Blurring Spatial Limits:
Photography and spatial definition

By
Gustavo A. Rodriguez
Arquitecto
Universidad Nacional Pedro Henríquez Ureña
Santo Domingo, Dominican Republic 1997

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Signature of author
Gustavo Rodriguez, Department of architecture
May 23, 2002

Certified by
Omar Khan, Instructor
Thesis Supervisor

Accepted by
Professor Julian Beinart, Professor of Architecture
Chair, Committee on Graduate Students

Readers:

Mark Jarzombeck
Associate Professor of History and Architecture

J. Meejin Yoon
Assistant Professor of Architecture

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Abstract

The Image based space of vision has substituted functional space as a stage of contemporary life, the relationships between physical spaces are constantly being redefined by the change from function to image, forcing us to live in a state of spatial indeterminacy, in a Blurred space that lacks a specific formal, territorial or social definition. The notion of "limits" is constantly being questioned and redefined by this transition, giving way to overlapping interpretations of the meaning, shape and function of limits and the spaces that they contain. These undetermined or Blurred limits are permeable elements that allow interaction through them at different levels of engagement (visual, tactile or spatial). The Blurred space is, then, not characterized by confusion, but by a multiplicity of interactions between its components, its visual space becomes the spatial generator of our image-based culture. The power of photography as a representational tool allows us to explore blurred representations of space to understand the spatial characteristics of the photograph's altered space and its relationship to the user. This thesis looks at the Blur's qualities and explores its conceptual possibilities as a design tool by studying the relationship between its components, its relation to vision and its spatial characteristics. The blurred space of the image becomes descriptive of the visual Blur, yielding information about the spatial characteristics of the Blur and its possible translation into architectural space.

Thesis Supervisor: Omar Khan
Title: Instructor

To my parents and sisters.

This thesis would not have been possible without the help of my advisor, the corrections of my readers and the constant support of my friends. Thank you all.

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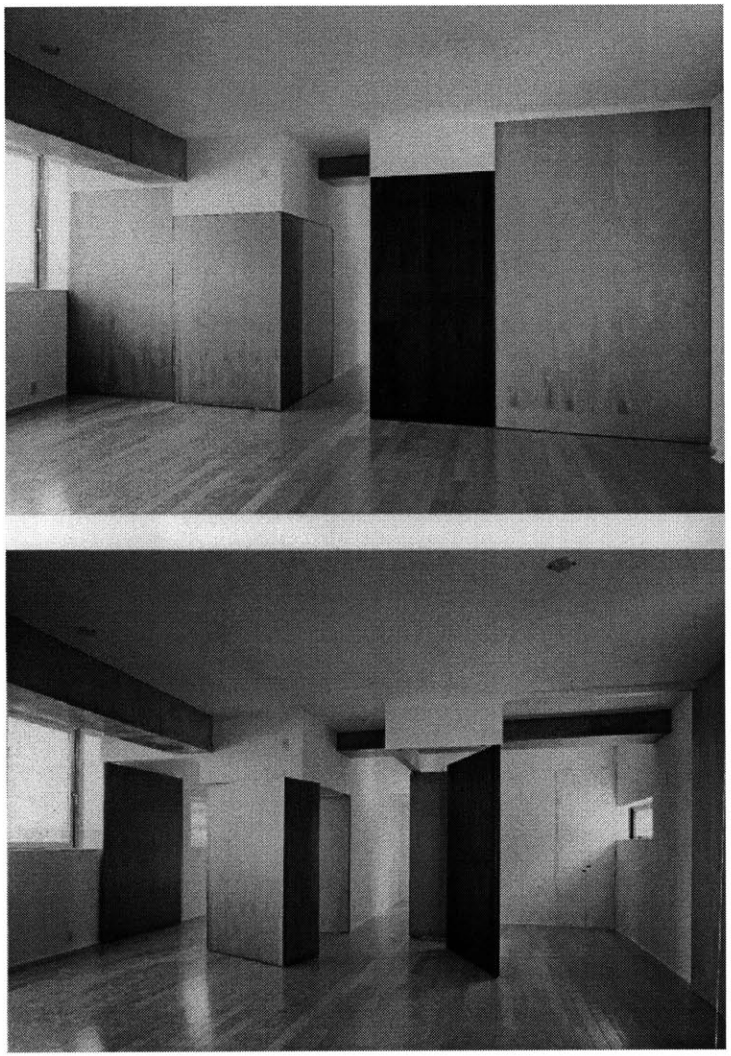
Introduction

1.1 Le Fresnoy Art Center , Bernard Tschumi.

While growing up my favorite space was our house's front porch, it was slightly elevated from the ground and defined by a waist high iron fence; it was the perfect space to watch the city pass. Its condition of part city part house always fascinated me, placed in a fluctuating zone between the public and private realm gave it a condition of indeterminacy between inside and outside that became a part of my interest in architecture.

The work of many architects have addressed this permeability of limits to varying degrees, and have made proposals that question relationships between form, program and space. For example, the recent work of Bernard Tschumi in the Le Fresnoy Art Center covers existing structures with one large roof. The space in between is crossed by walkways and platforms that inhabit the undetermined gap. This space is neither inside nor outside but somewhere in-between the duality often perceived as oppositional.

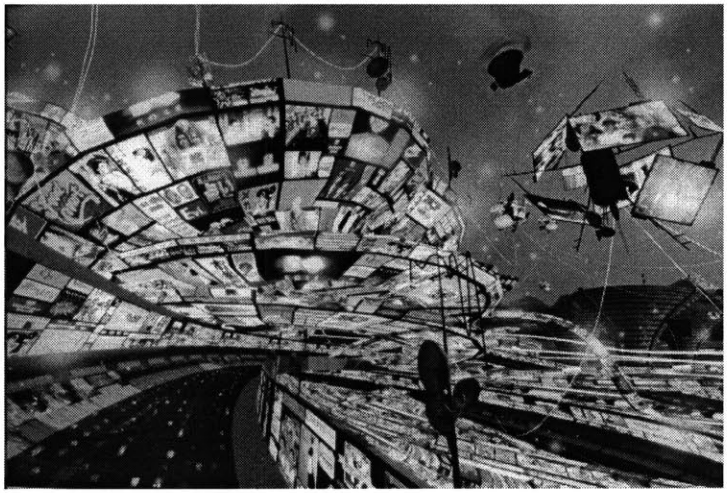
Similarly Steven Holl's Hinged Space creates spaces whose limits are acted upon by the users through movable partitions that define the spaces in one position and divide them in another. The space is always shifting, not between inside or outside but changing its internal order and relationships. The limits are not stable; instead they are constantly adjusting to particular conditions.



1.2 Hinged Space Apartment, Steven Holl

The rigidity of "limits" has therefore been questioned and redefined, giving way to overlapping interpretations of the meaning, shape or function of the spaces that they determine. The redefinition proposed by such architects creates a conceptual zone in which limits begin to "blur", where blur is understood as a lack of hermetic definitions. It becomes a permeable limit that allows the interaction through it. In the past, blurring has been looked at as a more of a formal gesture and not as a spatial quality. The object of this thesis is to explore the practical possibility of applying the qualities of the Blur to a spatial physical investigation.

In Toyo Ito's book Blurring Architecture, he advocates for a new tendency in architecture that reacts to the characteristics of our world culture, fixated on media, consumerism and multiplicity. He uses the term "Blurring Architecture" to describe the type of architecture capable of reflecting all these ideas, an architecture that values transparency over symbolism, homogeneity over multiplicities and weightlessness over gravitas 1. However, he creates a space in where the softness of limits simply affects the visual and not the physical or spatial aspects. The blurring is limited to transparency, while visually accessible form one another; they are still contained by hard edges and not the permeable limits of "a soft architecture which has not yet taken any particular shape". It's blurring is limited to transparencies, but the physical limits of a glass wall can be just as hard and impenetrable as a solid wall. In contrast

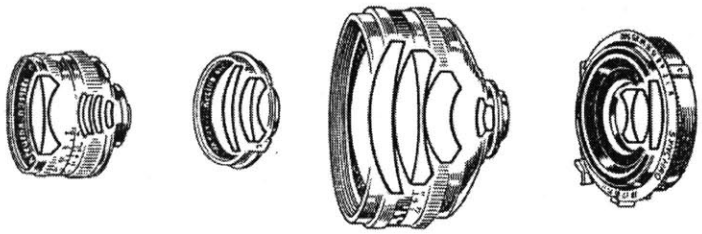


1.3 Total City, Project-Zaha Hadid, ilustration-Hideyuki

I propose that the edge of a space should not be determined by a physical line, but by the perception of change in the environment, a change we first experience through our sight. Sight becomes the key element for navigating our environment, and society in turn has evolved into an image-based culture that forces us to process visual information in all aspects of our life.

The image based space of vision has substituted functional space as a stage of contemporary life, the relationships between physical spaces are constantly being redefined by the change from function to image, forcing us to live in a state of spatial indeterminacy, a Blurred space that lacks a specific formal, territorial or social definition. The notion of "limits" is constantly being questioned and redefined by this transition, giving way to overlapping interpretations of the meaning, shape and function of limits and the spaces that they contain. This media space is shaped by our visual engagement with it; sight defines the territories we occupy and gives us crucial information of the spatial condition we inhabit but also brings the impreciseness of optics to the space.

Such understanding of a Blurred limit blurring is tied to the visual realm. Vision is at times the first sense that informs us of changes in our environment be it through a direct observation or through the subconscious function of the peripheral vision. Therefore we can start to play off the visual ability to convey information and use it as a first approach to understand a blurred limit,



1.4 Convertible lense system

exploring the characteristics of visions and the spaces that are created by it. For example, if you suffer from astigmatism the world without your glasses is a series of blurs of mass and color, without them the reality that is presented before you is different than your crisp conventionality, but there is still enough information present for you to read significant details. The hard limit looses all significance because you don't perceive it. The limit then is not determined by the physical boundary of a transparent glass, but by the changes in the space beyond it. We could argue then that the eye is producing a blurred limit because it is downplaying the preciseness of the physical limit and creating a perceived transition from one space to the other in the visual realm. Can we use this alteration of our environment, produced by the aberration in our eye as a tool to document and produce a blurred condition? Could we use photography to capture these instances?

A camera uses a system of lenses based on the same scientific principles than the eye. In the case of the camera, the lens actually consists of three independent lenses. Each one has intrinsically some type of aberration (colorcast, light distortion, deformations). In the case of the human eye when the "lens" produces some distortion, the problem is remedied by the compensation of corrective lenses or glasses. The same is true with the contemporary design of a camera lens; only through the interaction between the lenses can the camera truly work and accurately represent reality.

But there are other aspects to photography that make it a compelling medium to explore the link between spatial representation and the visual realm. Walter Benjamin regarded the photograph as the medium that allowed us to study a fragment of reality by being able to rip an instant from the fabric of time. According to Benjamin, in addition, through the use of the close-up we could see hidden structures that the eye couldn't see.2. By taking advantage of a lens-produced aberration we can make a blurred representation of an existing spatial condition, turning the simple act of photographing a space into a process that enhances the spatial elements or characteristics that are hidden from our constantly sharp vision. By allowing the camera to displace our vision we can produce a representation of the space that is sufficiently removed from our reality to make evident some relationships that we may have overlooked.

This process takes the idea of the corrective lens and inverts it. The normally crisp image of the camera is altered by the addition of an extra lens that distorts the image instead of making it clearer. The camera is treated as the recorder of an image related to the blur that is lost in human vision and the lenses that are added to it as a filter that allows us to look at the world in a constantly blurred state. Thus blurred the image becomes descriptive of the visual blur, its study yields information about its spatial characteristics and its possible translation in to architectural space.

The thesis' first chapter discusses current architecture propsosals that explore spatial indeterminancies. Steaming from the analysis of spatial limits that such proposals create, I argue for a new definition of spatial limits which I call "Blurred"

The following chapter looks at the evolution of the photographic process' effect on its representation of space. I identify a shift in attitudes towards the effect of the camera, firstly perceived as un-biased recorder of reality and then perceived as a constrained reproducer of a limited part of our environment. Following this shift in attitude I argue that the blur emerges as a newly identifiable presence within the space depicted in the photographs. Because the blur in addition an inherent part of the cameras' optical system, it is present in the work of many photographers either intentionally or coincidentally. Therefore the blur in their images is studied to determine its effect on the space that is captured by them.

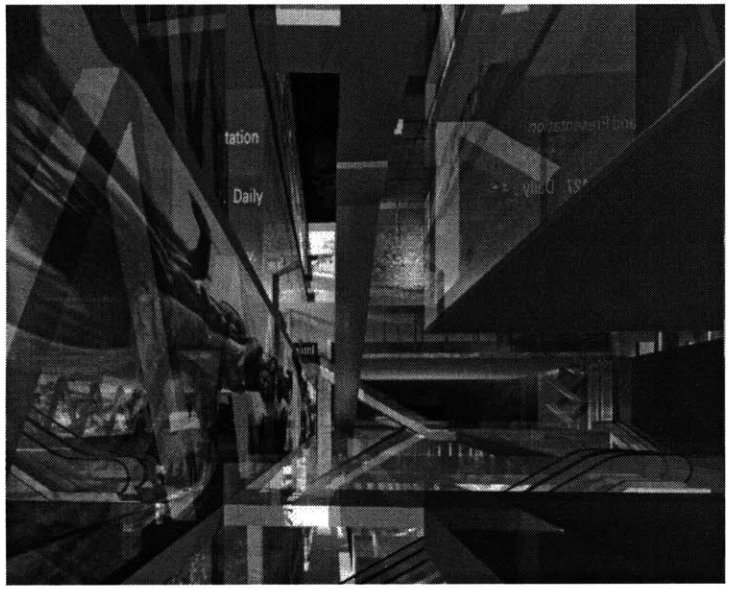
The understanding of lenses becomes necessary to understand the relationship between the blur and the photographic representation of space. The optical principals and aberrations that rule lens systems of the eye and the camera are presented, and the differences between the two systems are examined. These differences produce different ways in which the blur is perceived by each system and, consequently, these differences produce different perceptions of the space. Whereas the eye is unable to see the Blur, the camera can record it.

Finally we will explore the space that is defined by the blur that is recorded by the camera. The effect of the use of the blur in photographic representations of space alters our understanding of the space represented. What are the visual spaces defined and altered by the Blur? What are the spatial characteristics of a Blurred Space?

1 Toyo Ito, Blurring Architecture, (Milano: Charta, 1999)
2 Detleft Mertins discusses this argument in Walter Benjamin's Images of the Unconscious. History of Photography, vol 22, no 2 1998

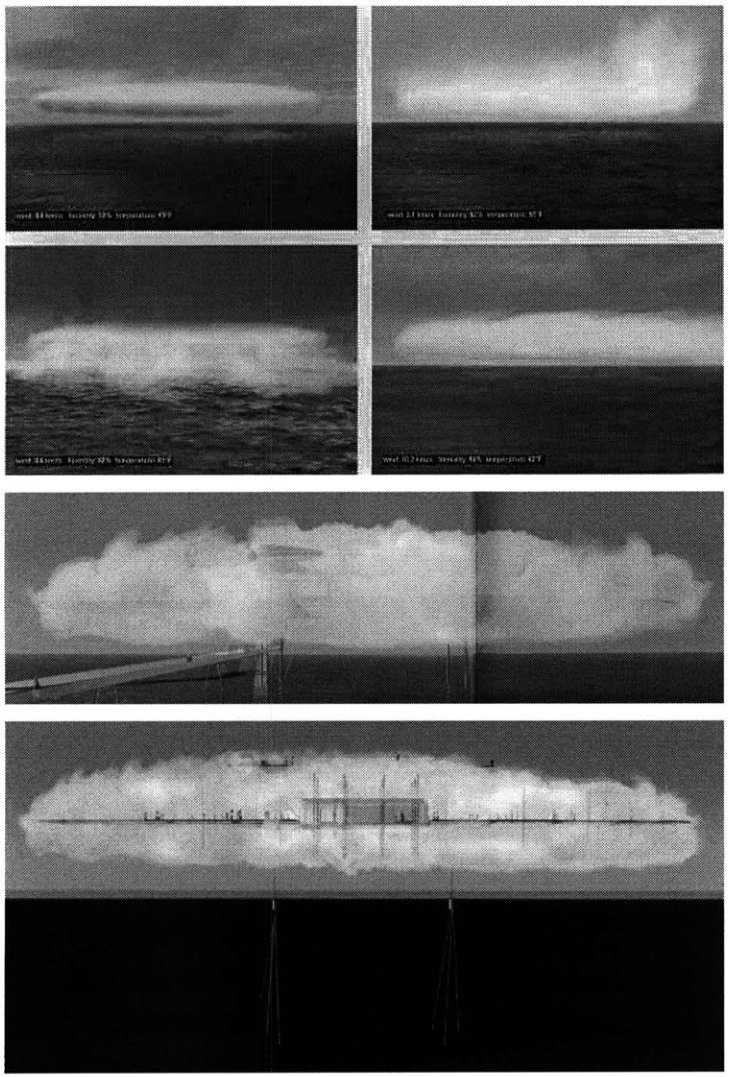
Blurring and architecture

2.1 Travelling, Unknown Photographer



2.2 Museum Proposal, MVRDV

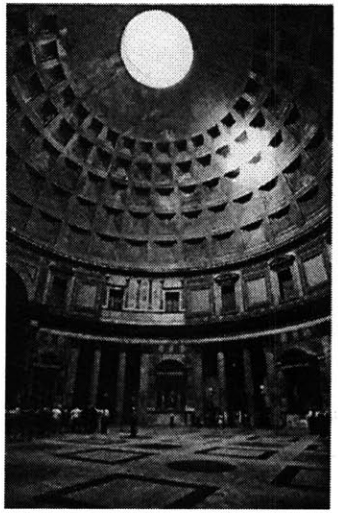
The ever elusive and often used word "Blur" is present in the widest range of subjects possible, from optics to sociology, it is used anytime we want to characterize something as imprecise, undefined or elusive and to a certain extent has become a buzz word that reflects the non committal world we live in, where media and its fast paced image culture have created a reality in which we are constantly bombarded with information, we are forced to experience a mass media space, assimilating constantly fluctuating images. The space we now occupy is not a space of singularities, of function, but a space of multiplicity where information is perceived, arranged and rearranged by the users in a basic structure that allows them to define and navigate the space1. Media space has substituted functional space as the stage of our lives redefining the relationship between social, political or architectural spaces. We live in a state of indeterminacy; we live in a blurred space that lacks a specific formal, territorial or social definition. The polemic of the definition or limits of private and public space reflects this situation, the limit between the two are constantly redefined, or questioned to and extent where we can no longer draw a line where one or the other ends. If we are sitting in our house but are watching television or surfing the net we are a part of a bigger public space, the media becomes a window in to different reality than our physical one, we might be secluded in privacy but we are interacting in a "virtual" public space.



