging them in relation to the angle from which they are seen by the observer. Vitruvius makes a distinction between "symmetry" and "euryrhythm," meaning by this latter term an adjustment of objective proportions to the requirements of a subjective vision. The scientific and practical development of the technique of perspective bears witness to the gradual maturation of this awareness of an interpretative subjectivity pitted against the work of art. Yet it is equally certain that this awareness has led to a tendency to operate against the "openness" of the work, to favor its "closing out." The various devices of perspective were just so many different concessions to the actual location of the observer in order to ensure that he looked at the figure in the only possible right way—-that is, the way the author of the work had prescribed, by providing various visual devices for the observer's attention to focus on.


11. Ibid.


14. My concept of "invisible intervention" finds a certain resonance with the comments of Patrick A. Heelan, a Professor of Philosophy at the State University of New York at Stony Brook who speaks of the "transparent" qualities of certain modes of acquiring or expressing information in which "intermediaries (information 1) in the acquisition or expression of information (information 2) 'drop out of consciousness.' " Heelan goes on to write: "It is a commonplace, however, that many processes perfected through the painful process of learning share this characteristic, that intermediaries drop out of consciousness. The paradigm example is reading, but there are other processes that are similar, such as playing a musical instrument, sight-reading music, driving a car, and reading an instrument: to a suitably experienced person processes like these have 'the same subjective ease and immediacy as the simplest perceptions.' (Heelan cites S. Ullman and E. Schrodinger in his discussion) See Patrick A. Heelan, *Space-Perception and the Philosophy of Science* (Berkeley: University of California Press, 1983), pp. 195--201.


17. This idea of concealment through modes of abstraction is something that has characterized much art done clandestinely under oppressive political regimes. The dada artist George Grosz, for example, in describing his work in collage, stated that his early work in 1916 was cut up and assembled "in such a way as to say, in pictures, what would have been banned by the censors if we had said it in words." Quoted in Dawn Ades, *Photomontage* (London: Thames and Hudson, 1976), p. 19.


d'Harnoncourt and Hopps write: One section of The Large Glass has perhaps undergone the most direct and witty transformation in the
mise-en-scene of Etant Donnes...The delicate, silvered patterns on the Glass, just below the "horizon," which represent the Oculist Witnesses observing the stripping of the Bride, now become ourselves---stooping or stretching to peer through the holes in the old wooden door. As in To be looked at with one eye, close, to, for almost an hour, the small glass study of 1918 in which a magnifying glass is glued onto the pane, in effect, Duchamp requires the viewer to become a voyeur. To look at To be looked at..., or, more pointedly, to look at Etant Donnes...is to catch oneself in the posture of a Peeping Tom. It is Duchamp's ironic and brilliant achievement in this new work to have transferred the responsibility for whatever erotic interpretation it provokes from the impartial facts of the assemblage itself to the eye of the beholder.


21. Hawkes, op. cit., p. 115. Hawkes further characterizes the "two kinds of pleasure" as follows: "plaisir (pleasure) and jouissance (bliss, ecstasy, even sexual delight). Plaiser seems to come from the more straightforward processes of reading, jouissance from a sense of breakdown or interruption."

22. Donald Preziosi, op. cit., p. 169.

23. Rudolph Arnheim, Visual Thinking (Berkeley: University of California Press, 1969), p. 27. Arnheim's passage concludes with the following: "Since reasoning about an object starts with the way the object is perceived, an inadequate percept may upset the whole ensuing train of thought."

24. See Leeman et al, op. cit., p. 59 for the following information on the painting:

Hans Holbein the Younger. The Ambassadors. 1533. Oil on panel, 81 1/2" x 82 1/2" (206 x 209.5 cm). National Gallery, London. When Holbein painted this lifesize double portrait of Jean de Dinteville, the French Ambassador, and his friend, Bishop Georges de Selve, in England, he surrounded them with attributes that could be interpreted in various ways. The highly detailed still lifes in the center show the interests of both friends, yet at the same time refer to the transitory nature of human endeavors. The crucifix just barely visible beyond the drapery at upper left sustains this theme. The elongated form in the lower foreground pierces the painterly illusion and makes it relative. For when one looks at it from above at the right, it is seen to be a skull.


