Approval

Name: Peter Wollheim

Degree: Master of Arts (Communication Studies)

Title of Thesis: "Optics, Aesthetics, Epistemology: The History of Photography Reconsidered."

Examining Committee:

   Chairperson: Thomas J. Mallinson

   Robert J. C. Harper
   Senior Supervisor

   J. Zaslove

   J. Marcíá

E. Gibson
External Examiner
Associate Professor
Department of Geography, Simon Fraser University
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Title of Thesis/Dissertation:

"OPTICS AESTHETICS, EPISTEMOLOGY: THE HISTORY OF PHOTOGRAPHY RECONSIDERED"

Author:

(signature)

PETE R WOLLHEIM

(name)

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(date)
Abstract

This thesis deals with the status of "truth" - epistemological, aesthetic, and psychological - in photographic representation. Using materials from the sociology of art and comparative epistemology, the photograph is contrasted with the medieval icon, and its evolution examined in terms of various "truths" about nature and optics as defined by scientific inquiry. The thesis concludes by examining anxieties that photography arouses in modern culture, and demonstrates that they are part of larger ambivalences which can be investigated as the fetishizing of appearances in capitalistic society.
As the mirror said, "It's all done with people."

--- Tom Robbins
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Foreword

This thesis is part of a longer work-in-progress on photographic criticism, the main purpose of which is to liberate photography from the confines of its current ideological frameworks. The general method of that work is set forth in this thesis, and will be followed up by accounts of how individual photographic artists have fought against the conventional concepts of the photograph as representation, and how the form and style of their works reflect this struggle. The reader is therefore invited to consult other reviews and articles that I have written on this topic.¹
Photography: the Search for an Aesthetic

Despite its increasing popularity and acceptance as a fine art, photography remains one of the most problematic and barren areas of serious aesthetic criticism. Within the last ten years voices as diverse as *Aperture* and *Popular Photography* have called attention to this vacuum, but there is still no recognized and coherent body of photographic criticism.

On the whole, the greatest obstacle to the growth of such criticism is the habit of regarding the camera as a syntax-free and somewhat passive instrument suitable for merely recording visual images. The pre-history of photographic criticism is the battle for the recognition of photography as an expressive medium fought by Alfred Steiglitz, the F/64 group, and a number of other photographers, curators, editors, art historians and critics. To a large extent their goal has been accomplished and photography is now accepted by museums, galleries and art schools as a legitimate field of interest. But in a short monograph on *The Criticism of Photography as Art* (1970), Professor John L. Ward suggested that there is still a residual refusal, on the part of professional critics, to treat photography as something other than a mechanical operation accessible to artist and non-artist alike,
regardless of skill or training. Ward suggested that the general public complements this attitude by responding to the subject matter of photographs rather than to the style of depiction. 3

More recently A.D. Coleman, former critic for the Village Voice and New York Times, has cited some immediate and practical obstacles to the creation of an on-going discussion. As Coleman points out, there are few public forums for the exchange of views aside from consumer-oriented magazines largely dominated by the commercial interests of advertisers. This often engenders a cheap pseudo-criticism which either reflects the momentary idiosyncrasies of a particular reviewer, or discusses the image as an end-product of certain combinations of equipment. Coleman noted that the readership of these magazines uses photography primarily as a craft or hobby, and responds to critical writing by often requesting information on cameras and lenses. Speaking from experience, Coleman deplored "the lack of a functional vocabulary for the criticism of photography."

The language currently applied to photographs as distinct from other kinds of images is derived entirely from the jargon of technique; it is a form of shop talk which pertains to the manufacturing of photographs as objects rather than to their workings or effects as images. In essence, it deals not with the creative/intellectual problems of the photographer as artist and communicator, but with the practical difficulties faced by the photographer as craftsman. 4

There are a number of additional problems which hinder critical discourse. Contemporary aesthetic theory relies heavily on
definitions and distinctions, but the term "photograph" applies equally to snapshots, photograms, x-ray and aerial photographs, commercial portraits and wedding pictures, i.d. and passport shots, and a variety of other images made for purely utilitarian purposes. The borderlines between some commercial work - in advertising, architectural or fashion photography - and "fine art" photographs are often indistinguishable. Photomicrographs made during the course of scientific research have often been exhibited for their aesthetic qualities. At what point can or should a critic make meaningful distinctions between art and technology?

Secondly, photographs have become a commonplace element in the mass media and we are exposed to dozens, if not hundreds of photographs daily in newspapers, magazines, books, posters, on TV, billboards, calendars, etc. One result of this widespread usage is that photographs have come to be more used than viewed since they compete with other messages for our attention. Photographers are increasingly faced with a situation not unlike that experienced by poets of the early nineteenth century, when advertising and the popular press threatened to reduce poetic diction to a lingua vulgaris for selling insurance policies and diuretics.\(^5\) Photography is deeply embedded in what is now called "popular culture", a subject which has drawn only a minimum of scholarly interest. Critics of "fine art" have avoided the area entirely.\(^6\)
Photography has also blossomed out during a particularly chaotic period in the history of the arts and their criticism. As Harold Rosenberg aptly put it, the work of art has become "an anxious object." "Am I a masterpiece, 'it must ask itself, 'or an assemblage of junk?" With the profusion of styles and movements during the last century criticism has become a fairly risky activity.

One thing (has) been learned from the notorious mistakes of the past one hundred years, and the lesson was thoroughly confusing. It was that no new work, no matter how apparently senseless, repulsive or visually vacant, could be rejected without running the risk that it would turn up as a masterpiece of the era. The story of the Ridicule Of The Radicals - of the Impressionists, Van Gogh, Matisse, Modigliani, Duchamp - had become part of the folklore of painting.

The same trend is evident in the other arts and critics seem to have responded by staunchly defending yesterday's standards, or jumping on to each new and with-it bandwagon. The photographic critic works in an era during which the barely adorned act of public masturbation has received serious attention in a major journal of the fine arts.

Among the problems associated with this anxiety are refurbished hang-overs from the Romantic idealization of art and artist. Its photographic version reached a visible peak following the release of Antonioni's Blow-Up (1967), when phrases like "the camera" and "the photographer" received a new supercharge. Blow-Up's
subliminal message included two ideas that had been percolating through the collective cultural unconscious throughout the sixties: that art had become Big Business in North America and England, and that the role of the artist was now a permission-giving stereotype for smoking dope, kinky sex, and other forms of libidinous activities. Not only do these ideas draw attention away from the actual photographs to be considered, but they place critics into the negative stereotype of the jealous would-be artists who, embittered by their own lack of creativity, become parasites and power-brokers. "If you know so much about great photographs why can't you make them?" is now a standard defense against critical activity.

Finally, photography's long-standing resistance to criticism could be taken as a sign of health and vitality. One can too easily imagine graduate students suffering through dull seminars, sitting in stuffy rooms on warm spring afternoons, trying not to doze off while the professor drones on endlessly about the minutiae to be gleaned from the personal life of some insignificant photographer who was the subject of someone else's research project. Those of us who love photography would hate to see it share the fate of English literature, which has largely remained a "problem" for formalistic analysis. In academic quarters criticism is generally a matter of intellectualization and interpretation; the approach to art seems derived, without modification, from the dissecting room or laboratory. Critics
appear less concerned with their own responses to art than with fitting the work into some preconceived theory of interpretation. And as Susan Sontag has declared,

"Today...the project of interpretation is largely reactionary, stifling. Like the fumes of the automobile and heavy industry which befoul the urban atmosphere, the effusion of interpretations of art today poisons our sensibilities. In a culture whose already classic dilemma is the hypertrophy of the intellect at the expense of energy and sensual capability, interpretation is the revenge of the intellect on art."  