2.3 Blur building, Diller+Scofidio

Architecture has reflected this media space by building proposals which spaces have no clear function or form that define them. Architect's proposals reflect the fleetingness of the cultural context by proposing buildings that rely on this indeterminacy of form (The Blob and Light architecture of the late 90's) that resigned classical understandings of morphology in an attempt to develop new esthetic and spatial conditions. Toyo Ito describes this type of architecture as one that attempts to reflect the effects of new media technology and culture by being transparent, homogenous and not program specific. He defines this type of architecture as Blurred, "an image of a kind of soft architecture which has not yet taken any definite shape"2. The spaces play with various degrees of transparencies, reflectiveness and refractions to decompose the solid box -like forms. The ideal is to create a pure space that exist regardless of the shape of the container, in fact the goal is to not perceive the container at all and simply be in a space that is defined by layers of transparency whose edges are completely unperceived or blurred.

Diller & Scofidio have also developed a notion of a blurred building in their design for a pavilion at the Swiss expo 2002. The idea of an architecture that has not taken shape is at the heart of their proposal, the building materializes "de-emphasis", the immaterial, intangible space, it is made up of a steel structure that holds miles of pipes and thousands of nozzles that atomize water creating an inhabitable cloud roughly the size of a football field, you wonder in this nondescript space in



2.4 Parthenon and Pantheon

which all visual references are lost and where you not only can't perceive the limits of the space but the space itself becomes elusive. The project creates a space in which you are inhabiting the blur not being limited by it. These architects are trying to give form or spatialize indeterminacy, to define a space where the notions of how space is created or inhabited are challenged by an architectural space that is not a static container where we insert program, but a dynamic construct that shifts its spatial characteristics and alters the users perception of the space and activity (or lack of) that takes place inside it.

Spatial theories have categorized the different notions that defined space in the past. In his attempt to understand the historical progression of this debate Sigfreid Gideion defined three stages of differentiated spatial conceptions, conceptions that are more than formal proposals, but different attitudes towards the architectural entity and the space that it generates The first conception according to him is that of the early cultures like Egyptian and Greek, where architecture was considered a volume sitting in space, not something you inhabited but something that was placed in the greater homogenous space of nature that was able to claim an area of influence around it. Temples generated space around it but were not themselves spatial constructs. The second stage of spatial development according to Sigfried Gideon came with the Roman Empire, when the technological advances in construction (concrete, arches and vaults) allowed them to build massive public

2.5 Farnsworth House, Mies Van der Rohe

buildings that shifted the focus from the exterior space that the volumes generated to the interior spaces that where able to become more eloquent than ever before. Architecture no longer generated space but encapsulated it. The third spatial conception came about with modernity, when architecture shifted focus from looking at the interiority of its proposals, to also exploring the spatial relationships with the exterior. This conception of space proposed that modernity merged both preceding conceptions by understanding that the building generates space around it (influencing the ordering of it and dictating patterns for its use) and that the interior space limited by this volume is influenced by the exterior homogenous space.

Continuing Gideon's divisions we can define a fourth conception of space that has come about by the influence of the media space of information. As opposed to the third stage where architecture was conceived as a volume in space and as interior space at the same time, the new space generated by this culture of indeterminacy makes no absolute distinction between the space generated outward or contained inwards. Architecture is seen as a temporary limiting of the general exterior space in order to allow the activities of the users to take place. Architecture produces a space (which could be considered interior only in the sense that it is inhabited) that takes a part of the general space (that Gideon alludes to as exterior), and limits it, situating itself in a fluctuating zone between interior/exterior without having to define exactly it's position. This tendency to the undetermined and mutable is a

2.6 Exhibition Hall, Toyo Ito

reflection of society's image culture, where the preciseness of the image is not only destroyed by the fast pace interaction between the observer and the image, but also by the use of the blur in image. The spatial conception of this media space is similar to the way a blurred image defines the area of the subject without defining clearly the limits of where subject and background end, because doing so would make it be a static instant instead of the fluctuating space dictated by the always evolving. However the notion of "interior" and "exterior" is still present meaning that the possibility of the completely blurred limit is still elusive. In the cases that we discussed earlier, Diller & Scofidio come close to creating built indeterminacy, the problem with their proposal is that their building completely lacks spatial perception, the space you inhabit is devoid of any information that would facilitate your use of the space except for wondering lost through its cloud. It is an example of the power of the "de-emphasis". But aside from the space of spectacle that a world fair is, has little possibility as a new spatial conception because it precisely destroys any sense of space.

The desire to de-emphasize space has led architects to produce a "homogenous room whose goal is the further increase of homogeneity and transparency" however this space is still limited by the hard lines of the glass and steel of its structures. The blurred space is simply an optical illusion created by the play of refractions. But there is a different way to look at transparency than just visual immediacy, Collin Rowe and Robert Slutzky argue that "transparency" is not about simple

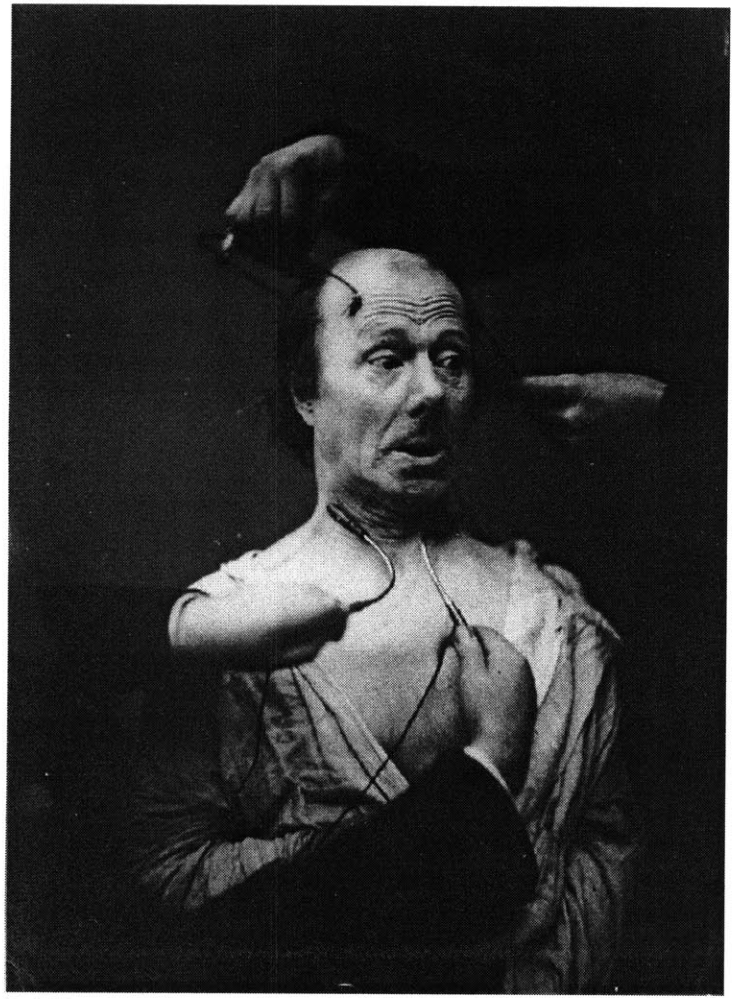
2.7 Curtain House, Shigueru Ban

overlapping of transparent forms but a simultaneous perception of different spatial locations, "the transparent ceases to be that which is perfectly clear and becomes instead what is clearly ambiguous"3. The perception of this multiplicity creates a space where a new type of visual quality is present. Its limits don't frame the adjacent space but incorporate it as part of itself. This happens in the work of another Japanese architect, Shigeru Ban. In his Curtain House the limit between the outside and the inside is much more than just the visual accessibility of transparency, but the incorporation of the outside space to the experience of the interior. The limit between the two environments is either completely permeable or constantly changing by the billowing of the curtain that can be used for privacy, the limit is blurred not because of its transparent quality, but because of its ability to change, adapt and redefine itself according to the owners desire. It is a blurred limit is not only visually permeable (which does not mean transparent) but also physically permeable

In this permeability lies a new way to conceive space as something exclusive of the interior/exterior duality, a space that is more interested in creating a zone of activity in space without having to determine precisely where it begins or ends. It's an interior space that generates space around it without fabricating a descriptive limit by which you can determine it's interior or exterior. It's a dense space you know you have entered by the change in the characteristics of the space not by a threshold condition

1 Beatriz Colomina, Information Obsession: Multiscreen Architecture. ANYthing, 2001 MIT press, Cambridge
2 Toyo Ito, Blurring Architecture. 1999 Charta, Milano
3 Collin Rowe and Robert Slutzky, Transparency. Birkhäuser-Verla für Architektur, Basel, Switzerland.1997

Blurring and photography

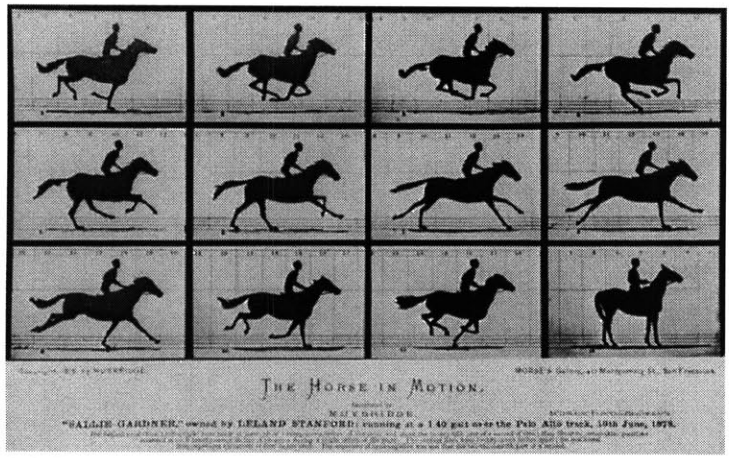


3.1 Fear

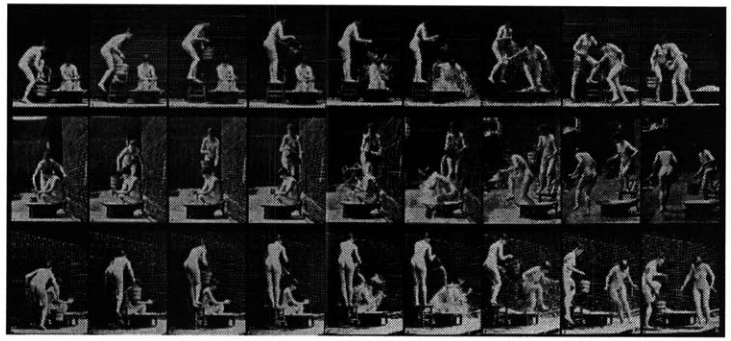
While architects struggle to give shape to the "de-emphasis", the undetermined and the undefined photographers have struggled since the beginning of their trait to precisely convey the sharpenes and preciseness of the camera. The motion blur or the out of focus image are intrinsically tied to the photographic process and the resulting images. Given photography's ability to capture in an image a representation of a space, could we then study blurred representations of spaces in an attempt to bring the impreciseness of the blur to spatial terms? Can photography become the tool to facilitate blurred space?

Photography and representation

The use of Photography as a tool has attracted scientist since it's development, using it to quickly and accurately capture a space or subject. In the 19th century photographers like Eadweard Muybridge captured the remote places of the world and brought them back to urban centers to show the citizens the vastness of the landscape, at the same time researchers at hospitals and universities used photography to graphically document pathologies, deformations and deviations forever changing the role of the medical illustrator, who used to draw detailed representations of the subjects. In these cases photography was used because it could produce a direct translation of what the eye could see, the fact that the images



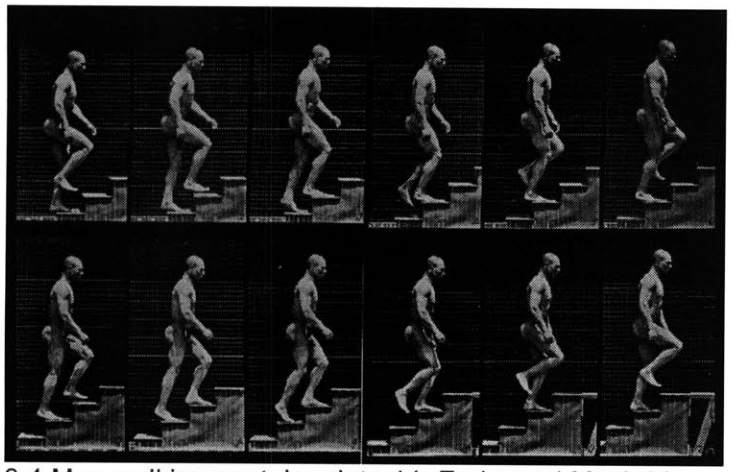
3.2 The Horse in motion, Eadweard Muybridge



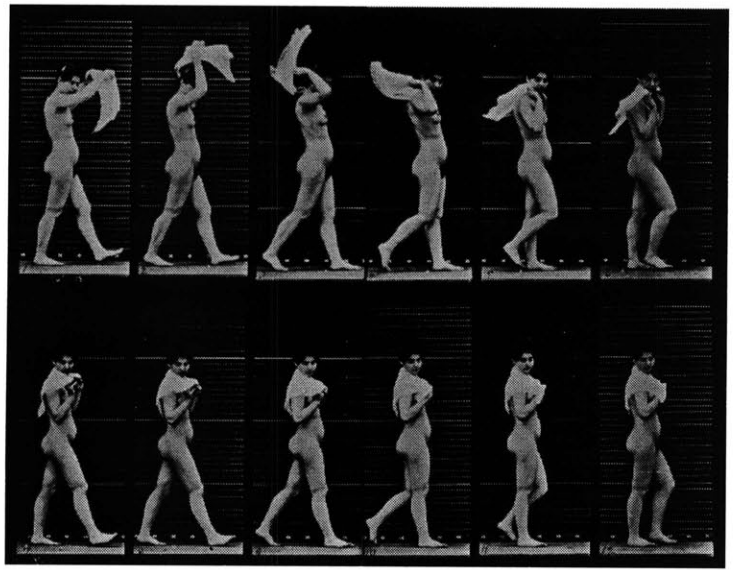
3.3 Woman emptying bucket of water on seating companion Plate 160,Eadweard Muybridge

where produced mechanically gave the camera its scientific credibility, what you saw was "real", the camera doesn't lie. These axioms lasted until the appearance in the last decades of digital manipulations where what we see is not necessarily "real" and the camera "lies" all the time.

But before the digital revolution the camera was a valued part of a lot of research teams working in the most disparate fields, basing it's importance in the directness, factuality, accurateness and immediacy that the images provided, which worked perfectly if you where trying to capture the static or still. However, if motion was involved the photographic technology available in the 19th century made the camera obsolete or in any case less than accurate, that is until Eadweard Muybridge was called by Leland Stanford in 1872 to help him settle a bet. Muybridge was an accomplished photographer in the west coast and was contacted by the former governor to capture in a photograph the movement of a horse as it trotted to prove that at one point it lifted all four legs of the ground. Muybridge began working on ways this could be achieved and came up with a system of cameras and magnetic sensors that where triggered by the horse as it ran in front of them. Muybridge captured the image of the horse floating above the ground and for the first time the camera became more than a tool that captures what the eye sees, but instead showed us something that was beyond human sight.



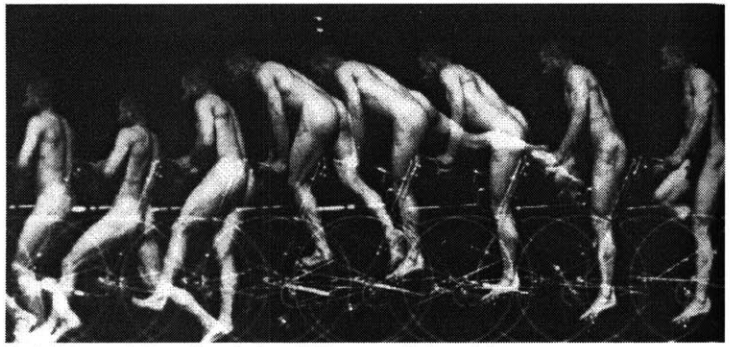
3.4 Man walking upstairs plate 14, Eadweard Muybridge



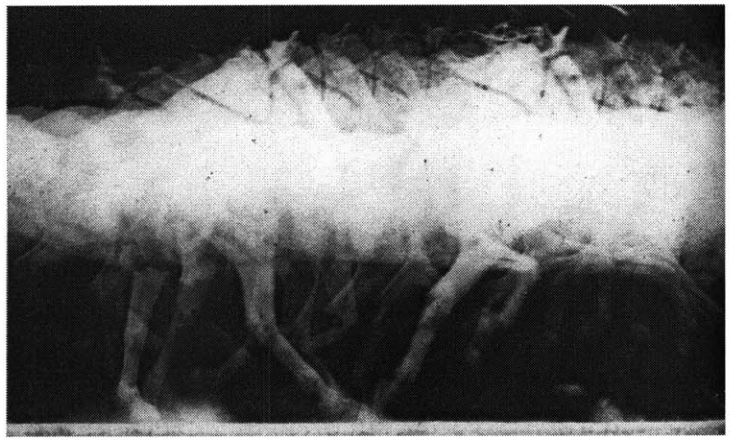
3.5 Woman walking throwing scarf over shoulder plate 100,Eadweard Muybridge

This simple bet changed our visual understanding of the world by introducing a sense of time and motion to what used to be static images. Where before the subject had to remain still for a long period of time to capture a detailed image, compressing a lot of time in to one image. Now Muybridge was able to reverse this relationship by expanding a single second in to many images, breaking time in to smaller parts than we where able to do so before.