26. Ibid., p. 82.
27. See also Patrick A. Heelan, op. cit., pp. 9–10. One needn’t read Lacan to find an endorsement of such a position. Patrick Heelan writes from his vantage point as a philosopher of science:

The perceived object is experienced as being given to human experience, and it is normally accepted spontaneously without any reflective question having been raised and considered about the possible source in the subject of that recognition and acceptance. Husserl calls this attitude "the natural attitude." This is the attitude that supposes that we can gaze on a World with an "innocent eye," and that what we find unexamined in this way is real and as such privileged.

In contrast to the natural attitude is the reflective–transcendental attitude—-or simply what I shall call "the reflective attitude"; that is accompanied by an awareness of the role that the subject plays in knowing, through preparatory intentions that prefigure in our expectations, the horizons that "speak" to us. A perceptual object, for example, is given not atomically as an isolated experience unconnected with anything else, but as fulfilling certain enabling conditions, such as being located in time and space among the things and situations that comprise a World.

30. Ibid., p. 68.
32. Ragland-Sullivan, op. cit., p. 88
33. Ibid., p. 75.
36. Ibid., pp. 107--108.
39. For a fascinating account of the convergence of art, ophthalmology, and perceptual psychology in the person of one unique individual, see Roy R. Behrens, "The Life and Unusual Ideas of Adelbert Ames, Jr.," *Leonardo*, Vol. 20, No. 3


Anamorphic system: Optical system utilising prisms or cylindrical lens elements to yield different image scales in the vertical and horizontal direction. The resulting image is thus compressed or expanded in one direction. (E. Abbe, 1897). Used in motion picture cameras to squeeze the image horizontally to permit a wide aspect ratio to be recorded within the normal limits of the frame. The effect is corrected by projection on to a wide screen using an anamorphic projector lens giving a corresponding lateral expansion (A. Chretian, 1927). A typical motion picture anamorphic lens has a horizontal angle of view approximately twice that of a normal lens of the same focal length. The system is also used in reprography to compress strip chart recordings on a continuous flow film copying machine by modifying their scale in one ordinate without affecting the other (K.R. Honick, 1971).

43. From a conversation with Ernie Flotto, Engineering Supervisor at Television Station KAET in Tempe, Arizona (7/3/91).

44. I am indebted to professor Bill Jay of the photo area at Arizona State University for bringing Arthur S. Mole's anamorphically-corrected photographs to my attention.


Examples of the former anamorphic mapping techniques include comparative graphs in which the physical proportions of a map are altered to communicate a symbolic or quantifying function. Illustrations are accompanied by a brief text on page 82. It reads in part:

In cartography, the generic term for this type of representation (in French) is anamorphose or cartogramme. Since the latter term has too many other meanings, "anamorphose" is the preferred term for its meaning as a transformation of geographic space into another type of space. (from an unpublished translation by Tom Hartman, Tempe, Arizona, 6/91)
47. See for example Howard V. Daly et al, *Introduction to Insect Biology and Diversity* (New York: McGraw-Hill, 1978), p. 264. Certain insects---myriapods---are said to "grow by a process of anamorphosis, whereby abdominal segments are added at the time of molting." The Oxford English Dictionary defines anamorphosis in part as "2. Botany. degeneration or change in the habit of a plant...to give appearance of a different species; abnormal transformation, chiefly said of cryptograms, as fungi, lichens, and sea-weeds." Random House Dictionary defines "anamorphism" (as distinct from "anamorphosis") as a geologic term meaning "metamorphism, usually occuring deep under the earth's surface, which changes simple minerals to complex minerals. cf. katamorphism."