Is there a way then to talk about photography without killing it, and without falling into the trap of rejecting any sort of intellectual guide to the appreciation of art? I believe there is, but it is one which is anathema to our dominant aesthetics since it involves those areas of inquiry subtended by the names of Sigmund Freud, Karl Marx, and John Dewey. This does not imply the creation of one more Freudo-Marxist theory of interpretation, but does point to the conceptual means whereby our personal responses to photographs can be put into broader and deeper experiential contexts. It is an approach close in spirit to that of oriental cultures in which art is not a separate category of existence, but forms an important commentary on the aesthetics of everyday living.

The contextual aesthetic to be proposed is one which can hopefully move us beyond viewing the photograph as merely an end in itself, or as the manifest expression of a latent content, or
as the simple product of class interests. Though Freud, Marx, and Dewey have all been accused of reducing art to fantasy or ideology, a close reading of their thoughts reveals the basis for a common agreement that the power of fine art stems from its ability for unmasking the dogma, prudery, moralizing, depersonalization, and idealization that actually keep us from coming to grips with reality. From a Freudian perspective this means that art helps us recognize the prices we pay for living in a complex civilization: the repression of spontaneity and desire, and the accompanying guilt, neurosis, separation, and defensiveness erected against our own deepest feelings. For Marx, and particularly Engels, art can demystify "the fetishism of commodities, reification, alienation, false consciousness, ideology, objectification, estrangement." And for Dewey, art provides a way out of the false dichotomies that cripple our thoughts and emotions, dichotomies between subjective and objective, means and ends, text and context, art and life, body and mind, spirit and matter. Moreover all three thinkers suggested that art transcends its immediate psychosocial contexts precisely to the extent that it becomes as sensual and material as possible, and that its life-affirming qualities are ultimately derived from the erotic.

At the same time all three recognize that some types of aesthetic experience serve as opiates which provide substitute
or entertaining satisfactions, drugging consciousness instead of extending it. These are the forms of artistic experience that D.H. Lawrence denounced as "counterfeit", while he still left open the possibility that the dialectic nature of art makes some element of counterfeit inevitable in every effort. For a contextual aesthetic this point is crucial, for around it revolves the question of the work's entrapment in conventional and hence safe modes of experience, modes which offer worse than nothing in the way of growth and challenge. But in order to make these sorts of discriminations the viewer-critic needs to know what areas are safe and conventional, and this means studying the repressive and oppressive elements of the culture in which the work originates. For photography especially this requires a self-examination on the part of the viewer-critic to determine the extent to which he or she participates in defenses against new and potentially threatening experiences not sanctioned or rewarded by our culture. This demands taking risks which are at least equal to those of the creative photographer, and makes the critic an ally in the struggle for new ways of seeing.

The materials for a contextual study of photography are quite plentiful, and await only an open-ended synthesis. There are the excellent though limited histories of photography by Beaumont Newhall, Helmut and Allison Gernsheim, and other historian-critics; comparative studies of photography and painting casting light on both subjects; comments on photographic aesthetics generated by
the age-old purist-pictorialist controversy; writings by pioneer photographers like Steiglitz, Ansel Adams, and Edward Weston; studies by McLuhan and others on the social impact of photographic technology; the miscellaneous and often scattered writings of a few critics; and above all the images themselves, to which we must always turn for final verification of our theories.

Perhaps the most appropriate method for correlating these materials, and for overcoming many of the obstacles to criticism mentioned earlier, is the approach from epistemology, the theory of knowledge. Photography is the only art still burdened with the double expectation of truth and beauty, mostly because the perceived literalism and accuracy of the camera allow for application in science, medicine, law, and warfare. The uncritical and widespread acceptance of the photograph as a representation of reality makes truth an aesthetic value without really dealing with its epistemological significance, but the critic must question the meaning of "truth" with respect to both aesthetic and epistemic frames of reference. Historically it is obvious that the tendency of academic theory to treat all art as a representation of nature (real or ideal) has its correlates and predecessors in other theories of representation such as the habit of abstracting types and norms out of the world, generated by empirical science; or in the growth of representational over participatory models of democracy; or in the use of money as a symbol for materials and
labor on the commodity market. The idea of representation has a long history with regard to both art and science, of which photography is the most important recent example. Taking it as a starting point gives one a handle on a number of other social and philosophical issues which aesthetic theory is required to address. Representation was also a primary element in the Romantic theory of art, which held that photography could be used to mirror a higher or non-material reality, and in the Surrealist attempt to use photography as a direct representation of the unconscious and its processes. As a result of the theory of representation, photography and the other arts have been judged by values extrinsic to them, values imported from science, religion, political science, or psychoanalysis. A contextual theory of photography must therefore follow the principle of representation to its limits, before being freed from those root assumptions.

What follows then is an effort to construct an aesthetic for photography which is relational, not representational. Relational thinking about art brings us into the twentieth century instead of lingering on in the eighteenth or nineteenth: it joins an intellectual stream which is having profound effects in physics (relativity of the observer), biology (ecology and adaptation), psychology (Gestalt theory and psychoanalysis), and communication theory. The principle of representation in all these fields is being reassessed, if not discarded. There is no reason for aesthetics to stand aloof from these developments, especially when
it is evident that these new ways of gathering and evaluating knowledge about the world are finally approaching the place where art has always taken us.
The Photograph and the Icon

For active photographers, teachers and critics, the subject of aesthetics holds out the promise of answering a series of basic questions: what makes an image work, and what is it about certain images that makes them meaningful and effective? Where does the power of a strong photograph reside, and how can one get in touch with that power? How does one put a finger on the evanescent quality of a fine photograph which sets it off from lesser creations?

The most influential answers, in contemporary circles, come from the Anglo-American trend in aesthetics often called formalism by its adherents. Broadly defined, formalism has dominated photographic criticism since its inception, and formalist assumptions are unquestioningly accepted today in most discussions of photography, whether in academic journals, popular magazines and newspapers, or historical accounts of photography as a fine art. Because it is so enmeshed in the broader philosophy of liberal humanism, formalism also pervades the teaching of photography in North America, especially at the university level.

Taken at its roots, formalism begins to answer the basic questions by maintaining that works of art are successful when they satisfy "a natural aesthetic impulse" in "a suitably trained
and prepared observer."¹⁴ This aesthetic impulse, as formalists see it, is an inborn drive similar to hunger or thirst, but which operates at a much higher plane of cultivation and fulfillment. As a uniquely human endowment the aesthetic impulse is a genuine need in itself, one which cannot be reduced to any other, and which is relatively autonomous in creating its own standards of satisfaction. Formalists go on to argue that works of art come into being largely in response to the aesthetic impulse, and that the ultimate value of art "derives partly and perhaps mainly from the full exercise of (this) trained and mature sensibility extended to maximum capacity."¹⁵ Effective photography would therefore be that which best sustains aesthetic feelings in a prepared and sympathetic observer.

Despite the appeal of immediate practicality, any effort to apply formalism's basic premises to art naturally leads to another, and more complicated set of problems. Just how can the maker or appreciator of photographs isolate the aesthetic experience from other kinds of experience - how does one separate the beauty of a sunset from the beauty of a photograph of that sunset? Since many photographs have practical uses, and many utilitarian images are aesthetically appealing, what is the essence of the artwork which distinguishes it from similar objects: can an attractive photograph of ice crystals, made for the purposes of scientific investigation, be seriously considered as an object of autonomous
aesthetic significance? And if the "aesthetic impulse" is truly a single, unified capacity, how can one deal with the satisfactions offered by images as diverse as photograms, nudes, landscapes, architectural shots or portraits, or media as varied as music, drama and sculpture, often quite unrelated to photography?