The success of Muybridge's work gave him the opportunity to further his research in animal motion financed first by Stanford and later by Pennsylvania University. He extended his scope beyond animals to include human motion and activities. His work, while mostly scientific, began to set up shots that where anecdotic, perhaps fuelled by the desire to see everyday activities in the new way that his process allowed. The contrived camera set ups (24 cameras parallel to the movement, 12 in a lateral view and 12 at a 60° angle) allowed him to capture motion and time in at least 36 different simultaneous views that dissected the everydayness of the activity and turned them in to analytical advances in the field of anatomy and human behavior studies. His photographs influenced the way artist, represented bodies in motion1 marking a change in the usual relationship between painting and the camera, which was always trying to imitate composition and techniques developed for painting. The camera had developed such a new radical way of seeing that the influence not only reversed it's usual flow, but actually helped to create a new field in the



3.6 Man riding bycicle, Etienne-Jules Marey

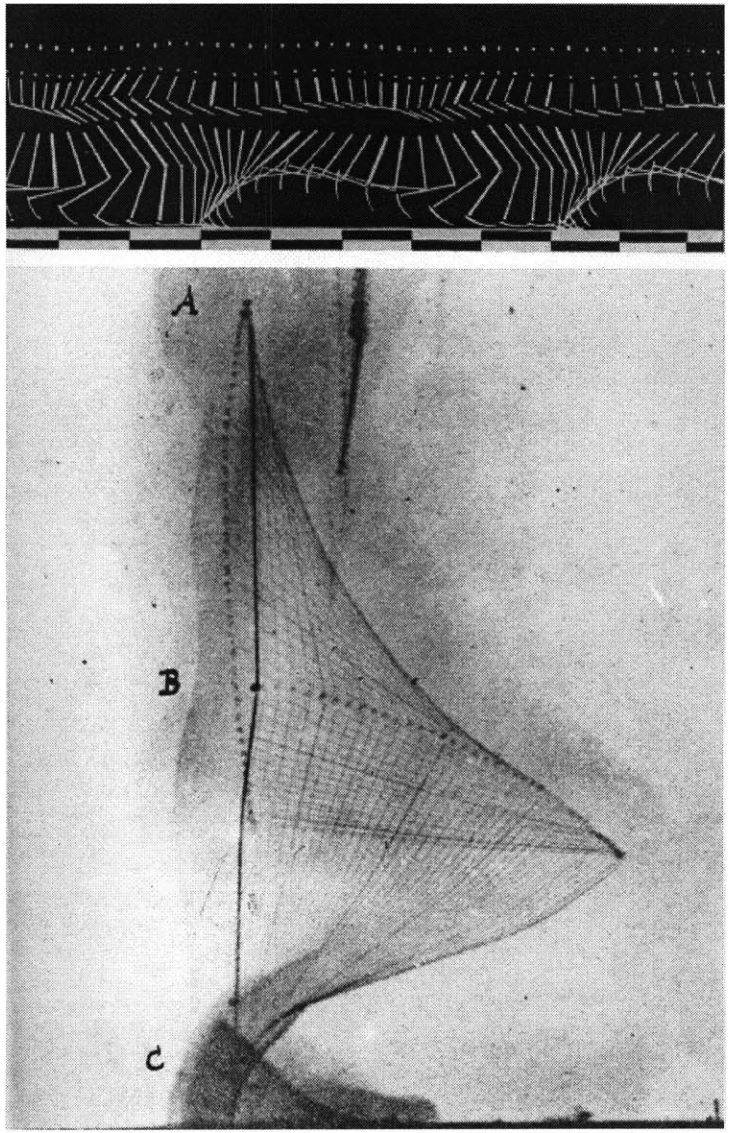


3.7 Horse Galloping, Etienne-Jules Marey

arts (cinema) by showing that conventional representations of motion where composites of the observer's brain2.

On the other side of the Atlantic French physiologist Etienne-Jules Marey was also working on animal and human motion. He had devised complex apparatus that mechanically transferred motion to analytical charts in an attempt to measure movement in dynamic bodies to apply to them the same principles of thermodynamics that applied to mechanical systems; in order to achive this he needed to quantify and understand the amount of energy that was spent at every stage of movement. After seeing Muybridge's pictures he recognized in photography the tool needed to capture the elusive motion, like other scientist of the time he regarded the camera as the only unbiased observer capable of objectively representing those things that human vision could not capture, but found that muybridge's methods of splitting the images in individual frames was discarding key instants in the process.

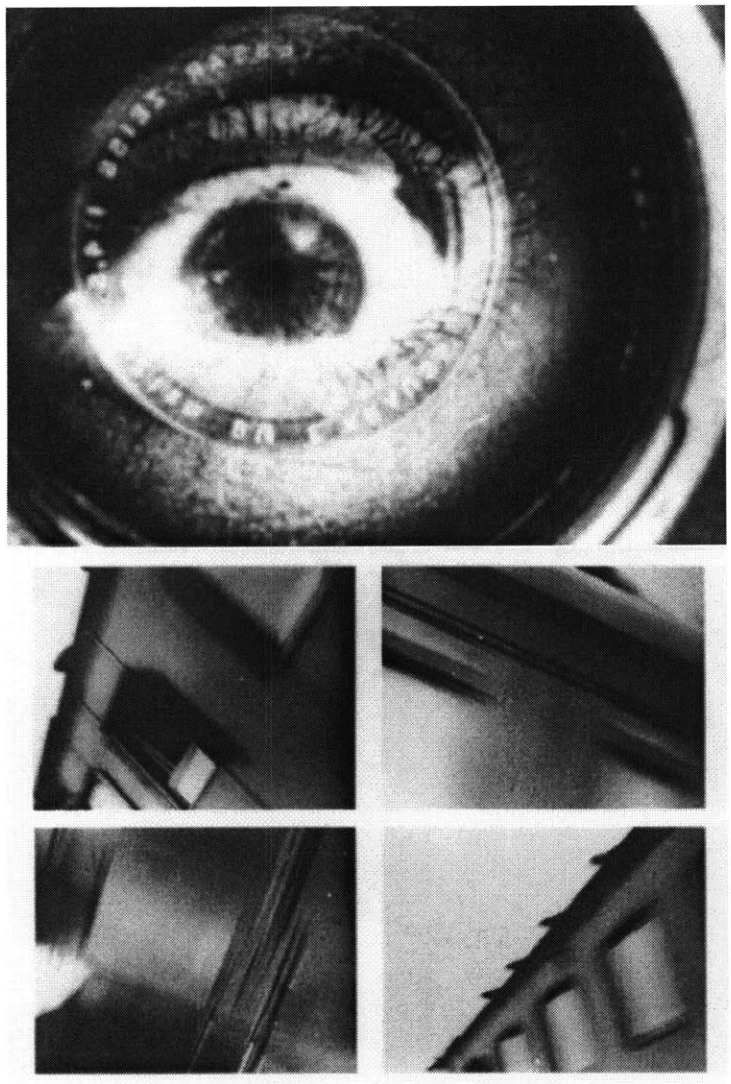
Marey filled this gap in information by developing its own photographic array that consisted of a high speed camera (shutter speed of 1/2000th of a second) mounted on a rail that followed the movement of the subject exposing all the shots in one plate. The resulting photograph was the representation in one image of all parts of the movement, the more exposures he got the more precise the movement's description. The problem was that as he attempted to



3.8 Motion diagrams, Etienne-Jules Marey

capture all phases of the movement, the images began to overlap and obscure details in the complexity of bodies in motion. He turned to abstraction, reducing the excessive information that the camera was capturing and focusing on the parts of the body he was looking at. By covering the subject in a black suit and attaching to it reflective stripes and dots he achieved a tight sequence of lines that "decompose bodily motion in to the smallest temporal and spatial segments"3 allowed by photographic techniques, turning the photographs in to diagrams that where further abstracted in to graphical notation. Photography was not a representation tool for him, instead it was the means to get the information he required out of the body in such a way that he could then manipulate or work on. Before he produced his abstractions his images where a continuous representation of time and space, the camera was not capturing a fragment of a second in a single image, but slowing down time in a way that the eye could see the different stages of the body. By reducing the body to lines and turning the subject in to an abstract representation his photographs transcended direct representation and produced analytical data that at once captured time and space.

The camera transformed from an object that aided human vision to a completely independent observer that had the ability to see beyond the limitations and flaws of human vision. Writers like Walter Benjamin and Dziga Vertov attributed an enhanced sense of perception to the camera and the lens



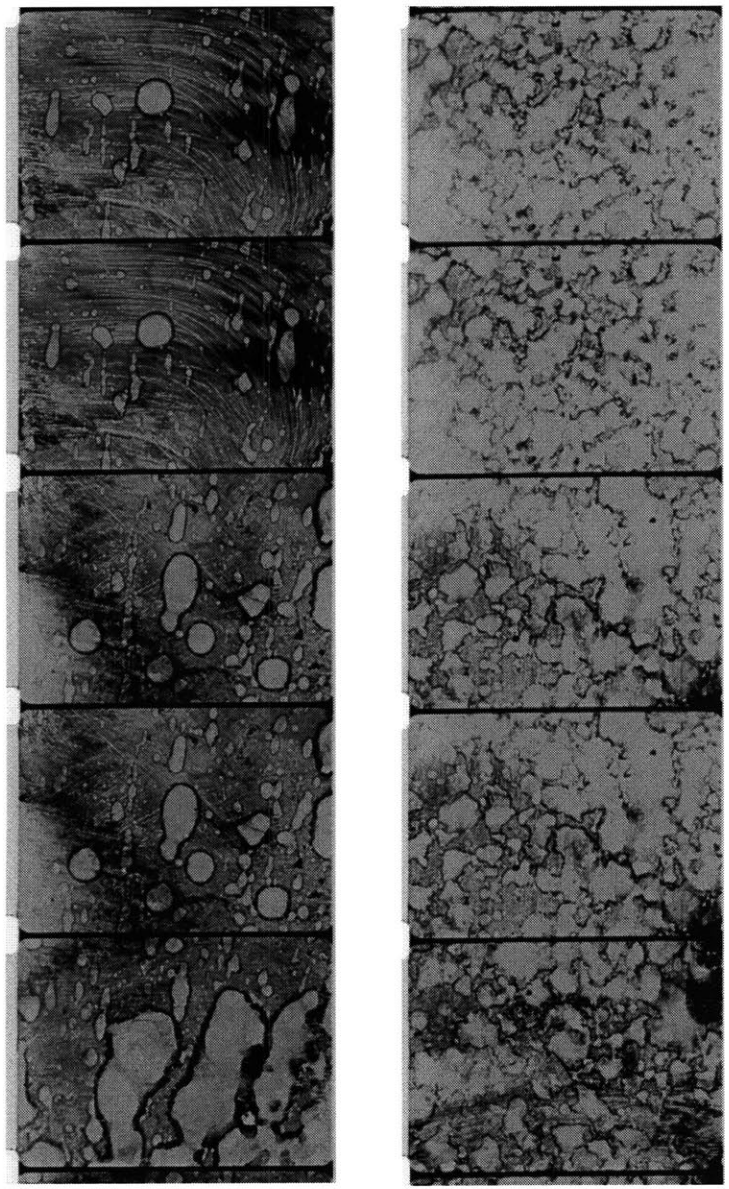
3.9 Stills from *Manwith the movie camera*, Dziga Vertov

and advocated for a new use of the medium in which we explored the new reality that the camera was able to unfurl in front of us. What we saw, according to them, was not necessarily what happened in front of the camera, but what the camera and its way of seeing captured in that instant. Time and space became abstracted like the movement of the runner in Marey's work.

Dziga Vertov in his work in films developed the concepts of the Kinoglaz (film-eye) in which the camera literally sees the world in its own way. It allows the camera to fragment and rearrange space and time taking away form the preconceived notion of its accurate representation of reality and presenting a reality that only exists in under the cameras gaze. The camera, according to them, is the ultimate observer that dialeticaly presents the world and the complexities that are in it far beyond our inferior sense of vision. He writes "Kino-Glaz offers the possibility of seeing the living process in a temporally arbitrary order and following a chosen rhythm, the speed of which the human eye would not otherwise be able to follow"4. This and other theories regarding film are captured in his film The Man with the Movie Camera, in which we follow the camera and its operator, as they document everyday activities. The star of the movie is the camera, not simply representing what it sees, but slowing it down, superposing it, creating montages and radically altering our perception of the environment. The camera and the image that's produced become detached critics of a reality that we are not able to see.

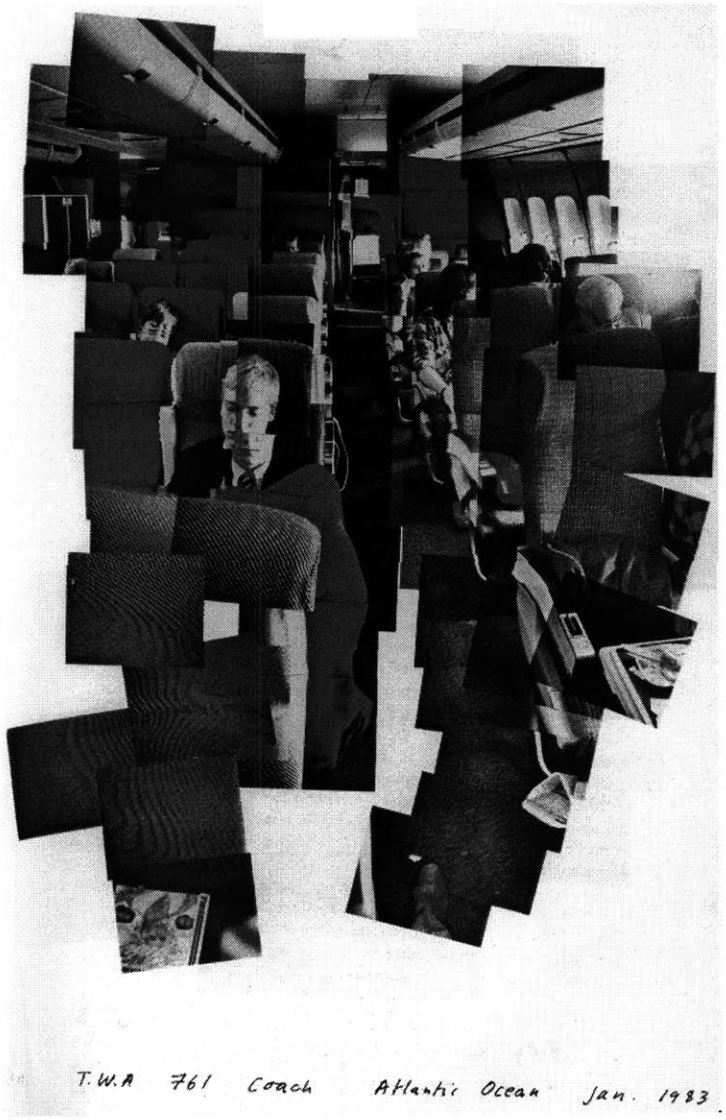
Walter Benjamin in The Work of Art in the Age of Mechanical Reproduction (1936) identified photography as a new way of reproduction that was able to bringing out information of the original that was unattainable to the naked eye; the camera and the lenses are able to rip an instant from time and freeze it in a frame so that the eye could study it. The photograph is no longer a stable and unchanging representation of space and time, scientifically preserving the idealized subject, but a tool of mass production that destroyed the notion of authenticity and originality and removed space and time from the frame. Benjamin also proposed that the value of the camera's way of seeing was in the techniques that the camera operated on the image that made evident what was before only unconsciously perceived. "The enlargement of a snap shot does not simply render more precise what was in any case already visible, though unclear: it reveals entirely new structural formations of the subject matter... It thereby becomes tangible that a different nature speaks to the camera than to the eye. For in a place interwoven with consciousness one interwoven with unconsciousness steps in"5. Benjamin argues that aside from the aspects of reproduction, the operations of the camera like blow up, close up reveal the hidden meaning not only behind motion or time, but also behind the everyday objects that populate our environment.

We have gotten to a point where photography and the camera are regarded as more than an extension of the eye or an enhancer of vision, speaking a different visual language



3.10 Film from *Prelude 2*, Stan Brakhage

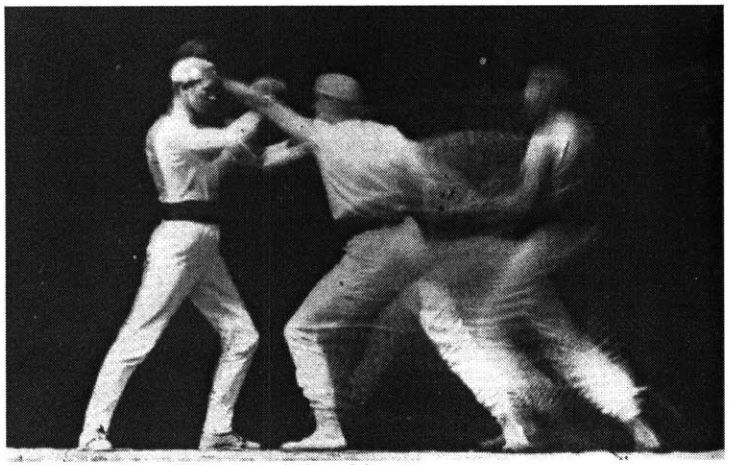
that fragments, expands, freezes and dilates space and time. Where the image produced is no longer a real object but the representation of a reality that has past. The "original" is non-existent, just reproduced. If we understand photography as such an abstract process, why then do we still expect it to present to us an image that is made to meet the limitations of the human eye? Can photography develop it's own visual vocabulary by exploring the inherent process of this alternate way of seeing, creating in the process a new reality that only exists in this representation? Muybridge and Marey used photography to stop movement, they took advantage of the technology they had at the time and used it as a tool to help them in their research. This understanding of photography as a creator of an image that exists separate from the object could be just as much a tool as it was in those days. According to Stan Brakhage we should re-learn to see our environment, we should "Become aware of the fact that you are not only influenced by the visual phenomenon you are focused on and attempt to sound the depths of all visual influence"6, influences that the camera can make evident. However if we are to achieve this we must free photography from the constraints of compositions, lenses, focal lengths, and even color that have limited its range as a tool. Precisely because of this limitation David Hockney criticized the camera comparing it to a paralyzed Cyclops, limited by a single lens and its forced perspective that creates greater distance between viewer and subject. As a reaction to this time and space, in Hockney's photographic collages is fragmented and compartmentalized



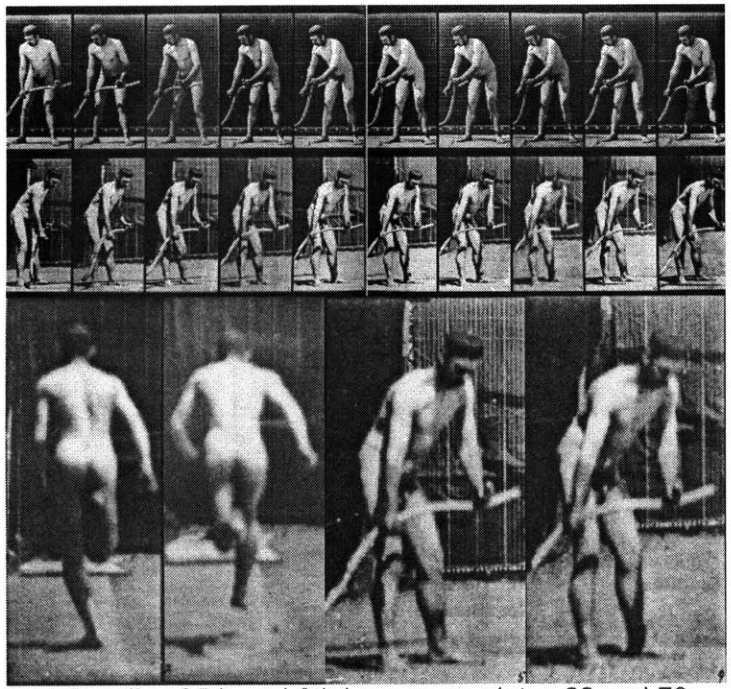
3.11 Jhon on TWA flight 761, David Hockney

forcing the viewer to see the image as more than a flattened representation but as something that exists in different times and perspectives. The space captured in Hockney's collages exist only in their representation. By breaking the constraints imposed on the photographic process Hockney was able to create a new way of understanding time and space in an image. The time captures is related to the time we need to understand a space. In a way, even though the space represented is not similar to our visual perception, the experience of the photographic space and its navigation is related to the way we would experience a physical space.