49. For a detailed account of Dibbets's work see the catalog from his recent retrospective at the Walker Art Center: *Jan Dibbets* (New York: Rizzoli, 1987)


51. Ibid., p. 150.

52. See Leeman et al, op. cit., pp. 51--58.


54. Whatever the method used for projecting images---slide projectors, opaque projectors, shadows, etc.---the images remain undistorted to an observer positioned at a point exactly identical to the origin of the light rays producing the projection---even if the image is projected across an irregular surface. This idea of projecting images onto irregular surfaces has a history that may even pre-date the introduction of linear perspective in the early 15th century. See George Bauer, "Experimental Shadow Casting and the Early History of Perspective," *The Art Bulletin*, Vol. LXIX #2, June 1987, p. 215. The technique of "shadow casting", according to Bauer, was used in a number of ways, the most useful of which included the construction of anamorphic images and the adaptation of properly foreshortened figures to nonplanar or curved surfaces. He quotes Leonardo who recommends it to those who "want to represent a figure on a wall, the wall being foreshortened, while the figure is to appear in its proper form, and as standing free from the wall." When seen from the point at which the light had been placed, Leonardo promises, "you will never be able to persuade yourself that the image is not detached from the wall."(Bauer references J.P. Richter, *The Literary Works of Leonardo da Vinci*, London, 1970) Bauer (referencing Baltrusaitis, op. cit.) continues: "Daniele Barbaro later published a variation on this procedure in which light is passed through a drawing pricked as if for pouncing (as in stenciling, DLC), and even in the seventeenth century the method was not forgotten."

The second application for which the shadow as an actual projection was especially adapted was in forming properly foreshortened images on nonplanar or curved surfaces. Bauer tells us that Leonardo seems to have been the first to describe the use of shadows for this purpose as well, but suggests that it was
sometime later (as described by Simon Stevin in 1605) that the technique was modified such that the shadow of a grid of ropes or cords was cast onto the nonplanar surface. This "accurately deformed grid" would provide the basis for reconstructing a drawing that had been overlaid with an undistorted grid. The artist would simply transfer, square by square, the contents of the normal perspective drawing.


62. Robb Lovell continues his explanation of the definition of "morph rays:"

\[
\text{P}_i' = F + t_i (P_i - F) \quad i = 0,...,n
\]

where \( F \) is the location of the eye, and \( n \) is the number of points in the object. This equation is interpreted as placing the points of the object \( t_i \) units from the eye. If \( t_i \) is constant for all points, the object remains normal. If \( t_i \) is allowed to vary for different points of the object, the object becomes distorted in other views, but not in the view used to define the equation. This anamorphic method has been implemented on a Silicon Graphics Iris 340GTX machine, using objects defined in BYU format between 100 and 300 polygons.


As far as thing perception is concerned, the concept of horizon can have two meanings. It can refer to the detailed adumbrations of a thing, or it can refer to its perceptual background. They collaborate to make up for the "inadequacy" of our perceptions.

These two moments of the concept of horizon might seem at first sight not quite related. But in this regard Husserl later on introduces a new demarcation in which the above two moments of horizon elegantly fuse together to form a homogenous structure. Here I am referring to Husserl's conception of internal and external horizons. Under internal
horizon Husserl understands in fact the possible details and nuances of an object that the perceiver might not be aware of for the time being, owing to the confinement of his perspective or the limitation of his attention, but might be able to come upon later under a different stimulation. What Husserl calls external horizon refers to but a much more complicated and far-reaching problem.

The external horizon on an object of perception is in fact just its perceptual "background." Just as has been hinted at, for a thing to be concretely (in a Hegelian sense of the word) understood, the mere going into details will not suffice; rather, the perceiver must reach "outward" putting or weaving the thing into a wider context so that a more concrete and more oriented understanding might be obtained. In this way the internal horizon and the external horizon of an object work together to furnish for that object its microscopic details as well as a macroscopic meaning context.