It is in answer to questions like these that formalists have tried to evolve a theory of artistic categories, one which seeks to define words like "art", "beauty", and "aesthetic experience" as clearly as possible. When applied to photography this search for essence and uniqueness usually translates into a classification of the normative or ideal properties of the medium, those qualities which best characterize accomplishment in photography as distinct from painting, cinematography, and other kinds of visual expression. Formalist aesthetics, such as those embodied in the "straight" or "purist" tradition, tend to value images that are uniquely photographic over those which borrow from other media.

In speaking about photography in particular, the formalist approach has generally centered itself around a very specific vocabulary. Photographs have been analyzed and praised with words like "candidness and spontaneity"; "credibility, moral neutrality"; "detail, texture, clarity of definition, exactitude, delicacy"; and above all, "realism, truth, the tangible presence of reality". These terms are constantly used in reference to "pure", unmanipulated, "straight" photography,
that is, a machine process unmodified by retouching, hand coloring, or any other kind of manual intervention. There is as yet little vocabulary for the discussion of manipulated photographs, other than to call them "painterly".

For many photographers the perfection of their craft has meant striving after the qualities formalists mention, but the most important and problematic of these has been the ascription of "truth" to the photographic image. This has meant a variety of things to various photographers, but all stem from the basic idea that the photograph always starts with, and refers to something "out there", an idea which need not be strictly applied to even the most realistic forms of painting, except the consciously mimetic. Unlike painting, a photograph is always of something, even if distorted. It is partly because of photography that one seldom speaks now of paintings in terms of accuracy, and the chief inauthenticity in painting can only be blamed on forgery. But while paintings can be forged, there is virtually no such thing as a forged photograph - inauthenticity here is always the result of "trick" or "doctored" photography.

Consideration of these facts complicates any attempt to isolate the authoritative "truthfulness" of the photograph as a purely aesthetic value, as the commonplace notion that "the camera never lies" has a number of broader implications. The precise, detailed qualities of photography justify its use in scientific research,
medicine, geographical surveying, archaeology and anthropology, and so on, to the extent that major hypotheses may be supported by little more than photographic observation. The undeniable accuracy of the photograph also permits its use as evidence in legal proceedings and journalistic documentation. The "truthfulness" of the camera constantly enters into decisions regarding surgery (x-rays, medical photography), jurisprudence (forensic photography), military and foreign policy (aerial reconnaissance), and retail marketing (advertising and fashion photography). At the humblest level, what most people still value in a studio portrait is "a good resemblance" even more than skillful lighting or dramatic composition. Obviously this literal and somewhat mundane realism is not the "truthfulness" that formalism identifies with the generation of aesthetic feeling in an artist or viewer, because as Rudolf Arnheim put it,

The artist is rarely concerned with making things look real. He wants them to come alive... Nowhere in the arts, except for the few episodes of extreme illusionism, can "to be alive" have meant to be like living beings - the difference between nature and simulacrum must have always been obvious.

Yet if the literal truthfulness of photography has anything to do with its ability to "come alive" on the aesthetic level, then one must deal with the inevitable paradox, understood by most photographers, that the truth of a photograph is itself a controllable illusion. The making of a photograph usually involves rendering three-dimensional objects of various colors onto smaller,
two-dimensional, often monochromatic surfaces. This reduction in size generally entails a decrease in brightness range also: a snow-covered landscape in direct sunlight presents more visible contrast to the eye than any photographic paper can match or duplicate.\textsuperscript{23} This is even more noticeable in color photography where the hues and tones of a slide or print represent a small portion of the visible spectrum.\textsuperscript{24} Much of the training of any photographer is devoted to acquiring the skill of "seeing photographically", which is to say, in terms of the particular possibilities of optical and photochemical materials.\textsuperscript{25}

The illusionary nature of photographic realism has also been underscored by experiments in the psychology of seeing, indicating that the camera is not simply an extension of the eye, as often thought, but a distortion or departure from natural vision: the eye sees neither detail nor linear perspective while scanning its field of vision.\textsuperscript{26} Children do not begin drawing by making photographically correct images, and even adults must be trained before they can do so.\textsuperscript{27} Field studies in anthropology confirm the suspicion that photographic realism is a very specific way of seeing; people in nonliterate cultures tend to treat photographs as undifferentiated masses of grey or color. Only when the tactile element is added, when they run their fingers around the outlines of shapes on the two-dimensional surface, do these " primitives" learn to see the photograph as a
The illusionary quality of the photograph is also underscored by comparison with forms of realism in painting which are not photographic. The aerial perspective of Japanese sumi-e, the overlapping planes of High Gothic murals, the receding colors of Hellenistic painting are all examples of "two-dimensional representations of the three-dimensional world that bear no relation to photographic representation."29

In terms of the original question - how does it work? - the cross-cultural information suggests that the "truth" of the photograph, even the non-artistic photograph, lies outside its borders as much as it does within them, namely in the formation of the "suitably trained and prepared observer." At first this would imply nothing more than the observer who has learned to see the photograph realistically, even if by running his or her fingers around its visual contours. Unfortunately this is more a description than an explanation, and a deeper look brings one into the middle of an important controversy in the psychology of aesthetic perception. One side of this dispute was presented by E.H.Gombrich's noted Art and Illusion (1960), which argued that the success of the illusion of realism depends on mental sets or concepts supplied to artist and viewer alike by their culture, and particularly by the artistic conventions which give precedents for encoding the world in terms of various media.30 Gombrich's tendency to see artistic styles as the products of conceptual schemata has been vigorously challenged by the Gestalt
psychologists who put the emphasis on the organizing tendencies of the human perceptual apparatus, especially its predisposition to structuring the visual field with the least ambiguity possible. According to their research, the illusion works because it is simpler for the eye to see a photograph realistically than as a group of amorphous masses. While the Gestaltists admit that the process is modified by conceptual thinking, they stress that intellectualization dominates the interpretation that follows, rather than precedes the act of perception.31

As it stands now, that controversy is not to be settled quickly if only because it is impossible to experiment with subjects whose perceptions have not been influenced by previous experience and conceptual reflection. The question of "how does it work?" is not to be fully answered within the current frameworks of psychological research. But despite this impasse one can still ask other questions about the illusion, regardless of its origins. Given that it succeeds in any competent photograph, one can still ask how the illusion of realism comes to have significance and value, even when its primary aim is not to satisfy the aesthetic impulses. On first thought this requires one to confront the perennial question of "the meaning of meaning", a sticky philosophical problem with many metaphysical implications. The usual course is to argue whether the value and meaning of art are personal and subjective, or absolute and objective, or some
combination of the two of them: the bulk of contemporary aesthetic writing is devoted to solving this very problem. But perhaps, as John Dewey suggested, the question appears insolvable because of the very way in which it has been worded, as though subjectivity and objectivity were mutually exclusive qualities, and as though to value a photograph meant to confer an abstract significance onto it. A more fruitful method of inquiry might be to investigate the clear-cut "meaning" of certain images with respect to some specific human actions which indicate significance and valuation. Thus photographs can be said to acquire very special meanings depending on their use as tools for scientific research, as keepsakes and momentos, or objects for quiet and appreciative contemplation. Moreover, these meanings are readily observable in terms of concrete actions and behaviors which can range from use in an experiment to placement in a photo album or museum along with similar images. Certainly one of the most explicit actions possible is to verbally place the photograph into a more elaborate system of symbolic meanings such as a philosophy, religion, or personal aesthetic.