The photographic process has been tailored to meet the standards of the human eye (focal length, definition and depth of field) any image produced that does not meet this standard is thought of as inferior, a deviation or artistic statement, with little value for analytical purposes. The camera is forced to work under these conditions because, like Brakhage says, "typically man rejects that which doesn't appear to be readily usable"7 and the image produced by this deviation from the norm was quickly rejected as something that strayed from the true purpose of photography. The lenses that form the camera were precisely balanced between each other to correct any deformation on the image that would displace it from the range of human vision. Our eye's lens is flexible and alters its shape to maintain our viewing standards. However, the cameras lenses are hard and un-malleable and cannot adjust themselves to change.

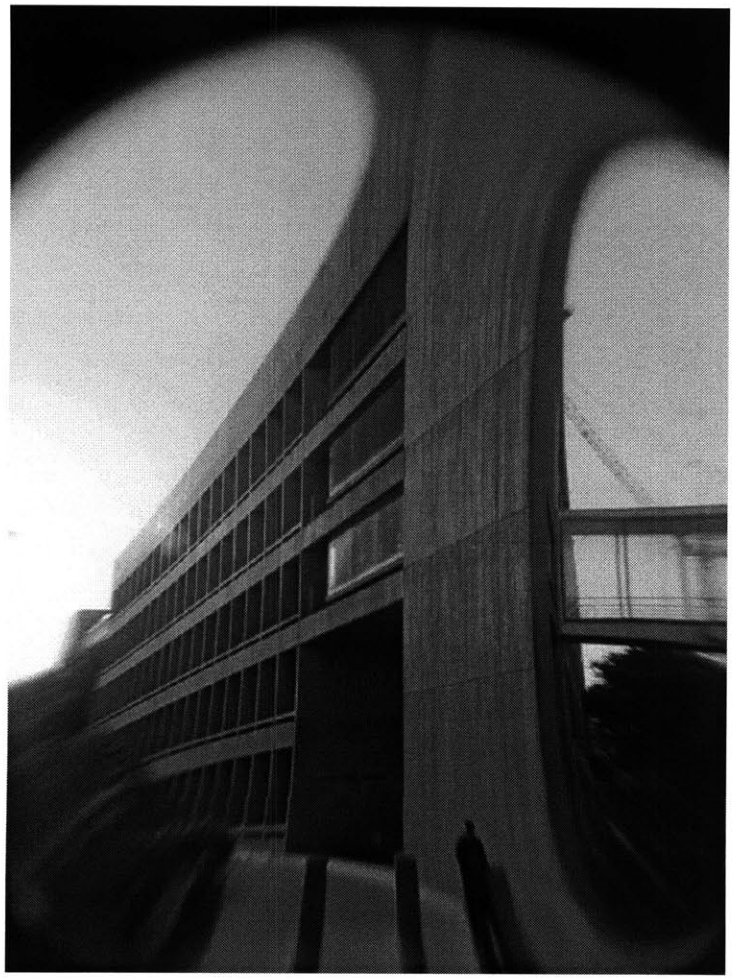


3.12 Boxing, Etienne-Jules Marey



3.13 Details of 5th and 9th images on plates 22 and 79, Eadweard Muybridge

Lens deviations have been an intrinsic part of the photographic process, and can be found in the work of Muybridge and Marey, which usually are associated with preciseness and exactitude. The limitations of the camera where what drove Marey to abstract the image in to lines to remove the overlapping or motion blur. But the images of the motion blur represented a different understanding of speed and mass that the simplified diagrams lost in their preciseness. The understanding of sequence and directionality, of the flow of the body in space and time, that the blurred images presented were lost when translated to lines in the simplified diagrams. In the case of Muybridge, the exactitude of his images and its freezing of time and space are qualities that identify his process, but his plates reveal that the 5th and 9th camera used to capture the lateral view of the subjects sometimes presented some focal deviations, a blurred image. Within the preciseness of Muybridge's method the image can be easily overlooked or discarded as the flaw in the sequence, but if we stop to analyze the effect the cameras inherent aberration had on the definition if time-space we could develop a new understanding, not only of the subject, but of the process itself. In this sequence the fact that the image is blurred gives you different information about the space itself, a space that is compressed or flattened by the lack of definition, the outline of the figure and the lines of the body are softened, if before we looked at the image to see muscle definition or forces in action on them, by removing the extra information the blur allows us to see the general shape of the body, the way it is

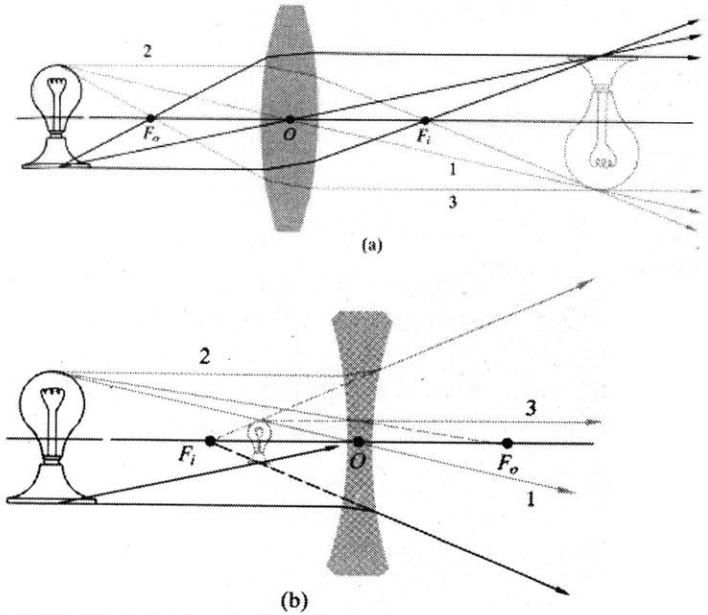


contorted by movement or the placement of its parts. The abstraction that Marey produced to remove the excess information form his motion images is now produced by the lens of the camera. The lens alters the space just in those frames and changes from within the structure of Muybridge's intentions.

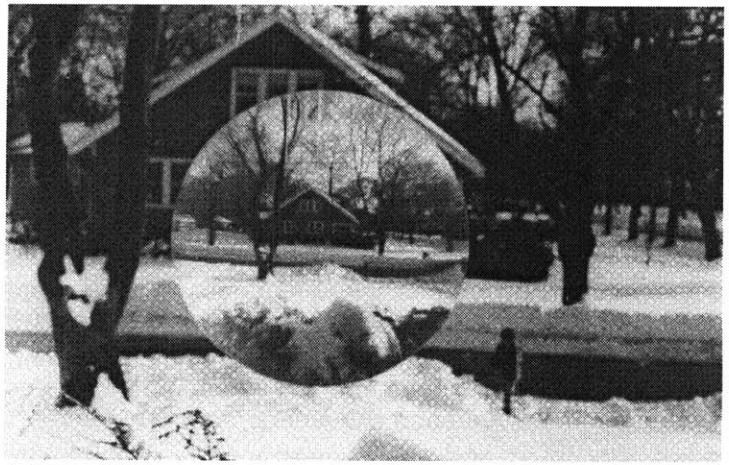
By letting the components of the camera act independently from human vision we can capture a reality that is truly impossible for us to see, not because of the speed of the exposure but because of the differences between the optical systems of the camera and the eye. The image captured by the cameras lenses still captures time in an instant or prolongs the exposure to expand it, but its effect on the space is completely different than that of traditional photography. The conventionality of perspective is transformed by the lenses, space expands and contracts it is deformed and warped, even light and color are manipulated in the process; the result is a space that can only exist in the cameras representation of it, a "blurred space" that does not exist according to our eyes but that the camera perceives as its reality. The image becomes destabilized in such a way that photography no longer reproduces the subject but creates an alternative to it. It's not a representation of the space, but the creation of a new one that exists only in the image, a space that is linked to the subject by origin not by form.

1 In the introduction to the book The human figure in motion (1955, Dover Publication) Robert Taft suggests that artist Frederic Remington adopted a mode to represent the galloping horse that bore a remarkable resemblance to Muybridge's images.
2 Frederic Remington quoting the work of a "modern scholar" in the introduction to The human figure in motion (1955, Dover Publication)
3 John w. Douard, E.J. Marey's visual rhetoric and the graphical decomposition of the body, published in Studies of History Philosophy and Science Vol 26, no 2 1995
4 Dziga Vertov, Kino-Eye, Lecture II, The Avant-garde Film, edited by P. Adams Sitney, (New York University Press 1978)
5 Walter Benjamin quoted by Detleft Mertins in Walter Benjamin's Images of the Unconscious. History of Photography, vol 22, no 2 1998
6 Stan Brakhage, Metaphors on Vision. The Avant-garde Film, edited by P. Adams Sitney, (New York University Press 1978)
7 Stan Brakhage, Metaphors on Vision. The Avant-garde Film, edited by P. Adams Sitney, (New York University Press 1978)

Blurring and lenses



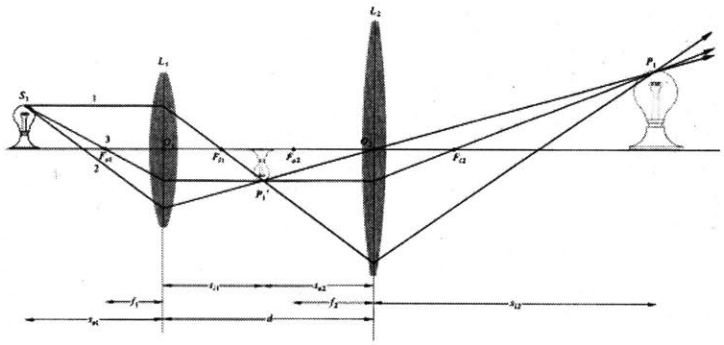
4.1 Positive and negative lens



4.2 virtual image formed by a negative lens

A lens is a refracting device that is used to reshape light in a controlled manner. The way the lens bends the light depends on its shape, whether it's a positive (convex) or negative (concave) lens, affecting the type of image it produces. A positive lens produces an inverted image that you can actually project on a surface, a "real" image, while a negative lens produces a "virtual" image with correct orientation that is not projectable but is viewed through the lens. The preciseness of the lens is only true for images produced exactly at its focal point, which is crisp and detailed. Light also arrives at a different area aside form that exact point, this area is called the Blur Spot and its located immediately in front or behind the focal point. There is still an image produced at this area, but if you place a surface within it the image that is produced is not a perfect recreation of the source but a soft imprecise one. The blur spot is what we see when we have an "out of focus image" or if we have sight problems.

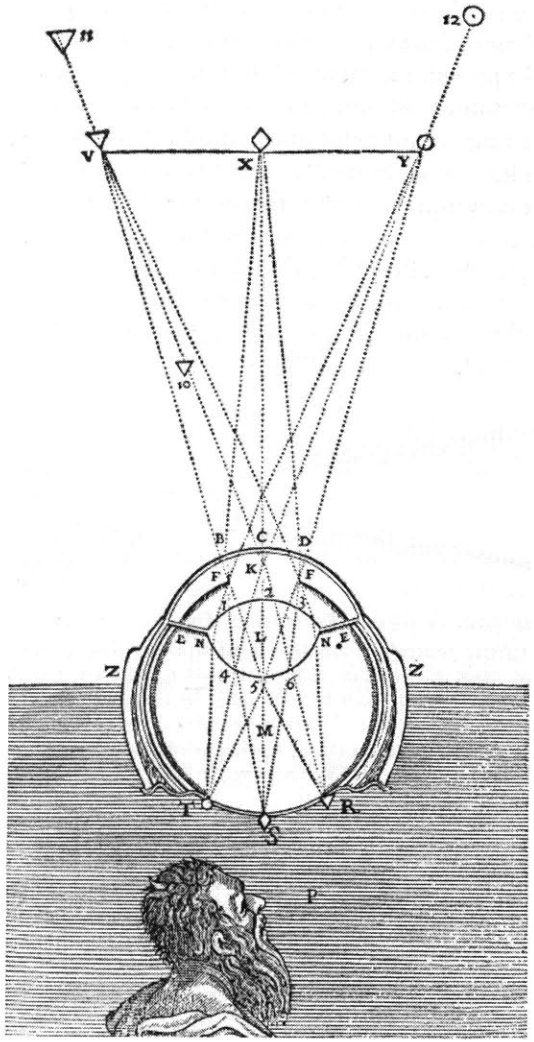
There are also aberrations in lenses that causes distortions, color shifts or blur because they make certain rays to be refracted to the blur spot instead of the precise focal point. They are divided in to chromatic and monochromatic aberrations. Chromatic aberrations are produced by the fact that different color lights have different frequencies, when the ray goes trough the lens, different colors are focused at slightly different points producing some color separation in the image



4.3 Simple optical system

produced, and causing the perfect image of one color to be formed in the blur spot of others. Monochromatic aberrations are deformations produced by the shape of the lens and the way it bends the light. There are 5 main aberrations which are: Spherical aberration, produced by the rays of light that enter the lens furthest from the center and are focused on the blur spot, producing an image with a bright central spot resulting in the overlapping of images. Coma produces a slight overlap of the image in spherical lenses as a result of the rays of the periphery being refracted. Astigmatism is the result of rays entering the lens at different angles and producing an image that can't be focused. Field Curvature is caused by the fact that the focal point lies in a curved plane behind the lens that is equidistant to a curved plain in front of the object, this produces an image with its edges out of focus because the focal point is a in front of the image plain. Finally the last aberration is distortion, a lens varies in size and magnification along it's axis, rays of light that enter at different points of it will be bent and magnified accordingly producing an image that is distorted either positively (pincushion) or negatively (barrel).

These aberrations can be corrected either with slight alterations to the shape of the lens or with the addition of an extra lens placed at the right distance. This is the principal behind corrective lenses for sight problems. Such layering of lenses allows us to have complex optical systems that enhance human vision like cameras, microscopes or telescopes, that allows us to see things beyond the limits of our optical array.

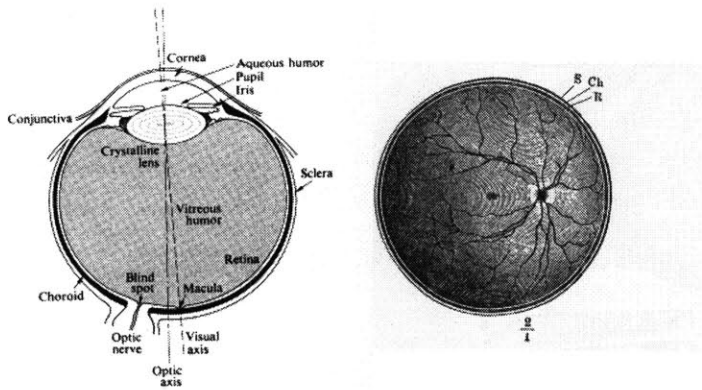


4.4 Formation of the retinal image acording to Descartes

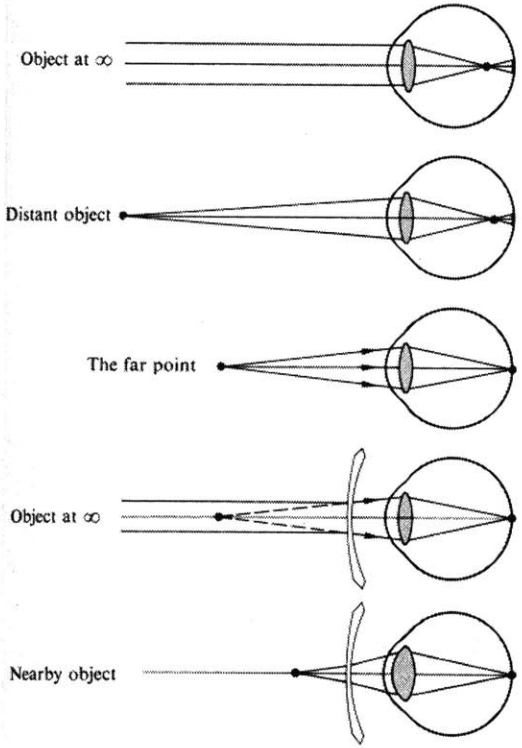
Lenses and the eye

The first to try to decipher the inner workings of the eye where the Greek philosophers like Plato who thought that a light flowed from our eyes that, when fused with natural light, increased the luminosity of the object allowing us to see them. Aristotle did not agree with this theory of light emanating from the eye, and believed instead that light was a non-corporeal entity that created a link between the eye and the object. Medieval scientist proposed that the eye function just as a receptor of light but the theory of light emanating from the eye still was considered the correct one. When the Camera Obscura was developed it became evident that there was an image that was formed in the inside of the eye and that the eye perceived this image. 'Experiments by Scheiner and Descartes removed the cornea from an animals eye and seeing through it confirmed the formation of this image in the wall of the retina.

The fact that this image is formed tells us that the eye behaves like a positive lens that concentrates the rays of light on the retina, it is composed of two main lenses that adjust the light that they receive to produce this image. These two lenses behave as one complete optical system that adjusts itself to different focal lengths. The two lenses are the cornea and the crystalline lens, which are at the outer edge of the eye. The light is first refracted as it passes the curvature of the cornea (which bulges outward) and is directed towards the crystalline



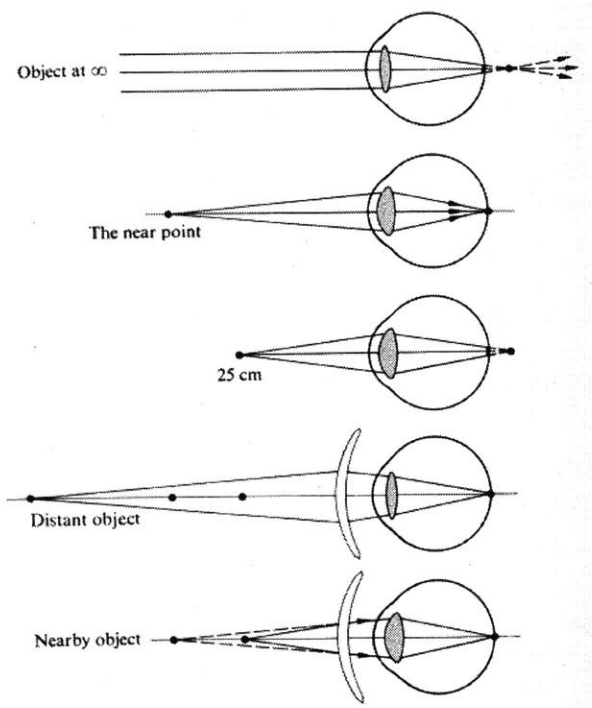
4.5 Two cross sections of the eye



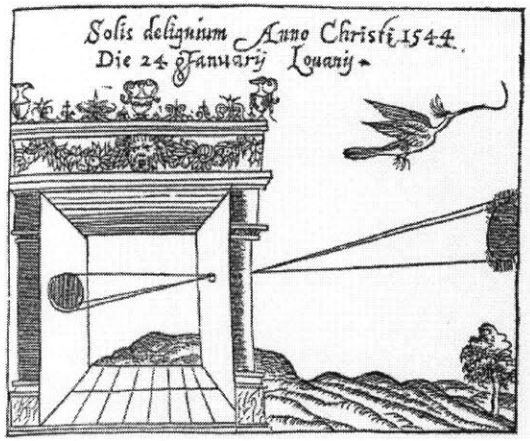
4.6 Nearsighted eye with lens correction

lens (the lens is shielded by the iris, which acts as a diaphragm that regulates the amount of light that enters the system). The lens is a layered fibrous mass that refracts the light in different ways, it varies from man-made lenses in the fact that it's flexible and can vary in size (compressed or expanded by the ciliary muscles) to allow for the fine focusing. The image that results from these lenses is produced in the back of the eye which is covered with light sensitive cells, the rods (which have great light sensitivity but little color) and the cones (which recognize color) This is the retina. The retina has a particularly dense part that is called the fovea centralis where the axis of the lenses hit it; this is the most sensitive part of the eye. A few millimeters from this is the eye's Blind Spot, an area completely devoid of rods and cones where the optic nerve leaves the eye, in this spot we can't detect anything. Given this condition the eye is usually moves to place the image of what we are focusing on in the fovea to get the most amount of information.

As in optic lenses, the eye also has aberrations that hinder its use. These are produced by the wear and tear of the mechanism of it and usually are correctable if we add a lens to alter the focal point. The three principal aberrations in the eye are: Myopia (nearsightedness) is the condition where the image of distant objects is refracted by the cornea and crystalline lens to a focal point in front of the retina. The image of a close object still is placed in the retina. Hypermetropia (Farsightedness) produces the image at a point behind the retina. Astigmatism, the most common of the aberrations, is



4.7 Farsighted eye with lens correction

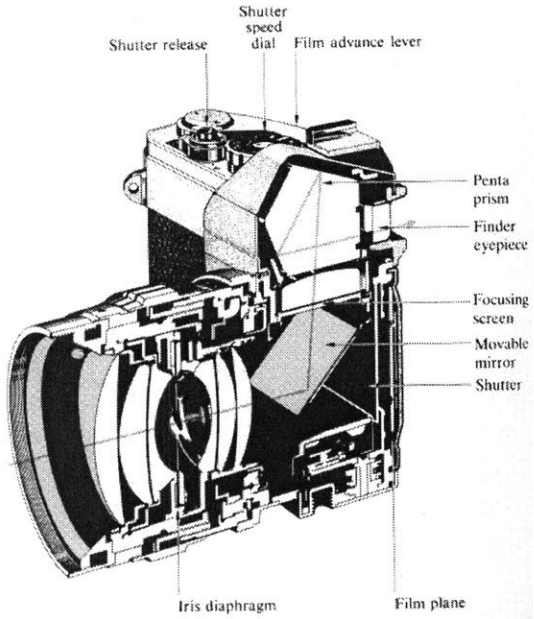


4.8 Early drawing of a Camera Obscura

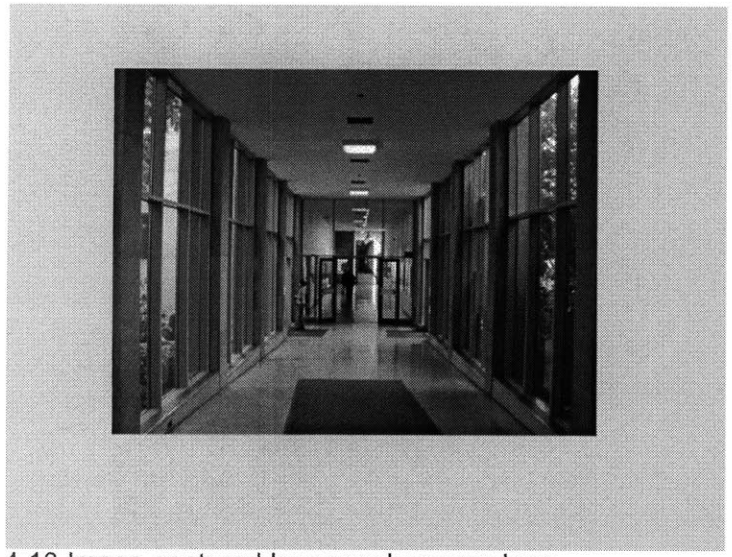
produced by a deformation of the cornea, therefore the image produced on the retina is slightly distorted and out of focus because the eye can't create a precise focal point. To correct these deviations from the "normal" you follow the same procedures as a man made lens, placing additional lenses in front of the eye to compensate the displacement of the focus. The result of all of these aberrations is that we in fact perceive the blur spot of the system instead of the focal point, our sight is not the precise instrument we regarded it to be since there are very few "normal" eyes with a precise focal point. The blur is the average perception.

Lenses and the camera

The development of the modern camera started with the Camera Obscura, the first of which was just a darkened room with a small hole on one of its walls. The Camera Obscura produces an image inside this darkened space by controlling the light that penetrates the space through this pinhole. Aristotle knew the principle of the Camera Obscura and Leonardo da Vinci described it in his writings, but the first detailed description of the camera and its process and applications came with Giovanni de la Porta who used it to record landscapes by placing a surface where the image was produced he was able to trace the image and produce an accurate, optically correct representation. The distance from the hole did not affect the focus, just the intensity of the image. The focus was determined by the size of the hole, which had



4.9 Cross section of SLR Camera



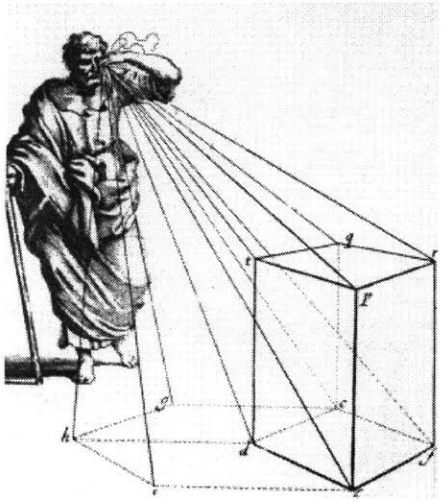
4.10 Image captured by normal camera lens

to be just the right size neither to big or small to produce a sharp image. Joseph Nicephore Niepce became the first photographer when he placed a photosensitive plate at the back of a small Camera Obscura and recorded an image of his workshop.

The camera lens, like the eye, is made up of a series of lenses; each of these lenses individually can't produce a precise image because the different distortions or aberrations that are present, only by working together can they correct each other to focus the rays of light on the sensitive film. The mechanism of the camera lens is however similar to the eye, the difference lies in the way the camera focuses, as opposed to the malleable crystalline lens that adjust itself to achieve focus, the hard lenses of the camera are static in their position to one another and can only achieve focus by moving the whole array back and forth form the film. In a way the camera eye, like Dziga Vertov described it, has very thick corrective lenses that repair its inherent astigmatism, myopia or hypermetropia.

Another difference between the Camera eye and the Human eye is how much information we can get from it. The size of the image in a camera is cropped by the diaphragm and the square edges of the film, cutting out of the image any field curvature or peripheral distortions. Also the range of the focal point of the lens can't be too big to assure that the image produced is as sharp as possible, this limits the amount of peripheral information that enters the image and results in a

4.11 Fig 4.12 with part of peripheral information croped by lens

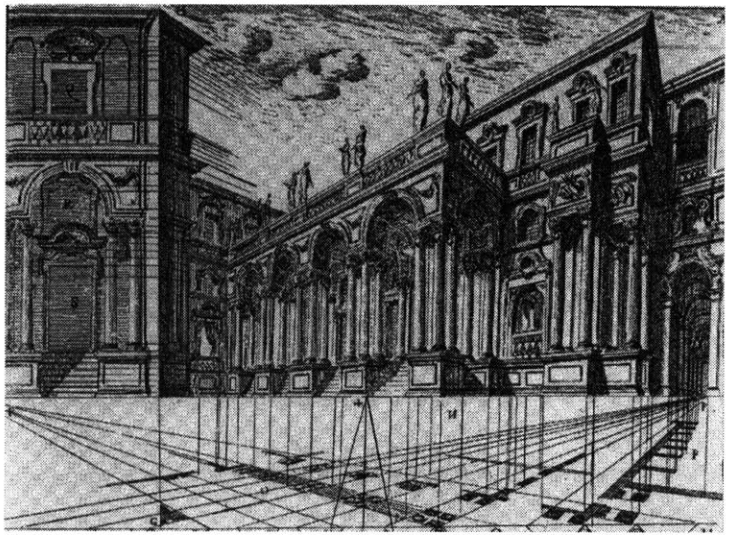


4.12 Euclidian cone of vision and perspective

cone of vision of 40° to 50° for a standard 50mm lens. Compared to the range of the human eye that can see as much as 208° the reality represented by the camera is extremely limited. So in fact, even though we tend to think of the image produced by the camera as an accurate representation of the way we see our environment, the fact remains that its optical system is very different to our eyes, we have assumed the conventionality of the representation as the reality we see.

Optics and representation.

The relation between what we see around us and how we represent it is as elusive now as it was before the development of modern optics. The first cave drawings struggled to represent the three dimensional reality on the flat surface of the walls. Egyptians developed a more stylized system of lateral projections and size variations that indicated depth. It wasn't until the renaissance that the representation of our visual world achieved a level of fidelity that was similar to what we saw thanks to the development of linear perspective. The basis for renaissance perspective can be found in Euclid's definition of the cone of vision, a cone whose point is located at the eye from which all rays emanate in a circular pattern. This cone of vision influenced the construction of the images created by linear perspective in the sense that it considered the act of seeing as something that could be abstracted geometrically and reduced to a single point of origin. Filippo Brunelleschi produced the first method to achieve an accurate linear



4.13 Scena per Angolo, Ferdinando Galli di Bibiena

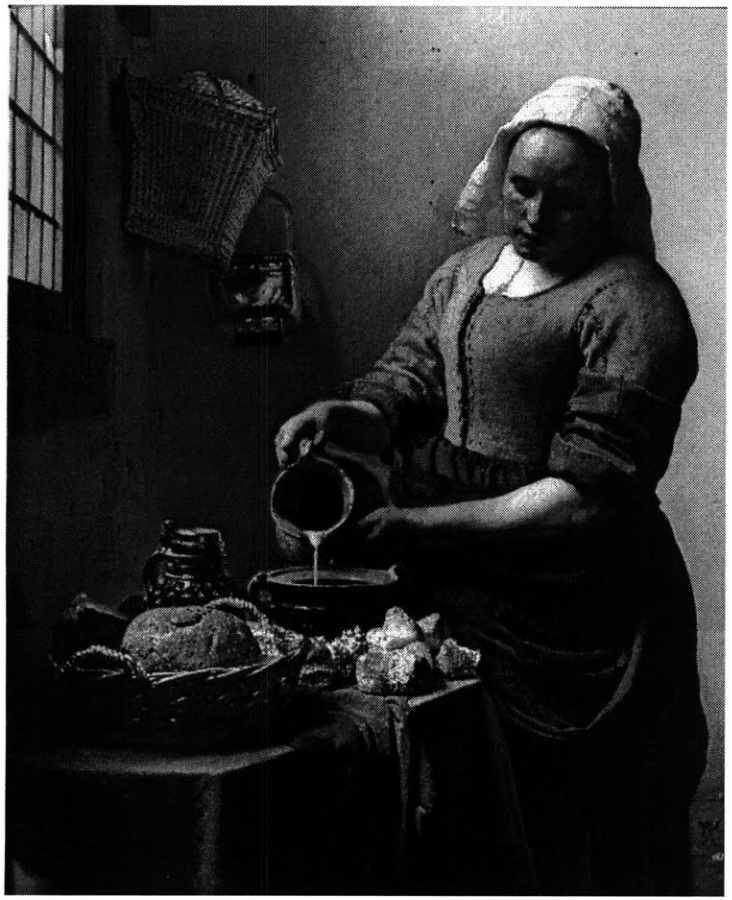
4.14 Perspective Machine, Albretch Durer

perspective by placing a point in the center of the image and radiating all lines from it in much the same way that they emanated from the eye. The resulting image was an accurate representation that depicted the space the observer saw in front of it, however this representation is limited geometrically to the center of the cone of vision, anything that falls outside the 45° angle starts to be distorted. This system developed by Brunelleschi is still the basic principle behind all perspectival drawings. Renaissance art was greatly influenced by the development of perspective, perspective machines where developed that allowed artists to create accurate images easier, the picture became a plane that cut the cone of vision where you drew what you saw. Eventually the convention of perspective became accepted as the way we see. We assume that if it is correctly set up to the right points the perspective is a true representation of the world when we are in fact just perceiving an illusion created by lines in a plane that intersects the Euclidian cone of vision. The Modern Movement attempted to remove the observer from the setup by destroying the linear representation and focusing on a more abstract Isometrics, but the conventions of the perspective image still rule the way we understand and create our spatial representations.

The development of perspective is also linked to the advances in optics, specifically lenses and the Camera Obscura. The Camera Obscura allowed artist to create a "true" image of nature, produced independently of human action, and freeze it by tracing it in a surface. The laws of "true" optics could then

4.15 Arnolfini Wedding, Van Eyck

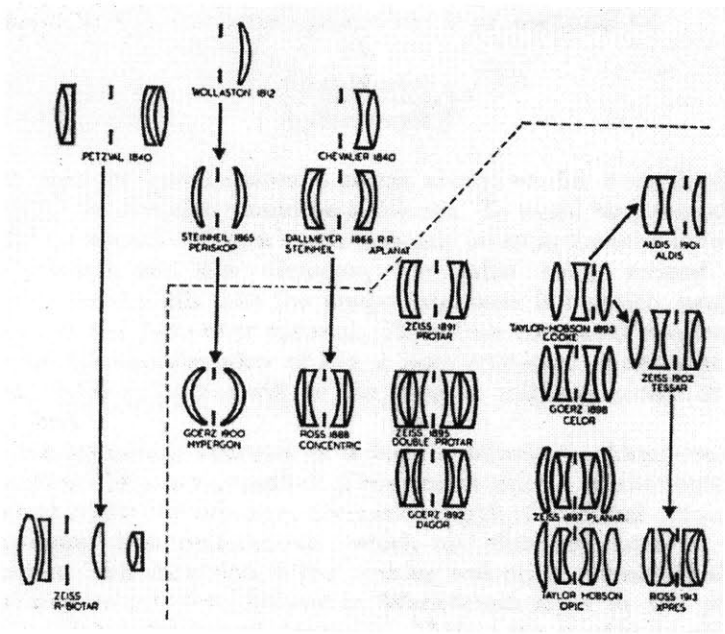
be studied in this frozen view. But with the development of more accurate production methods lenses where able to project an image (following the principles described above) with more detail and in more varied conditions, the Camera Obscura worked perfectly for landscapes and bright environments but the lens allowed projections of subjects that where brightly lit like people or artifacts. David Hockney proposes in his book Secret Knowledge (2001) that painters where influenced by lenses to a great extent and long before it was thought of before. Acording to Hockeny the influence of the lenses over painting is evident as far back as 1430 in Flanders, where there was a booming business in lenses and mirrors, the paintings of this area and period begin to show a very different look than the ones of the same period in southern Europe, and produced a revolution in the way the representation of the spaces was created, it was not an attempt to create true images by way of geometric drafting, but a never before seen realism created by a mixture of talent and optical instruments1. He sites as evidence the way fabrics began to be accurately represented, the way faces became more "contemporary" (accurate facial expressions) and the way lighting in some pictures is similar to the high intensity needed to project an image with a lens, concave mirror (similar to the one in the back of Van Eycks painting) or Camera Obscura. This would imply that the perspective representation merged with optical tracing and the image produced with the use of lenses would be affected by the deformations produced by them, these are not evident if you don't



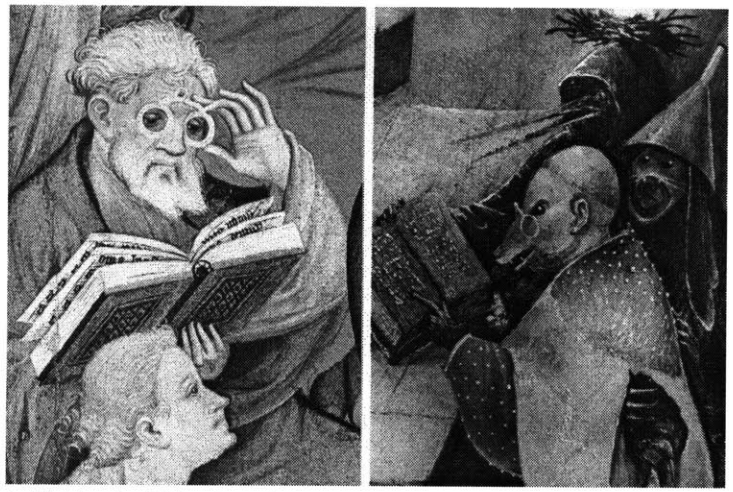
4.16 The Milkmaid, Johannes Vermeer

understand he property of lenses, but once you know what to look for the argument becomes stronger. In the paintings by Vermeer, who is widely acknowledged as a user of lenses in his work, we can find evidence of these deformations. In The Milkmaid (1658-1660) (p59 hockney) we find two baskets in the background, the furthest has a softer outline than the one in the foreground, with our photographic sensibility we understand it to be blurred. Because it was optically impossible for Vermeer to see the basket blurred because his eyes would have adjusted accordingly, this could indicate the use of lenses to project an image on to a canvas that becomes the basis of the painting. When the image was projected the focal distance was fixed, in this case the object lies behind the focal plane and the image is formed in the blur spot. The perspective laws are overridden by the lens image. The perspective was no longer geometrically precise but a tracing of the image produced by the lenses.