The point is clarified as soon as one begins to consider the sociological problem of the photograph as an "ideal type" in relation to its most radical opposites. To some extent this has been done in comparative studies of photography and painting, but the relationship there is often one of cross-fertilization. Taking a broader view, one finds images whose expressive qualities are
far removed from the photograph’s sense of realism, its tactility, clarity and detail: the sketching of children and schizophrenics, the art of tribal peoples, and private dream symbolism. But for purposes of historical comparison the epitome of non-photographic imagery in Western culture is best exemplified by the iconic art of the early Middle Ages.

The differences in both style and technique are readily apparent. In contrast to the photograph’s candidness and spontaneity, the mosaic presents stylization and a high degree of formality. Where the photograph is credible and realistic, the tapestry is almost purely imaginative, often depicting angels, unicorns, devils, and monsters which never had material existence. Texture in the photograph is rendered through lighting and chiaroscuro, which also add dimensionality, but in medieval images texture is usually provided only by the surface or background - the stones, thread or parchment - and the subject itself may suggest only two dimensions. Instead of the mass of individual details found in the photograph, medieval art tends to standardize posture, gesture, height clothing and facial expression, and it subordinates individual parts to a centralized theme or message. In place of the photograph’s alleged moral neutrality, the didactic meaning of religious art is explicitly stated. While the photograph can be produced and transmitted instantaneously (through the Polaroid process and telegraphy), the construction of mosaics,
tapestries and illuminated manuscripts are time-consuming projects requiring continual deliberation. And as opposed to the photograph's extreme portability medieval works of art are intimately linked to their architectural surroundings.\(^3\)

Having said this much, how is one to account for the differences? For those inclined to a rationalistic explanation the answer has usually been couched in terms of progress, or a linear scheme of evolution from icon to photograph.\(^3\) But while it is true that the technology of image-making has expanded rapidly over the last few centuries, this does not support the idea that photography is a higher, or more valuable, or even more natural kind of imagery. And if the photograph cannot claim superiority to the icon on the basis of expression or perception, then how does one explain its development? This would seem to be the fundamental question in the history of photography, one which has been unconsciously answered by historians who enumerate a list of fortuitous and isolated discoveries which, when added together, produced the modern camera, lens and photo-chemical process.\(^3\) This is the model of science and technology which Thomas Kuhn identified as "advancement-through-accumulation", a step-by-step model which generally fails to account for any major conceptual breakthrough in the history of science.\(^3\) The important advances occur, according to Kuhn, only when the basic paradigms of scientific thought are challenged and proven inadequate, though this often occurs when individual practitioners find new conceptual
means for dealing with previously inexplicable data. As Kuhn describes them, paradigms are the broad intellectual structures which define problems and methods of a research field for succeeding generations of practitioners... some accepted examples of actual scientific practice - examples which include law, theory, application and instrumentation together - provide models from which spring particular, coherent traditions of scientific research. These are the traditions which the historian describes under such rubrics as 'Ptolemaic astronomy' (or 'Copernican'), 'Aristotelian dynamics' (or 'Newtonian'), 'corpuscular optics' (or 'wave optics'), and so on.38

Keeping this in mind, a paradigmatic approach to the history of photography raises a number of critical questions not even recognized by the standard histories. Contrary to standard opinion medieval society in western Europe was not technologically stagnant during the "Dark Ages", and the abolition of Roman slave-labor initiated a search for nonhuman sources of power which brought forth the water-wheel, stirrup and harness, crankshaft, rudder, horseshoe, plough, compass, clock, vellum, springed carriage, and three-field agriculture.39 But if these inventions were possible was there anything in medieval paradigms which precluded the developments that led to photography?

To answer the question of why the Middle Ages did not invent photography and ours did, one needs to compare the social construction of reality40 - the basic conceptual schemata for organizing ideas and experiences - in both historical periods.
At the risk of generalization it is clear that the medieval sense of "reality" correlated with the feudal power structures which stratified all economic, social, and religious relationships in most of Europe. The ascendancy of Christian monotheism over classical paganism substituted the unity of one God and His church for a pantheon of innumerable specialized deities and spirits. This theme of religious unification, already evident during the waning of the Roman Empire, justified the prevailing social order by deifying it as an extension of the divine cosmos. Reflecting its basic political structures the medieval world largely saw itself as a self-contained and organic whole, a hierarchial system with God at its apex, man at its center, and a series of levels mediating between them. The visible distribution of power and privileged that ranged among king, lord, vassal, serf, was upheld as a lesser copy of the invisible boundaries separating God, archangel, seraphim, cherubim, and other angelic orders. The strong identification of politics with cosmology was maintained well into the sixteenth century and even then an apologist for monarchy could write:

    Hath not God set degrees and estates in all his glorious works? First in his heavenly ministers, whom he hath constituted in divers degrees called hierarchies. Behold the four elements, whereof the body of man is compact, how they be set in their places called spheres, higher or lower according to the sovereignty of their natures. Behold also the order that God hath put generally in all his creatures, beginning at the most inferior or base and ascending upward... Every kind of trees herbs birds beasts and fishes have a peculiar
disposition appropriated unto them by God their creator; so that in everything is order, and without order may be nothing stable or permanent. And it may not be called order except it do contain in it degrees, high and base, according to merit or estimation of the thing that is ordered.}

This organic or holistic view of God and Nature found expression in a number of cogent metaphors: the Great Chain of Being, the cosmic dance, the divine comedy, Ptolemaic astronomy, and the equation of microcosm with macrocosm on several levels. Within these systems the identity of individual beings was based, not on uniqueness, but on place and position within the pre-ordained cosmic order. The medieval sense of reality was imbued with notions of similarity, interrelatedness, coherence and intersection, all of which were incorporated into the epistemological principle of resemblance. Much of feudal heraldry employed the common equations of God (head of the universe), king (head of state), brain (head of the body), sun (ruler of stars and planets), lion (king of beasts), eagle (king of birds), whale (king of fishes), and so forth. The medieval concept of disease, and the body-image of the Middle Ages, was founded on correlations between parts of the anatomy and humors, planets, signs of the zodiac, metals, minerals, and seasons. The same principles applied to astrology and alchemy as well as to the biological aspects of the natural order.

Out of all these resemblances the Church created an official hierarchy of truth and knowledge through which it supervised the
evaluation of observation and experience. Medieval theologians were less concerned with the laws of nature and their technical application than with grace, salvation, predestination, and above all, faith. Knowledge of earthly matters was largely subsumed under other-worldly considerations, and all new sources of information were subject to censorship by a centralized authority which could and did isolate, excommunicate, and burn nonbelievers. Scientific experimentation as we know it today, without which photography is impossible, could not prove anything but was forced to "save the appearances" of a geocentric universe in which planets orbited around the earth in perfect circles, with uniform rates of motion.48