When Joseph Nicephore Niepce created the first photograph with a Camera Obscura he produced a more accurate tracing following the same process that landscape surveyors had used before him to trace the images, the difference lied in the production method, where before the hand of man intervened now light inscribed itself in the photosensitive plate. The camera was consequently designed to mimic the spaces captured by the conventions of perspective in terms of depth and size of the field of vision. The lens of the camera was carefully balanced with three or more lenses that corrected each



4.17 Evolution of the camera lens



4.18 Monks Wearing the earliest glasses

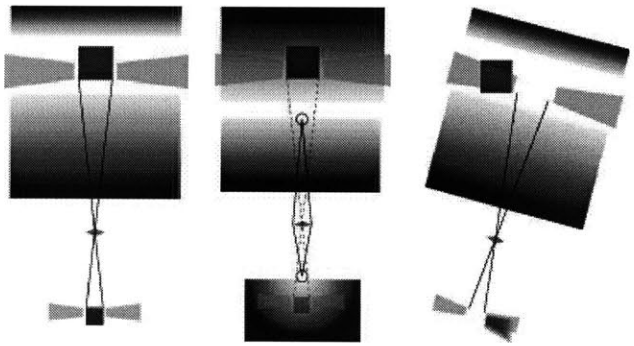
other's aberrations and focused the image on the rectangular format. It has been argued that the camera is conceived as the accurate representation of the human eye, however the properties of the camera that make it similar to the eye, being that both are optical systems that use lenses, have been engineered out of the resulting object to make it closer to the geometric abstractions of perspective, that we have assumed are the accurate representations of reality since they where the first ones to do so convincingly. Vertov's Camera-eye is ruled by Brunelleschi's perspective. A camera lens can be manipulated to record the world in a way that is truly representative of it's inherent process, freed from the constraints of renaissance perspective the camera can truly represent a world that we are not used to seeing, but that it is actually closer to the way we see the world.

The fact that we do not perceive the distortions of the periphery of our vision or the blur doesn't mean that the "perfect" eye doesn't have them. There is no "perfect" eye. Most of us have some type of aberration in our sight, we all perceive the indeterminacy of the blur spot of our optical system wether we know it or not. We correct this by wearing prescription glasses that alter the focal point and place it closer to the retina. Glasses are commonplace since the renaissance, but where considered the work of the devil in the Middle Ages because they altered the natural perception of vision. It might seem amusing now but this statement holds some truth that we have overlooked because of the everydayness of glasses,

4.19 Field # 13, Uta Barth

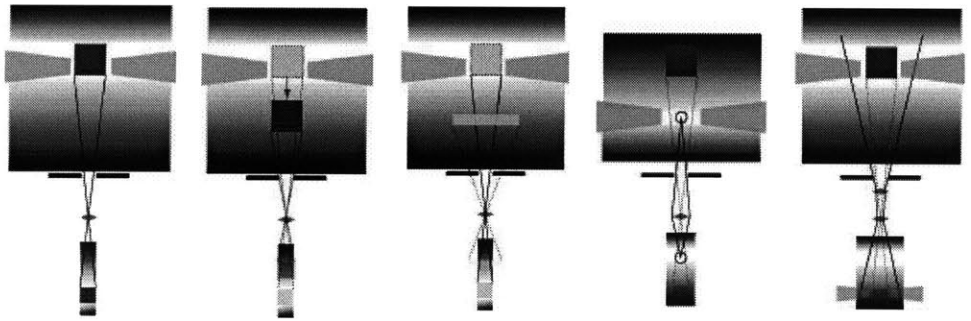
they do alter what we see in much the same way that the camera lens alters the part of the space we see in a photograph, but we still have some differences from the camera that are even present in the imperfect eye.

Since our eyes are in constant motion we do not perceive some things that happen in the periphery. The eye is constantly adjusting it's focus thanks to the Crystalline lens, when we focus our eyes on an object that's close our background is blurred, if we focus on infinity our foreground is blurred. The fact that we are not aware of this is that technically we can't see the blur, the moment we fix our attention to that area our eyes adjust to compensate, so we can only perceive the blur in our periphery where we can't pay attention to it. The static nature of the camera is able to capture the periphery and the blur and bring it to the center of our field of vision. Depending of the type of lens we place and the arrangement of the lenses we can make the periphery more central or "focus" on the blur. Artists like Uta Barth are attracted to this quality of the camera to shows something that we perceive but can't analyze. She produces images that capture the blur allowing the viewer to "focus on the out of focus"2 The fact that the blur is captured on an independent image allows us to concentrate our attention in the impreciseness of the system and analyze it, the same way that the image in the Camera Obscura was analyzed to understand the phenomenon of seeing, eventually giving way to the refinement of linear perspective.



These diagrams address the differences in perception between the eyes and the camera as discussed in the last paragraph. The diagrams consist of two main parts:
The top section is the space observed (or photographed).
The bottom section is its perception (or image).
Within these we find:
The diamond at the center representing the lens system.
The square the subject
The truncated pyramids the periphery
The solid lines our focal attention
The dotted line the perceived or captured area
The gradated areas represent the blur, the darker it is, the more intense the effect

1-When the eye looks at the subject directly we do not perceive the blur because our eyes adjust accordingly to the focal distance, the image formed is completely focused and it includes the peripheral information that the wide field of vision of the eye is able to pick up. 2-If we shift our attention in front to the empty space in front of the subject, we perceive that point as focused but since there is nothing there we can see past it to it and the periphery, but its image lies now within the blur. 3-If we shift our attention to the periphery our whole visual space shifts with it turning the periphery in to center and the center to periphery. The image of the subject is now placed in the area of the periphery where it is distorted by it.



4-The camera in principal works pretty much the same way than the eye, with two main differences, the reduced field of vision and, since is a static system that can't auto-adjust like the eye, the capturing of the blur. 5-if the subject moves so does its representation, but since the focus is held at the original position, the subject's image is blurred. 6-Similarly, If we place an object in front of the camera, the focus is maintained at the subject, but the image captured, which is blurred, is of the object. 7-If we change the camera's focal length the image captures is of the empty space in front of the subject, but the empty focal plane allows us to look trough it to the blurred subject. 8-By altering the optical system of the camera we can make it capture more than the blur by including some peripheral information, but since the operations destroys the focal balance of the system, the image captured is blurred.

This picture was taken with a 50 mm lens, which has a focal range similar to that of the human eye (the eye can focus on objects closer than the lens). But only a field of vision of about 50°, which pails compared to the eyes 208°. The image is cropped at the edges by the rectangular format of the light sensitive film, this is the image we are used to seeing; we can trace the vanishing points in it and follow exactly the edges of all shapes. This is the standard that has evolved from the perspective theories and is now the norm for accurate representations of reality. This is the image of the camera working under the false pretense of our visual accuracy.

If we introduce an extra lens in front of the camera we destroy the preciseness that has been attributed to the camera and the aberrations of the lenses are evident, this image captures the things our eyes can perceive but we can't see. This is the same thing that happens if we put a pair of glasses that don't belong to us or if we play with magnifying glasses. The difference is that the camera can record this instant and allow us to study it, the fleetingness of distorted vision is captured, the field of vision is expanded to include more peripheral information. The blur is maintained allowing our sight to perceive the phenomenon.

This method produces a representation that is filled with impreciseness and at the same time filled with possibilities. Uta Barth captures images that "invite confusion on several levels...

meaning is generated in the process of sorting things out". The capture of the blur produces an image that register the peripheral or incidental (the subject is missing) with this condition the observer realizes that these are "empty containers" and begins to project in to it their ideas about the spaces represented3. Where before we had the didactic representation of the perspective or the photograph we now have an interactive one that allows the users to come to conclusions about the space that they might not have perceived before, even tough they where seeing it in their periphery. The isotropic, static space represented in the perspective becomes the interactive media space of the blur.

We now have the possibility to represent space in a way different than the conventionality of the false visual preciseness forced on the camera that could start to generate a new understanding of built space and the shape that is given to it. Perspective evolved from mere representation to a design tool that allowed renaissance builders to explore spatial characteristics before building, in a way reshaping the space it was represented. A new understanding of the visual logic of spatial representation is accompanied with a questioning of the way we construct our spaces, or at least an understanding of the possibilities this new method provides.

1 David Hockney, Secrets Knowledge, rediscovering the lost techniques of the masters. pp71 Viking studio, New York, New York, 2001

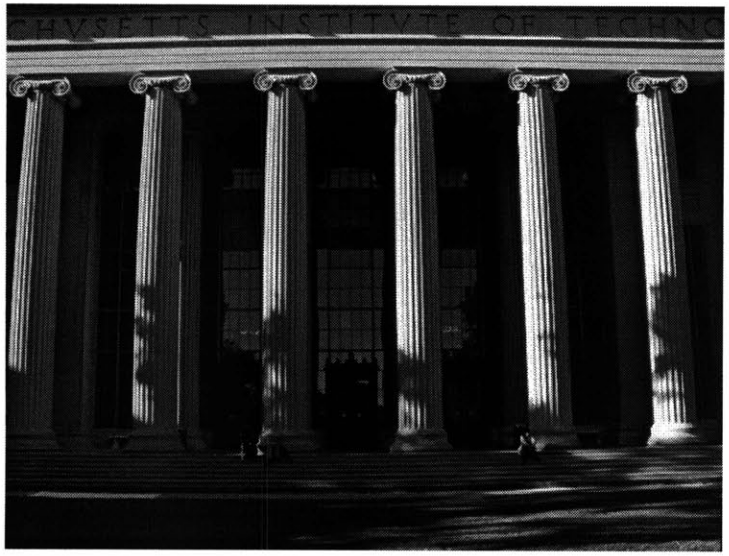
2 Uta Barth interviewed by Sheryl Conkelton in Uta Barth: In between places. Henry Art gallery. University Of Washington, Seattle. 2001

3 Uta Barth interviewed by Sheryl Conkelton in Uta Barth: In between places. Henry Art gallery. University Of Washington, Seattle. 2001

Blurred space

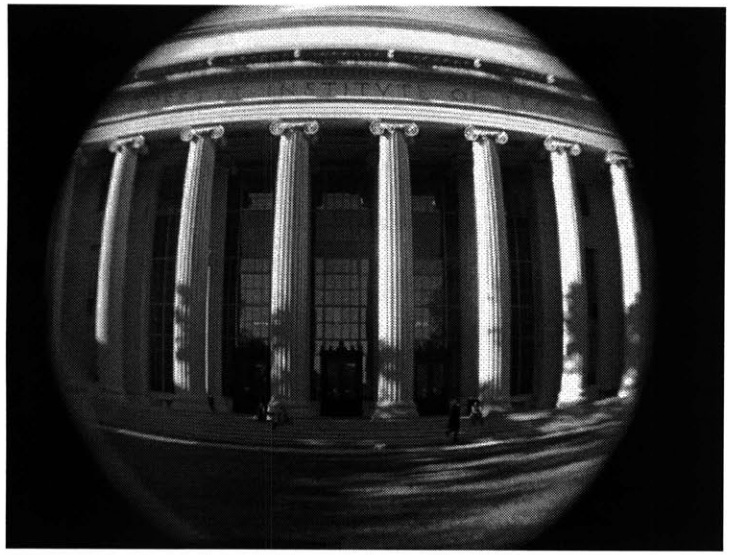
The first challenge in the research was to develop a way in which the camera's process could be exposed as different, not by simply capturing images by altering the focal length of the cameras lens (which would have resulted in blurred images that still responded to the existing set of constraints) but by destroying the limitations that had been placed in the photographic process as a result of the aesthetics of perspectival representation.

The Blurring process implemented consisted in adding an extra lens to the existing camera array, in much the same way that a pair of glasses alters the way one perceives the image. The use of these "blurring lenses" altered the way the camera recorded the spaces and facilitated comparisons by achieving a level of consistency from one series of photographs to another. The lens used consisted of two separate lenses; lens A, a flat concave lens and lens B, a flat convex lens. When both lenses work together they correct the aberrations of the other: the zoom lens selects the part of the field of vision that is going to be captured and the wide-angle lens focuses the image on the film. These lenses where placed in front of the camera as one and taken apart and placed in different permutations. The lens, working as one (A+B), barely altered the image, but as the lenses were separated and their order altered, the balance achieved was destroyed and the recorded images began to show the aberrations of the lenses.

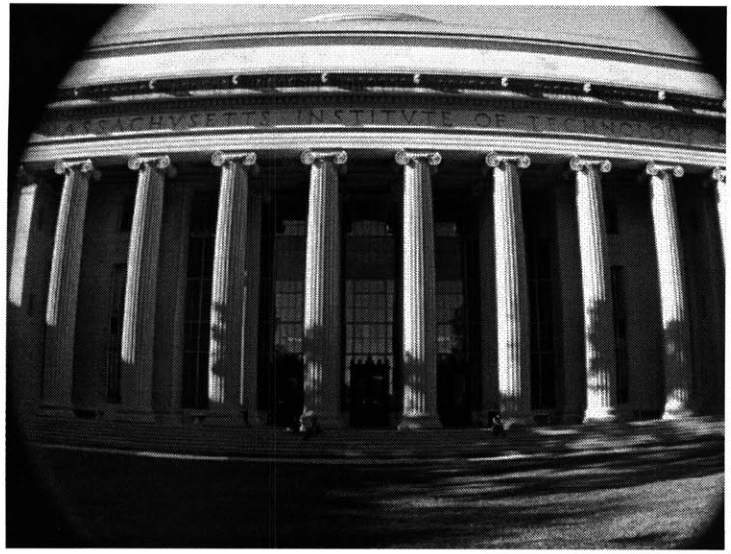


Each blurred series began with a record shot: the image captured by the unaltered camera that captured the hard lines, crisp edges and definition of the subject. Then the "blurring lenses" were added in a total of 8 permutations.

Lenses AB: Barely altered the image except the edges where slightly cropped by the edge of the added lenses and a slight overexposure occurred because there was more light coming into the system.



Lenses AB Inverted: By reversing the way the lenses were used the directionality of the system becomes apparent and the resulting image is very different from the previous one: the periphery is compressed in to the image so that more peripheral information is recorded in the shot as more oblique rays of light are captured by the camera

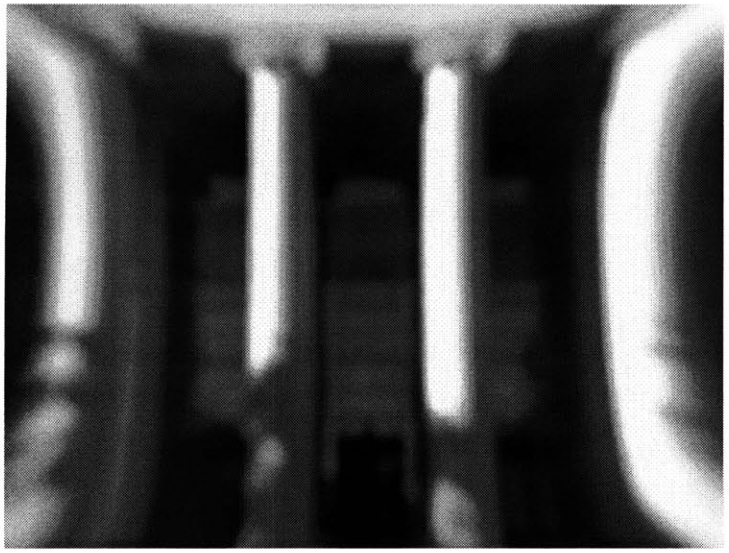


Lens A: By just using Lens A (Flat concave) we lose the focal correction created by both lenses working in tandem, resulting in a radical change of the camera's focal length. Where before the subject was in focus the placement of this lens brings the focal distance much closer to the camera resulting in a blurred image

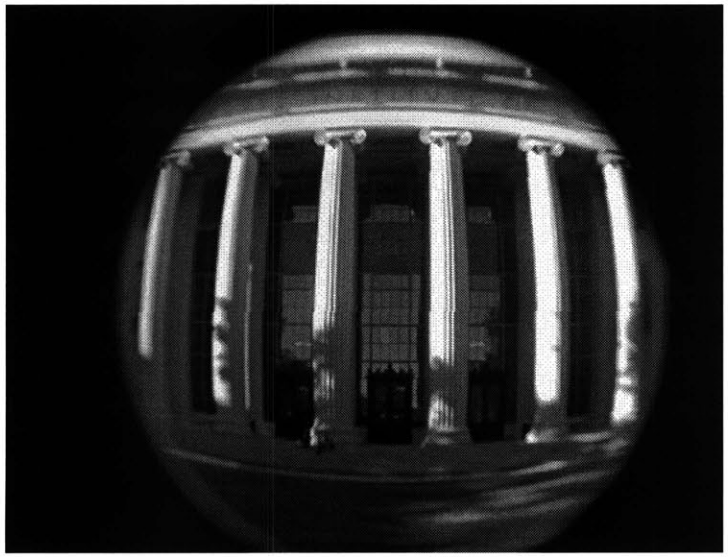
Inverted Lens A: Aside form the blurring described above, the reversal of lens A produces some deformation of periphery because of the oblique angle at which the rays of light hit the lens, when redirected to the focal point the image is slightly distorted

Lens B: This lens also alters the focal distance of the camera, but instead of letting more peripheral information into the image, the rays of light of the center are given more relevance and the periphery is discarded, resulting in an expansion of the center of the field of vision to occupy the whole image.

Inverted Lens B: Aside from the focal change and the concentration on the center of the image, the lens distorts the edges of the center. The rays of light enter the system and are refracted to different points and not concentrated in the focal point.