This cosmology, plus the Church's official espousal of asecticism shaped its policies with regard to art also. Aesthetic theory, which Hellenistic thinkers took seriously, was virtually ignored by most ecclesiastics, except for brief periods during the fourth and ninth centuries. St. Augustine (354 - 430 A.D.), influenced by Plato, set the tone for most of what was to follow in the Church's doctrines with respect to art and beauty. His thinking is summarized in the formula, "Unity is the form of all beauty."49 Things were beautiful "because the parts are similar to one another and are brought into one concordance by a certain combination."50 These thoughts were seconded by many others, among them Boethius (c.475 - 525): "Beauty appears to be a certain
commesurateness of parts.\textsuperscript{51} Augustine also held that the concordance of parts was a function of numerical ratios in balance, such as perfect symmetry in architecture, meter in poetry, proportion in painting, and rhythm in music.\textsuperscript{52} In all cases, according to Augustine, beauty is a property of the forms and shapes involved rather than the colors, textures, or emotional qualities.\textsuperscript{53} On the contrary, it is only reason which can judge beauty adequately:

\begin{quote}
I am delighted by the highest equality, which I apprehend not with the eyes of my body, but with those of my mind. I, therefore, believe that the more what I see with my eyes draws nearer to what I apprehend with my spirit, the better it is...For you see nothing but physical things with these physical eyes: it is with the mind that we see...unity.\textsuperscript{54}
\end{quote}

Theologians also arranged the appearance of beauty according to hierarchial divisions. Physical beauty was assigned a lower rank than spiritual or transcendent beauty, just as earth was placed lower than the upper reaches of the heavens. (The beauty of a painting was therefore prized only if it referred symbolically to the beauty of an invisible reality.)

\begin{quote}
Visible forms are not produced and shown to us for their own sake, but are notions of invisible beauty, by means of which Divine Providence recalls human minds into the pure and invisible beauty of truth itself.\textsuperscript{55}
\end{quote}

Even during periods of relative freedom, such as the rule of Charlemagne in the eight-hundreds, art was still a suspect form of human endeavor, an idle type of amusement verging on immorality.
Art was tolerated and sometimes supported for its didactic purposes. "Illiterate men can contemplate in the lines of a picture what they cannot learn by means of the written words... the picture is a kind of literature for the uneducated man."\(^5^6\) In other words, the Church recognized the value of art when used to convert and indoctrinate the masses.

But while visual exploration was suppressed mainly in northern Europe it was this same area that kept classical literature alive in the monasteries, and enriched its meaning through "higher criticism" or the method of hermeneutics.\(^5^7\) The interpretation of the Bible and other literature was founded on the idea that language was God's instrument of creation, and that creation was therefore synonymous with the process of naming. As in the beginning of Genesis, God says, "Let there be light, and there was light"; the first task of Adam is to name the creatures in the world around him.\(^5^8\) The gospel of St. John, drawing on mythological references, makes the identification more explicit: "In the beginning was the Word (Logos), and the Word was with God, and the Word was God."\(^5^9\) And if language came from God himself it followed that the name of a being contained hidden clues as to its inner nature. Language was studied as a set of signs revealing God's essence and purpose. The task of hermeneutics was to excavate these buried meanings by carrying all symbols to their furthest extension, by means of hierarchy and resemblance,
at which point they should resolve into unity. Instead of science
the medieval world-view encouraged those intricate systems of
interpreting the world as God's image adopted by the modern
"counter-culture": Tarot, alchemy, Kabbalah, ceremonial magic,
astrology, numerology, gematria, palmistry, etc. 60

A familiarity with hermeneutics helps explain certain medieval
attitudes regarding numbers, letters, and artistic images.
Following the Greek mystic, Pythagoras, theologians and
mathematicians commonly spoke of some numbers as "mean", others
as "excessive" or "defective", and a few as "perfect". 61 Even the
letters of the alphabet were embedded in cosmic symbolism, as when
Christ said, "I am the alpha and omega." 62 Isidore of Seville
(c. 560 - 636), one of the Church Fathers, wrote a treatise on
grammar which examined the Greek letters for their moral
significance:

The letter Pythagoras of Samos first made, after
the model of human life, whose lower stem denotes the
first of life, which is unsettled and has not yet devoted
itself to the vices or virtues. The double part which
is above, begins in youth; of which the right side is
steep, but leads to the blessed life; the left is
easier, but leads to ruin and destruction. 63

The hermeneutic frame of mind is implicitly built into those
aspects of medieval art which are more symbolic than illustrative.
When the art of the Middle Ages did not present narratives of
scenes from the Bible it developed a highly stylized hagiography,
or constructed allegories of light and darkness in which
explorations of style were constrained by moralistic considerations. When Nature makes its appearance here it is as allegory itself. Ants preach industriousness, bees teach harmony and cooperation, lions symbolize the power of leadership and royalty. In the most extreme instances certain Byzantine theologians came close to idolatry in their insistence that images of Christ took on the sanctifying and healing qualities of the God-head. But even when not taken to these extremes the hermeneutic method reveals the essential medieval attitude to art - that it was there for the sake of reminding viewers of a "higher" value and meaning.

Finally something needs to be said about the economic structure of artistic activity throughout the Middle Ages. During the earliest days of the Christian movement, before its adoption as a state religion, the artwork used to decorate catacombs and churches must have originated in the donated labor of dedicated amateurs. The early Church could not have afforded the skills of professional artists and this accounts, in part, for the technical crudity of Christian art in its initial stages. With the establishment of relatively stable monastic orders the manufacture of handicrafts and images was put on a more systematic basis. The monasteries employed principles such as the division of labor and organization of the day into hours for regulating the production of illuminated texts, pieces of sculpture,
furniture, ceramics, glass windows, and a variety of other artifacts. The monks, usually members of aristocratic families, acted chiefly in the capacity of supervisors and administrators, while the peasantry did the heavy labor. Courts and manor houses used the talents of domestic servants, supplemented by those of a few wandering journeymen. In short, there was no open market for art in the modern sense of free competition. It is true that this situation loosened up during the Gothic period of the twelfth and thirteenth centuries, but even then artisans and artists were bound to membership in guilds or lodges which were organized for the purpose of monopolizing the market. The system of independent patronage did not arise until wealthy merchants could provide an alternate source of income from churches, courts, and town corporations.

This brief glance at history indicates that the invention of photography was precluded, not by ignorance, but by a socioeconomic system which had little room for candid, spontaneous, detailed, realistic or morally neutral imagery, at least until its inherent contradictions released the return of previously repressed modes of visual expression. The development of visual realism was excluded on almost every level by medieval cosmology, ideology, aesthetic thought, hermeneutic discourse, modes of artistic production, and organization of social life in the courts, churches, monasteries, and other centers of cultural activity. The inherent conservatism of medieval culture in all its aspects
made "pure" scientific and artistic exploration extremely difficult, though perhaps not impossible. But given the prevailing conditions any breakthrough or challenge to the system would have meant a reaffirmation of this life, of the body and the senses, in the face of economic isolation, censorship, and excommunication. This is not to imply that medieval culture was a monolithic unity entirely free from conflicts and contradictions. In actual fact, the Church's dominance was often undermined by both feudal kings and popular millenial or heretical movements: it is out of these conflicts that the highest and most innovative examples of medieval art came to fruition.67

The example of the Middle Ages also serves to illustrate the critical point that the meaning and significance of art works and aesthetics can be examined in terms of their functions as the extension of a controlling ideology. The visual language of medieval art and the philosophical language of medieval aesthetics used the vocabulary of hierarchy, resemblance, correspondance and subordination that permeated government, religion, economics and philosophy during that era. From the monk working on it to the layman and theologian who contemplated it during the act of worship, the final meaning of any single image was always to be evaluated in terms of an absolute and all-encompassing system of meanings that touched upon every aspect of existence. Moreover, it is clear that the influential pronouncements of a thinker as
sincere and intelligent as Augustine accorded with the very earthly interests of ecclesiastical authority, no matter how idealistic their tenor or intention. The Church drew its strength partly from the sin-laden body/mind split thinkers like Augustine succeeded in maintaining, and from denying to human beings the validity of their own intuitions and perceptions unless sanctioned by dogma. The Church also supplied images which attempted to substitute metaphysical abstraction for the concreteness of sensual experience, and its aesthetics were essentially a means for suppressing the elements in art that hinted at immediacy, spontaneity, individuality or personal expression. This suggests that the most pragmatic test of any aesthetic is its potential to limit, rather than enhance the artistic experience - a test which quickly reveals the defects in modern photographic criticism.
Photography, as a graphic technique, contains the intersection of optics, chemistry and mechanics. But in order for chemistry to emerge from alchemy, optics from *perspectiva*, and mechanics and physics from astrology it was necessary to reorganize the medieval structure of truth and knowledge. The modern periodic table of elements could not be formulated as long as gold was revered as higher than lead in terms of economic and spiritual qualities. Optics was similarly impossible while light stood opposed to darkness as a cosmic analog of truth, intellect, power, prudence, wisdom, health, love, and the beatific vision. Science had to break the great but closed chain of being and its built-in limits to knowledge, symbolized by the apple in the Garden of Eden. In its place came the idea of progress, the infinite expansion of the human mind into nature. Science, at least until the twentieth century, reversed medieval epistemology by ordering the world in terms of difference and uniqueness instead of resemblance and correspondance. The discovery of the individual, the unit, the atom, the species and the entity was fundamental to the fragmented universe in which photography had its origins.

Visually the earliest indications of a major change came in Gothic art, a product of the most bourgeois and urbanized portions
of the Middle Ages. Just why the towns of Europe were revitalized at that moment in time is difficult to determine, but the growth of commerce and a market economy made its influence felt in an art reawakened to the possibilities of the material world and all its individual details.

The urban and financial conditions of life which force man out of his static world of custom and tradition into a more dynamic reality, into a world of constantly changing persons and situations, also explain why man now acquires a new interest in the things of his immediate environment. For this environment is now the real scene of his life; it is within this environment that he has to prove his worth, but, to do so, he must know its every detail. And thus every detail of daily life becomes an object of observation and description; not only human beings but also animals and trees, not only living nature but also the home and the furniture in the home, costumes and tools, become themes of artistic interest in themselves.68

A number of political and social changes helped ease the older shackles on artistic expression. Between the years 1200 and 1400 the Black Plague retreated from Europe, thereby allowing the continent to repopulate itself; the last of the Holy Roman Empire fell into ignominious collapse, forcing a clear separation between papal and secular authority; the Fourth to Ninth Crusades enriched cities like Venice while diminishing the influence of Byzantine culture and political authority; England and Norman France accrued embryonic senses of nationhood; and the growth of law and medicine helped give rise to fairly independent universities at Paris, Bologna, Salerno, Montpellier and Oxford. The intellectual climate of most of the universities was permeated by the rationalistic
teachings of men like Ablehard, Anselm, and Thomas Aquinas, and the scholastic movement, with Aristotle as its model, took a decided turn against Augustinian other-worldliness. All these changes, which amounted to a secularization of basic values, contributed to a decline in the style of art which cherished the icon as its greatest symbol.

Gothic art also received positive impetus from two innovations in technique and composition. The first was the discarding of time-consuming mosaics in favor of painting al fresco, that is, with water colors on wet plaster. There was much more urgency in this method since the colors would not take once the plaster dried. "This ensured a new spontaneity and freshness of painting, which was no longer flat and two-dimensional and rigid in action, but could depict movement and depth and feeling more freely and vividly than the solemn mosaics."69 This change coincided with the influx and adoption of other materials and processes such as paper, improved inks and stained glass, gold-tooling, the replacement of flax and wool by cotton and silk textiles, and the manufacture of artificial dyes and pigments, all due to European contact with the Moors and Arabs and all tending to encourage the Gothic artist to experiment with a brighter palette and extended range of colors. The production of art was speeded up considerably, to the point where one can detect the germ of the idea of photography's "decisive moment."70
Fig. 14. Drawings by Villard de Honnecourt showing how he traced the proportions of the human figure and of whole groups on the basis of geometrical figures.
The second innovation was also the result of commercial dealings with the orient: the introduction of a mathematical system which contained major advances over the Roman methods of enumeration. The twelfth century witnessed the translation into Latin of Euclid, Archimedes and Ptolemy; the thirteenth was introduced to Pythagoras and Plato along with popularized versions of Hindu-Arabic notation, which simplified reckoning for businessmen. Most of these translations were made by Greek scholars fleeing the Turkish advance toward Constantinople and their efforts earned many of them places in the courts and universities, two institutions which began to replace the churches as centers of intellectual activity. From the outset arithmetic was closely linked by them to geometry, and under the Pythagorean star gave a decidedly mathematical flavor to Gothic hermeneutics, aesthetics, and theory of the visual arts. The results are dramatically seen in Gothic architecture, as in the case of Notre-Dame (started in 1163), which uses triangulation and quadration as its basic structural principles. The architect of the Milan cathedral (1398) declared that, "Art without science is nothing", and the drawing-master of the fourteen hundred's, Villard de Honnecourt, wrote numerous treatises on "the art of drawing from nature, as taught by the science of geometry in order to facilitate work." The direct application of geometrical principles to artistic composition continued to live on in the Renaissance and was a working method adopted by Albrecht Durer
If one wants to study the case of an individual artist with responsibility for the greatest breakthroughs it would undoubtedly be Giotto di Bondone (c.1266 - c.1337), the first of the distinctly modern painters and the first to emancipate himself almost completely from the stylization and symbolization of his Romanesque and Byzantine predecessors. A well-paid and popular painter who supposedly wrote a satiric ballad against poverty, and who increased his personal wealth through land-speculation, Giotto belongs both to the Renaissance and the Gothic, though much more to the former with regard to style and subject matter. Like his famous acquaintances Petrarch, Dante and Boccaccio, Giotto was active at a time when Italian art was securing a semi-national identity for itself as the Papal State fought for military and political power against rivals in Germany, France, and Byzantium. This new patronage freed him from the constraints of the older Church's rudimentary aesthetics. Like most of the Renaissance, Giotto moved within a religious framework and his earthy love for animals and landscape was sanctioned by the newly-founded Franciscan order, which commissioned his early frescoes. His famous series on the life of St. Francis, a saint who was nearly a contemporary, also provided a topic which lent itself to naturalistic and nonallegorical renditions of cities and historical figures. Liberated from the duty of producing stereotypical icons,
Giotto's paintings give the impression of work done from living models instead of abstract mental images. Once Giotto received widespread support painting was forced out of its previous pathways, and naturalism became a driving force and objective until shortly after the invention of photography.  