Inverted Lens A + Lens B: By altering the way the two lenses come together we can also change the way the camera produces an image. In this case Lens A is inverted and then combined with lens B, which caused the complete distortion of the edges even though the image preserved its center in focus. This was caused by the fact that the second lens, which was supposed to bring the image into focus was inverted, so that the closer to the focal axis the image was, the more focused it became while the furthest it got the more distorted and out of focus it became.



Inverted (Inverted Lens A + Lens B): the reversal of the previous setup produced a similar image, but since the wide angle lens selects the area of the field of vision, making it extra wide, the edges of the lenses produce a circular crop eliminateing the areas of extreme distortion we saw in the previous example.

The series resulting from this process captured nine representations of the space photographed, ranging from the normative photographic representation, to the abstract distortions of the periphery. The moment the lens system was altered by the "blurring lenses" the image produced lost its direct relationship to the space from which it originated. The space represented is an altered reality that brings about a necessity to comprehend it and apply some order to the disorientation of the blur.

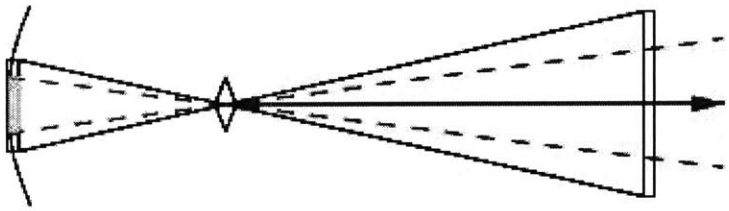
Instead of a homogeneous space of we have a space that fluctuates between different representations. The lenses distort the edges of the image, turning what used to be central into a peripheral representation and compressing the periphery to the center. The blur constantly shifts their relationship so that

we no longer find relevant what is center or periphery, but are more interested in the fluctuation between them in the represented space of the image.

The compression of the periphery in the blur allows us to capture in one image what we perceive only through our peripheral vision. It is within this understanding of the blur, and its center/periphery interaction, that we begin to see the edges of our vision. As the limits in the space are distorted by this interaction, what used to be a clear division between areas now becomes a permeable flow from one space to another. In this zone of distortion new elements are created and objects are transformed, things that were banal are more present, things that we overlooked are suddenly inescapable.

By widening the field of vision the blurring lenses bring more information to the image. When you have already set the correct exposure in the camera for its lens, the added information overexposes the image, making light and color the predominant factor in defining the spaces in the blur, not the hard edges of form or materials.

In this representation of the space, the camera has gone past the limitations enforced on it by geometric perspective in an attempt to explore the inherent optic qualities of its process. The alteration to the camera lens creates a spatial representation that follows the logic of our eyes and its aberrations and not of the abstract processes of linear



The following diagrams address the relation between observer and representation and its different levels of immersion. The are divided in two parts the physical (represented by the dark lines) and the perceptual (Lighter lines). Also the left part of the diagram represents the our conscious space and the right the physical space.

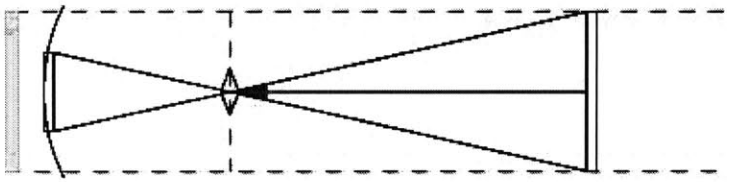
In the first diagram we look at perspective. When looking at a perspective drawing or painting we see the image itself and its resulting understanding of this image. We see it as a framed view of artificial creation that gives you and idea of a space but not enough detail to enter the image.

perspective that has nothing to do with our experience of a space. The blur presents an accurate representation of a space that we can experience but not clearly perceive. We place ourselves in this representation in a quest to bring order to the distortions of the space of the image. This forces us to fill it with our understanding of the environment it presents in order for it to be able to convey any type of information about it. The blur representation is then intrinsically linked to our focused understanding of this space; this allows us to see it as something different and yet related to the way we interact with our environment, and merges both understandings of the space in one image loaded with possibilities.

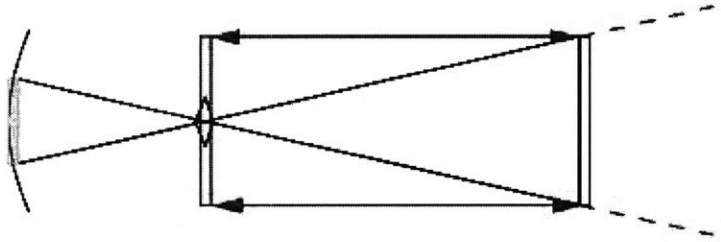
Space of representation

This interaction between observer and representation produces a different type of relationship with the image, not only are the spaces in the photograph blurred but also the interaction between observer and image is altered. Each mode of representation carries with it different levels of engagement of the observer, it is in this space that we experience one of the blurs more interesting effects.

In perspective drawings or paintings the image produced is a constructed space that follows the rules of linear perspective. The space represented looks similar to the reality we see, but we are still detached from it because of our realization that it is produced through this method. We are observers on the

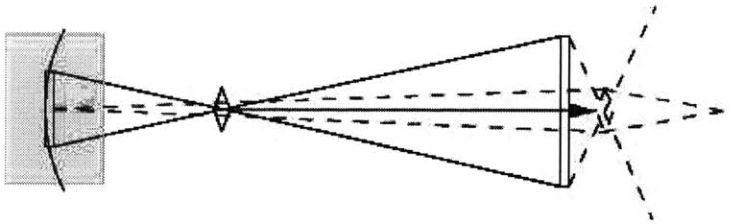


In abstract paintings or isometric drawings the observer is completely absent, try as we might we can only project ourselves in this representation as an abstract thought that floats in a space past or visual space



photography we have precise details that convey the nuances of the space, our sight flows effortlessly past the plane of the image in to the space captured by it. In this case the Photograph becomes a window into another space. We are held at the edge of the space because of the framing of the photograph, it's cropping of the environment.

outside of this space, our eyes see the frame and the image, but the image doesn't engage us in a way that propels us inside the represented space. In more abstract paintings and drawings, like for example isometric perspectives and plan views, we are detached observers of an abstract space that does not engage or invite the observer to place himself in the representation. The abstract space envelops us, but we loose any corporeal presence in it. In Photography the space has a level of detail and accuracy that is easily considered a true representation of reality, plus it behaves in a similar way to our eye, making it easier for us to see past the frame. We see the photograph as a flat image but at the same time this image becomes a window in to a different space than the one we inhabit, but we are held outside of this represented space by the cropping of the imageand our field of vision. We are looking into but not crossing the threshold of the frame. When this level of accessibility of photography is blurred its directness is lost, but the immersive qualities of the representation are enhanced, For example, when describing her work, Uta Barth explains that the images captured by her are spaces without subject, the focus of the image is held at a short distance from the camera making the observer share the space of the absent subject, altering the limit between the representation and the observer. The space comes out of the image to meet the observer, who in turn, tries to make sense of the lack of subject by placing himself on the edge of the image. The physical space and the represented space overlap.

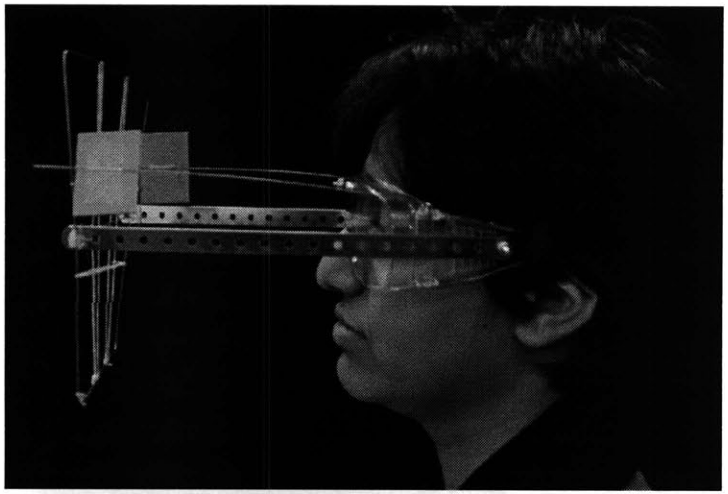


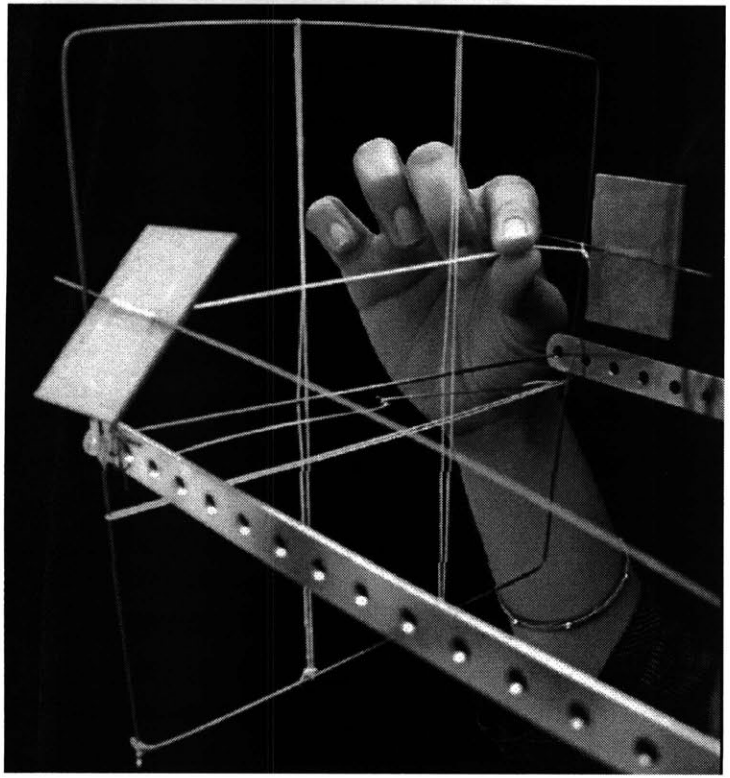
In the blur the lack of spatial definition doesn't convey an immediate idea about the space, but this diffusion makes us project our presence in it to try to bring the space back in to focus. The presence of the periphery facilitates this immersion, acting as the threshold to the blurred space we are trying to understand

This also happens with the blur produced by the lenses. The lack of definition of the subject (not it's absence) creates a situation where the observer is forced to project himself in to the image in order to understand it. This is facilitated by the compression of the periphery into the field of vision that takes away the cropping effects of the frame and reveals more information than we are accustomed to perceiving in a photographic representation of space. This compression transforms the static image of the space to one that is representative of a different type of spatial order, not following the rules of linear perspective or the cameras normative process but of the ephemeral qualities of vision. The periphery behaves as the threshold that allows us to immerse ourselves in the image even though we are not sure what our place in this space is. Because we perceive things that we normally interact with at a subconscious level, like the periphery and the blur, the representation becomes a tool for us to understand the way we visually navigate space, blurred and focused, and a representation of the space we experience.

Constructing the blur

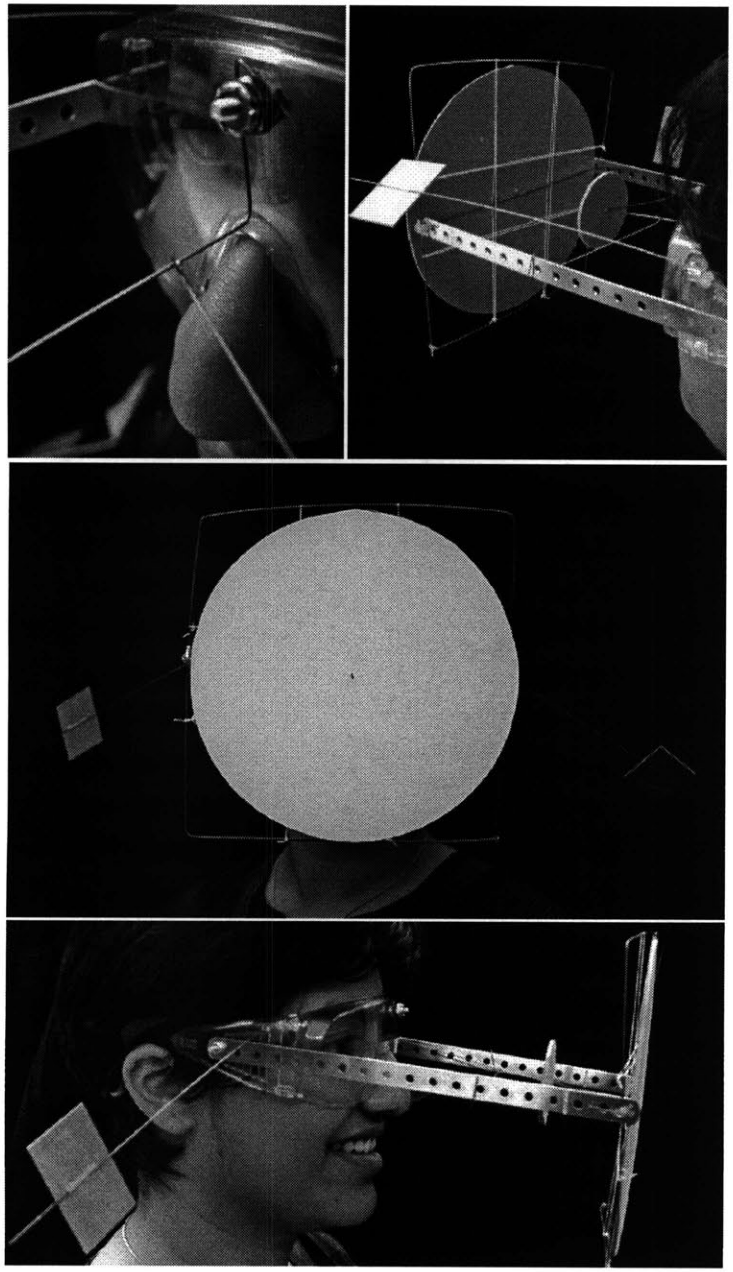
The most immediate way we perceive a space is through our vision, we navigate through it first with our eyes and then with our bodies. While doing this we are constantly refocusing our eyes to pay attention to our surrounding environment, always occupying a focused space. Regardless of our motion we only perceive the space of detail of the focus while the blur is





relegated to a secondary level of reading. Influences in the experience of the space come from different parts of our vision (periphery, center, distortions) but we always place our attention, and consequently our presence, on the focus. The eye defines the territories we occupy and contains within it their definition. If we are to understand these spaces we need to give some sort of physical presence to the zones that define or visual field. By developing simple tools that interact and record our vision we can capture a physical representation of the spaces defined by it and study it as an abstract space, like a plan or isometric, no longer related to the observer.

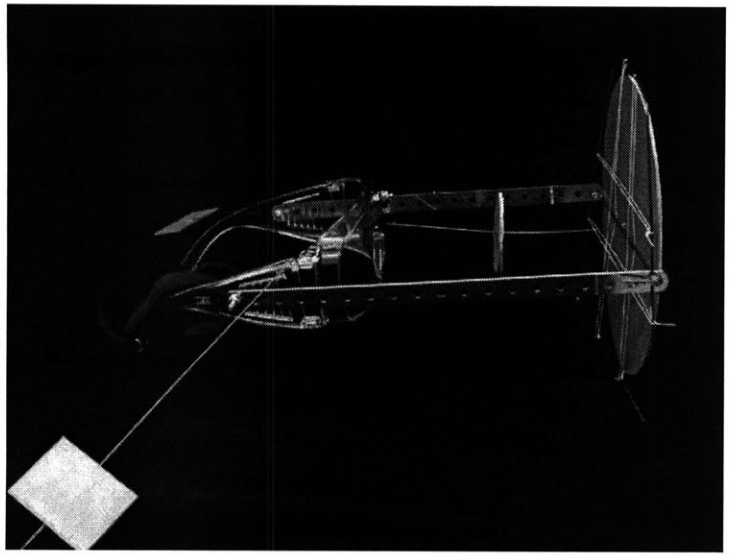
This artifact consists of three tools that attach to a pair of glasses. Each has a specific purpose and records something about the way our eyes work. All distances are based on the closest we can bring the focal points of our eyes and its change as we age, these are 6cm, for a child, 13 cm for an adult and 22 cm for the elderly. These distances become the dimensions of the artifact. The furthest plane is placed at 22 cm from our eyes and becomes the first tool, which facilitates our perception of the blur by forcing us to focus on a set distance from our eyes. In this condition, our environment beyond this distance becomes blurred and is compressed in to our focal plane. The tool marks our center of vision and our horizon with a wire frame that acts as the structure for two movable elements that record the blur and its effect on the space. The parallax effect (double vision) produced by the blurring and compression of the space into a plane, is recorded by two

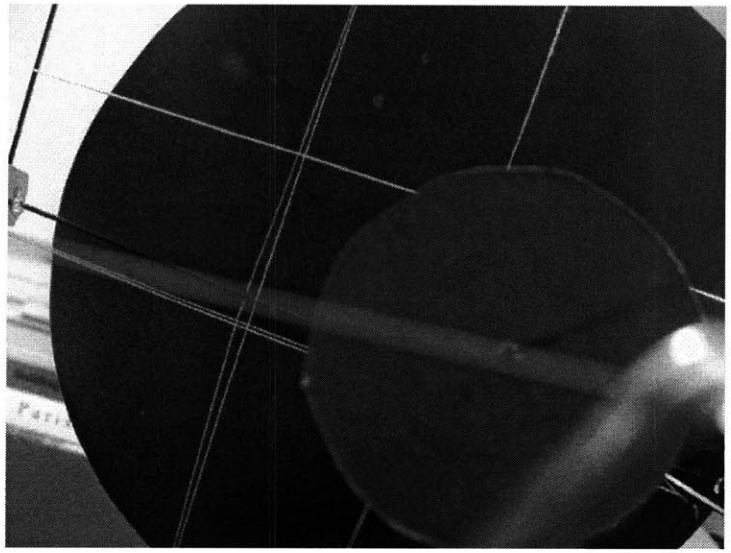


vertical lines that are placed according to the two manifestation of one object in the focal plane where two horizontal lines determine the top and bottom of the blurred object.

The second tool is then attached to the glasses marking the axis of our field of vision, but at the same time blocking it. This forces us to engage our periphery. Apart from this displacement of our attention, this tool records the space of focus, blur and proximity distortion by having a movable piece mounted on the axis of vision. We first bring this piece as close as we can to our eyes without distorting its shape (this position is recorded by a metal arm that is attached to the axis). Then we move the piece back to the closest position where we can clearly see it. This simple procedure records three key spaces that are generated by the act of seeing; the space between the first position and our eyes, which is a space of distortion; the space between the first and second position of the piece, which is the Space of the blur; and finally the space between the second position and the plane described by the first tool which is the space of focus. Past that all space is compressed in to the frame of the first tool.