The growing affluence of cities in northern Italy, the increasing importance of wealth in Italian politics, and the expanding control of the Church by financial and non-aristocratic interests also reduced priestly asceticism. Morality and salvation became less important the more the material world was taken seriously. This provided new demands for decoration on the part of churches and private families and opened up greater possibilities for innovation in music, architecture, sculpture, poetry and painting. Aesthetically the Renaissance found its sources in the rediscovery of Greek and Roman naturalism while still retaining the late medieval fascination for mathematics and geometry. The artist-engineer-philosophers of the Renaissance adopted this tradition and the fusion of classicism with mathematical hermeneutics led to the systematization of the visual arts, particularly in the areas of proportion and perspective. Historically both coincide with the "creations of the same spirit which makes its way into the organization of labor, in trading methods, the credit system and double-entry bookkeeping, in methods of government, in diplomacy and warfare." During the Renaissance "all criteria of artistic quality are subjected to rational
scrutiny and all the laws of art are rationalized." The medieval world had defined the *ars* as any occupation employing craft or knowledge; now painters sought to elevate their profession from the *artes mechanicae* (handicrafts) to the *artes liberales* (sciences). Their program had an economic basis since the higher status meant emancipation from the lowly guilds of artisans, stationers and apothecaries to which painters had been relegated like common tradesmen. Hence the common agreement that art was a rational activity. As one of the founders of perspective wrote, "...every art and science contains certain principles, values, and rules; he who carefully adheres to them and applies them in his art attains his objectives most beautifully." The great key to the rationalization of art was mathematics. Leonardo da Vinci (1452 - 1519), in a statement typical of his age, and preceded in time and authority by the great Alberti, wrote that "the painter should see to it that in proportion and size, subject to perspective, nothing occurs in the work which is not considered, reasonable, and in accordance with nature." To be "in accordance with nature" meant to be harmonious, and to most painters this meant that the secret of beauty was the use of perfect arithmetical, geometrical, and mathematical proportions. The anthropometric principles used by Leonardo and others were justified on the grounds that "we shall have to contemplate and love measure, which is nothing other than symmetry, for our body
is composed of such perfectly measured parts that it can be a harmonious instrument, perfect in all proportions." An interesting and somewhat extreme instance of this attitude is provided by the Florentine Academy, widely known for its mystical Neo-Platonic and Pythagorean tendencies. Founded in the first of Europe's leading financial centers, its guiding intellect excluded poetry from the arts because it does not use mathematics. "Arts are those skills which make use of the hands: they owe their precision, above all, to mathematical ability, that is to say to the abilities of counting, measuring and weighing." The entire trend is summed up in Germanic fashion by Albrecht Durer (1471 - 1528). Durer believed that beauty had many benefits for the artist who creates it - "joy, glory and eternal fame, and at the same time, wealth." His working method was cast into this formula: "...geometry is the proper basis of all painting. Without just proportion, no figure can be perfect, no matter how diligently it might be executed." It is precisely because Renaissance artists used geometry as a basis for composition that their designs are easily analyzed in terms of triangles, circles, and similar devices.

The invention of perspective was part of the same pattern and it is characteristic of the Renaissance that it investigated linear but not aerial perspective. The discovery of perspective and its rapid quantification are major watersheds in the history of Western art, and they had important repercussions in science and
philosophy. As a cultural artifact point-for-point perspective was part of the increasing emphasis on materialism and rationality that separates the Renaissance from the Middle Ages. As a standardized technique and short-cut to verisimilitude, geometrical perspective was used to produce the endless numbers of Renaissance views and vistas, forerunners of the postcard, and established "the tyranny of the static viewpoint, the conception of a static object in a static universe" as the hallmark of Western seeing until the invention of photography and cinematography. The basics of linear perspective for architecture, painting and sculpture were formulated in Italy by the end of the fifteenth century, and spread to northern Europe shortly thereafter. They were discovered primarily by artists, and later applied to physics and optics, and universally acclaimed as a revolutionary discovery. "An indication of the veneration for prospettiva is afforded by the fact that it was mentioned on the grave of Sixtus IV in Saint Peter's together with the seven liberal arts and philosophy and theology as the tenth representative of science."

The heightened sense of visual realism that perspective produces necessitates a specific relationship between painting and viewer which foreign to the Middle Ages not because of backwardness or lack of sophistication, but because medieval space was ordered around symbolic density rather than geometrical uniformity. To obtain linear perspective "the size and shape of
the figures and objects...depend exactly on their position in relation to a definite and measurable position of a theoretical spectator." The establishment of the base line (on which the artist and viewer stands or sits), the eye point and the horizon can only succeed if the viewer is at the proper height and distance from the painting. (The same holds true for photography and can be demonstrated if the viewer moves up to an image made with a wide-angle lens.) As a result, one of the contradictions of Renaissance naturalism is that it focuses intense concern on the individuality of the subject or sitter, but only by creating an anonymous audience, the hypothetical "average viewer" whose participation in art begins as a location for the forward vanishing point. This was not without social significance for into that vanishing point stepped both a painter freed from guild membership, and a patron whose quantification of the world was a necessary part of his dealings in finance. The precalculated and competitive economic individuality of both artist-producer and merchant-consumer found visual expression not in intuitive free-form, but in a mathematically apportioned exactitude. Gone was the tightly structured medieval communitas which saw the church as its social center, and which declared a public holiday so that the entire population could accompany an artist's paintings from his workshop to the altar of the city cathedral. In its place generally stood the individualistic merchant who regarded art not as a means of worship, but as a decorative commodity or
investment. The painting of the Renaissance was only possible because of the immense fortunes which were being amassed in Florence and elsewhere...rich Italian merchants looked upon painters as agents, who allowed them to confirm their possession of all that was beautiful and desirable in the world. The pictures in a Florentine palace represented a kind of microcosm in which the proprietor, thanks to his artists, had recreated within easy reach and in as real a form as possible, all those features of the world to which he was attached.

Art has usually preceded science in the exploration of nature and it was the Renaissance painters' interest in tactility and exactness which led them into a study of optics, long neglected by even the scholastic writers. The reasons for stagnation in this discipline included an epistemology which distinguished lux - a divine emanation - from lumen, its material manifestation; usually only the former was considered worthy of contemplation. Dante gave poetic voice to these attitudes:

Pure intellectual light, fulfilled with love,
Love of the true Good, filled with all delight,
Transcending sweet delight, all sweets above.

That light does so transform a man's whole bent
That never to another sight or thought
Would he surrender with his own consent.

The writing on optics in the thirteenth and fourteenth centuries had also been influenced by Islamic scholarship, for
which the *psyche* or spiritual condition of the observer was of greatest interest. Common folklore and common sense had been concerned with the correspondences and associations between light and the sun, strength, sunflowers, the number 9, Hermes, gold, hawks, and the higher mental faculties. This outlook, rich in symbolic references, inhibited understanding of the physics of light and the mechanics of vision because it precluded the basic assumptions that made them possible. The power of medieval epistemology is demonstrated by the fact that spectacles were invented between 1280 and 1285, but were not used by the upper classes until three hundred years later.

The classical reasoning can be summarized thus. The aim of the organ of sight is to know the truth, namely the real structure of the external world, by representing to our mind the shape, position and the color of the bodies which constitute it... The introduction of mirrors, prisms and lenses... brings inescapably an alteration of truth and these instruments make us see figures where the material objects are not and often make us see them enlarged or reduced, inverted, distorted, doubled and colored. It is all a trick and an illusion. All optical means must be eliminated if we really want to reach the truth.

The modern science of optics could not begin its development until the symbolic aspects of light were discarded, and the anatomy of the eye was considered apart from the soul and the psychology of seeing. Many of the scholastics had discussed the nature of light and color, but their notions were usually a mixture of ancient theories and religious doctrine. Leonardo da Vinci was
only one of the many artists who assisted in the birth of optics, dissecting the eye, analyzing its structure, and comparing its function with a machine, the camera obscura. The camera, like the lens, was essentially a mechanical device for producing perspective, and artists were interested in it because it might help painting become a true science: as an aid to drawing it soon inspired "the camera lucida and the graphic telescope; the diagraph, the agatograph, and the hyalograph; the quarreograph, pronoiograph and eugraph; the graphic mirror and the periscopic camera, the solar megascope, the prisme menisque; the physionotrace, the universal parallel and any number of other pantographic instruments." All of these devices were commonly used until supplanted by photography.