The final tool records the space of our periphery. It does so with two swinging elements that record the scope of the periphery and points of interest within it. The periphery becomes a space of orientation in the blur, even though we can't see it at it's widest we perceive motion in it and at a





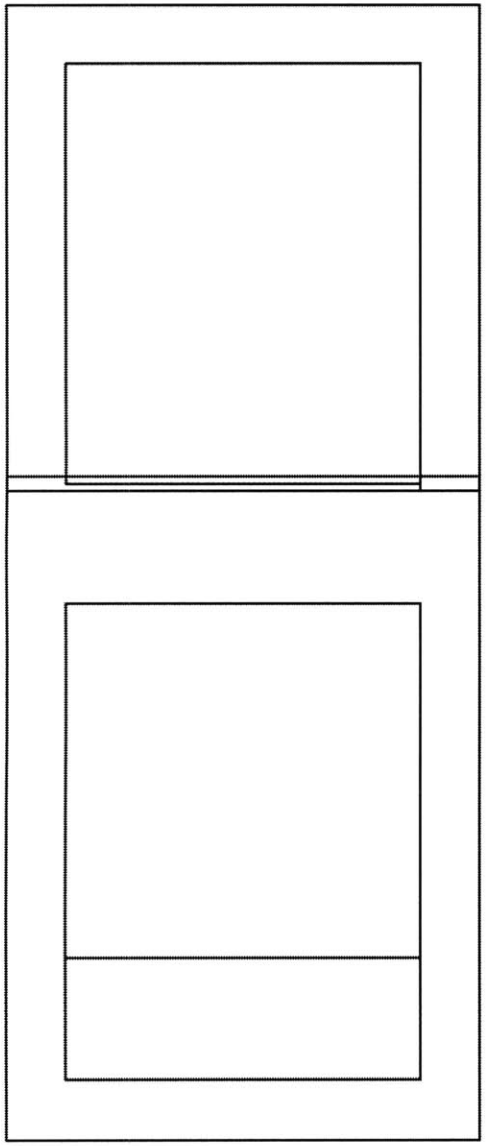
closer angle we perceive points that can orient or give information as we navigate a space.

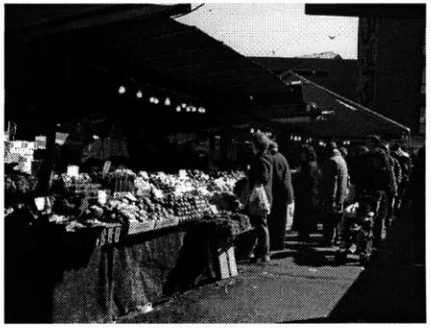
When we take off the artifact we are left with a physical representation of the way we see, a record of the spaces defined by the process of visual perception and the cumulative information gathered from the space by the three tools that interact with each other. This becomes a spatial representation of the components of the blur that, together with the understanding of the blur on the spatial representation, can give us an understanding of the blurred space and its characteristics.

Blurred space

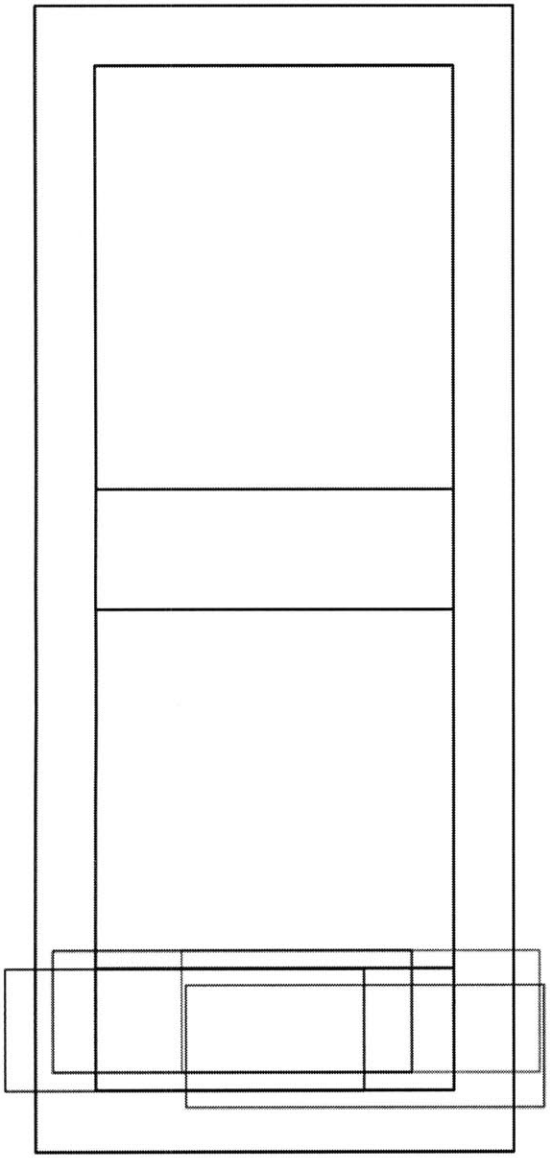
The information gathered by the artifact reflects the space of our vision, be it focused or blurred, defining five distinct conditions within this space: compression, focus, blur, distortion and periphery. Each of these conditions have spatial qualities that inform the blurred space we are attempting to define.

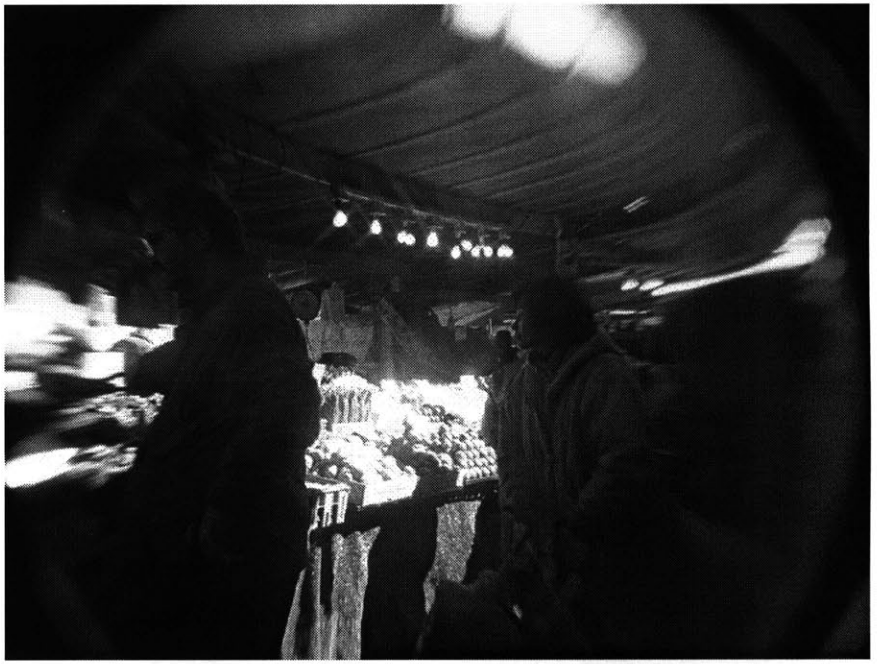
The focused space we inhabit is trapped between the blurred compression of the environment and the blur of our focal limitations. This space contracts or expands depending on our point of focus, it's the isotropic space of visual accuracy, regardless of where we look we always have the definition that our attention and projected inhabitation bring to it. However, in a blurred condition, the focused space is missing.



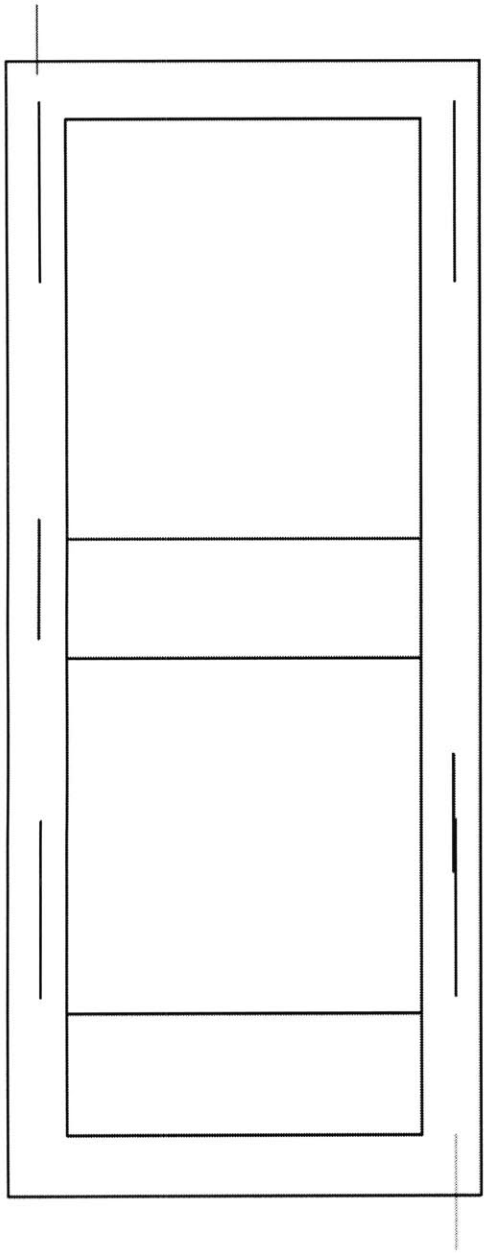


When we see the Blurred representation of a space we recognize it as part of our vision, but tend to look for the focus space so we can understand or relate to it at a more basic level. This focused space is not available to us because it is in fact empty, the area we instinctively associate with our presence is collapsed into a plane between the two blurs We can only project ourselves in it at an abstract level while the blur surrounds us. Even though we think we inhabit the focused space because it is what we concentrate on and relate with, when we are experiencing a space we are shifting positions from focus to blur, when we fix our attention on a distant object our immediate surroundings become blurred, when we look at something close the environment becomes blurred. However when we loose the ability to have focused space we begin to understand the role played by the blur (and the periphery) in our use of a space. The remaining components of the visual space (distortion, blur, compression and periphery) and their interactions characterize the blurred space.

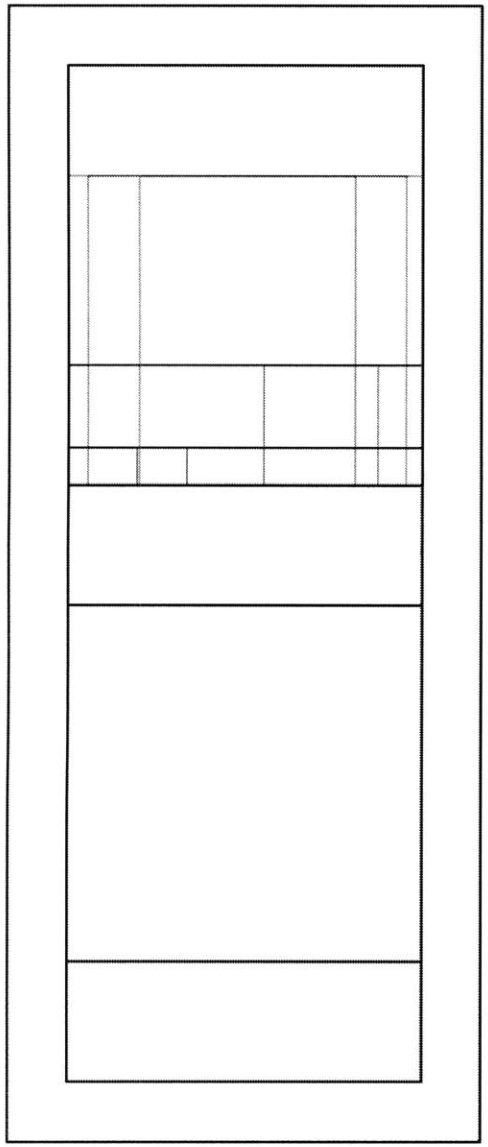




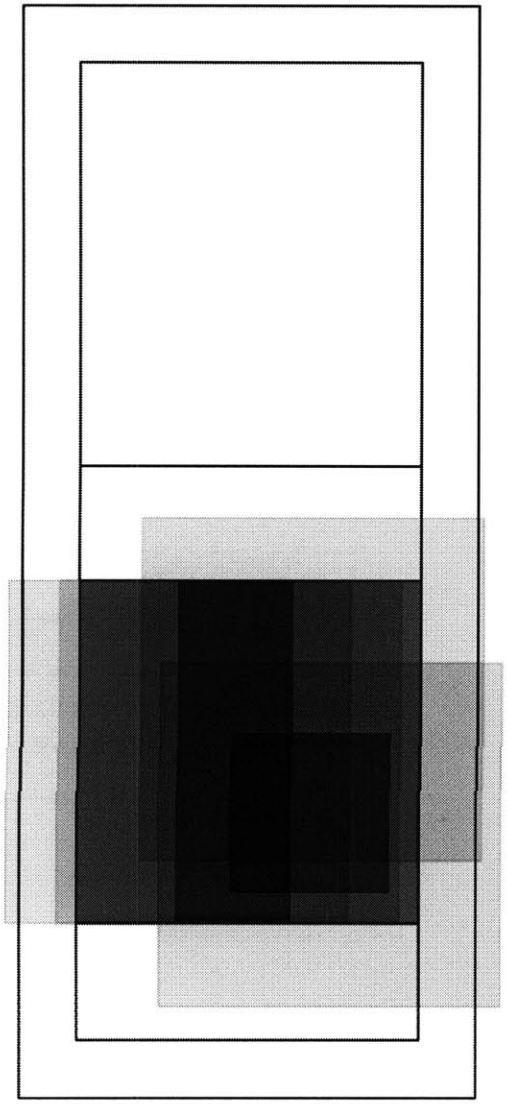
The immediate space that surrounds us is the space of distortion, produced by proximity, it is a tight space where we rely on other senses because of the deceiving effects of the distorted environment, this is the space of intimacy.



The space of the periphery is opposite to the tactility of the distortion. We are detached from it and can only perceive it as a zone of singularities: punctual elements that come briefly to our attention and alter the directionality of the space. The space of periphery intersects the other spaces and their points of contact behave as the nodes of orientation in the blur, altering our movement through the space. When we are focused on a space, with our attention concentrating on a specific part of it, it is the change in our periphery that shifts the directionality of our view, causing us to engage the periphery, and alter our bearing in the space.



Past the space of focus we have the compressed environment. this behaves as a blurred representation of the space beyond our focal length, it can either be a compressed blurred space of multiplicities or be absorbed by the focused space as we shift our focal point. It is not static but always expanding or contracting depending on our attention ad our position.



The blur condition is the displaced space, the one that's hardest to inhabit because it is always out of reach, it is the threshold to any focused space. In it we have a complete lack of definition, elements overlap and bleed in to each other, but still have enough information to allow us to navigate within it. When we are forced to inhabit the blur because of the lack of the focused space we begin to project in it our memory of the defined space enabling us to make associations and reinterpret the imprecise environment. This is what happens in the blurred representations of the photograph, even tough we see it as something estranged from our environment, we subconsciously recognize in it the other elements of our vision and place ourselves in the collapsed focal plane. We engage this space the same way our eyes engage the physical space.

Conclusions

The work undertaken in this thesis is only the beginning of a design research process. The materialization of the visual space of the blur into the blurred limits of architecture only begins with the understanding of said visual space and its spatial implications.

At the beginning of the thesis I posed three key questions. Can we use photography to capture blurred representations of space? What are the visual spaces defined and altered by the Blur? What are the spatial characteristics of a Blurred Space? What follows are some thoughts regarding these three aspects of the work.

The photographic process has been submitted to the standards of linear perspective and human vision, producing images that follow the logic of these highly specific systems. The camera's process can be modified from within its optical system to change the way it captures an image. A lens system needs to be only slightly altered to make evident the inherent aberrations that lay hidden by the constraints of these alternate visual systems. Since both the camera and the eye are lens based systems, the resulting image of this modification is at once a diverging reality than the one we are used to perceiving and representative of the way our eyes see a space through the aberrations that are also present in them. By letting the components of the camera act independently from the

constraints of perspective we can capture a reality that is truly impossible for us to consciously see. This shift from the camera's constraints produces a blurred representation of the space. It does so because it manifests the hidden elements of our vision that we deem imprecise or undefined without capturing the crispness of the focus, which is associated with the rational process of perspective.

The visual elements that are captured by this process become the visual spaces generated by the Blur. The act of seeing defines territories in a space. With our attention comes the focused space and our projected inhabitation. Surrounding it we have the spaces of distortion, periphery, blur and compression. Our sight shifts quickly between these depending on information perceived in these zones, but the moment we shift our attention the focus, and its definition, follow. Only through the modification of the camera can we capture these elements in a way that facilitate their study. The distortion is characterized by the deformation of information and the loss of visual dependency. The compression collapses all information of our environment in to a flat depiction that is not static but always expanding or contracting depending on our attention ad our position. The periphery gives us punctual information that causes us to shift the directionality of our view and alter our bearing in the space. The blur condition is the displaced space, the one that's hardest to inhabit because it is always out of reach, it is the threshold to any focused space. The visual space of the blur becomes a place of interactions

between its components, instead of the isotropic space of normal vision we have the multiple perceptions of the blur that fluctuate between periphery, distortion and blurred conditions. The most evident interaction of these happens between the center and the periphery of the space. The blurring lenses alter the cropping effects of the camera on the image, bringing the periphery to our center. The opposite also happens, when the lenses alter the focal length of the camera and the center is expanded to the outer edges of the image, where it's affected by the distortions of the lens; our field of vision is deformed and the blurred space envelops us.

The blur goes beyond the simple lack of visual definition, it alters basic preconceived notions of the components of space, like center or periphery, and the way we engage them. The center, understood as the rational space of homogeneity, becomes the unstable edge of our vision. The periphery, rejected as residual information, is now the invaluable tool of orientation. It is precisely this reversal of values that make the blur an important design tool. The reassessment of the duality of Center/Periphery and the insight into the way these two qualities interact, that comes out this process, could then be applied to other oppositions in architecture like inside/outside, private/public or even Central/ Peripheral. The limits, which where hermetically defining zones or spaces, must now accommodate this mutability; this state of flux that is the Blur.

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3.3 Woman emptying bucket of water on seating companion Plate 160,Eadweard Muybridge,*The human figure in motion* (1955, Dover Publication)
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