The Optical Revolution

The development of modern photographic optics rests upon a number of interlocking foundation stones laid during the Renaissance. Some of these were cheap paper, good ink and the printing press, all coming together in the 1450's, and all helping to create an international scientific community by easing communication and making the standardization of illustrations possible. Moveable type, another technique of mass production, allowed scattered and individual observers to compare their own perceptions with a fixed, portable, repeatable "truth" before them. In the year 1543 the printing press was used to publish two books
ANDREAE VESALII
BRUXELLENSIS, SCHOLAE
medicorum Patavinae professoris, de
Humanae corporis fabrica
Libri septem.
central to the scientific revolution: Andreas Vesalius' (1514 - 1564) *De Humani Corporis Fabrica* and Nicholas Copernicus' (1473 - 1543) *De Revolutionibus Orbium Coelestium*. Vesalius' book, meticulously illustrated by artists of the Renaissance tradition, pointed out serious deficiencies in the work of Galen, the most revered medieval authority on anatomy. Vesalius also dissected the human eye in detail, paving the way for a concept of its function which was later incorporated into a mechanistic explanation of human physiology. Copernicus' somber treatise was a reasoned alternative to Ptolemaic cosmology. These two books were key sources of information for Kepler, the father of modern optics.94

The line connecting Vesalius, Copernicus and Kepler also intersects with the name of Giovanni della Porta (c.1550 - 1615). His widely-read book, *Magia Naturalis* (1558) was, as its title implies, a catalogue of tricks, games, magical amusements and natural curiosities, and it is indicative of the times that the lens was one of them. What was of more importance was the challenge that della Porta issued to the scientists of the day to explain the well known effects of concave and convex lenses on defective eyesight. Della Porta himself attempted an answer in *De Refractione* (1593), the first systematic treatment of optics in modern history, and the very failure of his explanations revealed the flaws in classical and scholastic theorizing.95
Johann Kepler (1571 - 1630) took up the challenge a decade later. Kepler's background was in astronomy, and he was attracted to the Copernican theory because it simplified the casting of horoscopes, his official occupation. (This was not an exceptional hope as the first European observatory, founded in Nuremberg in 1471, used the sundial and mechanical clock for exactly the same purposes.) Astrological prediction was foremost in the mind of Tycho de Brahe (1546 - 1601), Kepler's mentor, and the one who taught him to use instruments for precise measurement. Kepler studied for years with Tycho in order to prove his one great idea, that the orbits of the five known planets could be inscribed within the five "perfect" solids:

I undertake to prove that God, in creating the universe and regulating the order of the cosmos, had in view the five regular bodies of geometry as known since the days of Pythagoras and Plato, and that he has fixed according to those dimensions, the number of heavens, their proportions, and the relations of their movements.96

This mystical attitude toward geometry enabled Kepler to answer some of della Porta's questions by shifting the nature of the God-term in the study of light and optics. The mathematical regularity of optical phenomena, not their substance, was now the proof of divine intelligence. By keeping geometry in this elevated position Kepler succeeded in giving the first rigorous explanations of refraction and reflection. By studying the anatomy of the eye in similar fashion he made significant contributions to the
understanding of the retina. These two contributions, along with his reputation as an established mathematicus, paved the way for Galileo and his telescope.97

The story of Galileo (1564 - 1642) overlaps that of Kepler at a critical juncture in the downfall of medieval cosmology. The authority of Aristotle had been upheld for centuries because his system was adopted by Ptolemy. But the rediscovery of other Greek philosophers made the Renaissance realize that, even in its own times, the Ptolemaic theory had been disputed by such notables as Pythagoras, Aristarchus, Heraclitus, and others. The efforts of Copernicus had been, in effect, a last-ditch effort to save an important feature of Ptolemaic astronomy, the revolution of the planets in circular epicycles at uniform rates of motion. Galileo was a loyal Copernican, a stance which brought him before the Inquisition, and shared Kepler's religious belief in numbers.

Philosophy is written in this grand book, the universe, which stands continually open to our gaze. But the book cannot be understood unless one first learns to comprehend the language and read the letters in which it is composed. It is written in the language of mathematics, and its characters are triangles, circles and other geometric figure, without which it is humanly impossible to understand a single word of it; without these, one wanders about in a dark labyrinth.98

Galileo searched the heavens like many others who, in the spirit of Thomas Aquinas, sought to justify faith through reason. Hence his spiritual interest in the telescope, from which he also
Galileo did not invent this instrument nor was he the first to use it for astronomical observation. His main contributions were to publish his results widely and to provoke the Church into a confrontation with the heliocentric view of the solar system. The telescope was probably invented at the beginning of the seventeenth century and was known in England, Holland and France before its success in Italy. Galileo brought it to popular attention by publishing, in 1610, a number of observations made through the instrument: craters on the moon and mountain ranges similar to those on earth; an infinite number of stars too dim to be seen by unaided vision; four moons revolving around the planet Jupiter. Any one of these new facts would, by itself, have cast serious doubts on the Aristotelian theory. Taken all together they were a major threat to common sense and theological reasoning, and many intellectuals refused to look through the tube, claiming that it was the work of the Devil. The attack on Galileo was made mostly on the basis of the unreliability of the telescope but Kepler's rapid and timely defense of the instrument, elicited by Galileo personally, blunted the major weapon of the attackers. Ironically the telescope was later used to prove the correctness of Kepler's theories rather than Galileo's, but it was still the first time in history that an optical instrument was convincingly employed to back geometrical speculation with empirical research, an important precedent for modern scientific method. Once this
occurred progress was fairly rapid. By the end of the seventeenth
century refraction, diffraction and interference patterns had been
studied, optics was put on a rigorous geometrical basis, the
microscope came to be invented, and first attempts were made to
measure the velocity of light. At the turn of the century Newton
was able to publish his monumental compendium on Opticks. A
historian of science has written of this intense period that,

This was one of the most momentous and catastrophic
revolutions recorded in the history of science. It is
really amazing that so stupendous an event is practically
unknown. For it meant the establishment of a new faith,
which radically altered the attitude of the scientist
and research worker toward observational instruments.
Formerly the skeptic was unwilling to look through them
from fear of being deluded by appearances. Now the
insatiable investigator pushes a device's potential to
the limit, seeking to obtain from it information, even
fragmentary and deceptive information, about the
macrocosm and microcosm. This change of attitude opened
a boundless horizon to scientific research and
progress.99

The intensive use of the telescope, microscope, astrolabe and
compass simultaneously opened up a number of New Worlds for
European civilization to discover, and if space now seemed to
contain an infinitude of universes inside each other, there was
also the optimistic belief that human beings could enter,
understand, and conquer all of them.

Descartes versus Bacon

After Galileo and Kepler the scientific revolution followed
two pathways: rationalist and empiricist. Even though their approaches differed on the surface, both reached strikingly similar conclusions. The rationalist approach was mainly the work of Rene Descartes (1596 - 1650), anatomist, mathematician, philosopher, meteorologist, and optical physicist. Even though he wrote practically nothing about art directly, his influence on modern aesthetics would also be hard to overestimate. Descartes' importance regarding optics rests on his investigations into several areas. The first is the marriage of algebra and geometry into coordinate geometry, a powerful mathematical tool which made the computation of lens curvature infinitely easier. The application of analytical geometry also allowed him to study rainbows in terms of the law of refraction and to explain the behavior of aspherical lenses.¹⁰⁰ As an anatomist he described the optic nerve in a way that also exemplified the change in body-image from corpus symbolicum to machinery:

Indeed, the nerves can very well be compared to the pipes of the machines of those fountains, the muscles and their tendons to the other various contrivances and springs that serve to set them in motion; and their animal spirits to the water that moves them and of which the heart is the fount and the concavities of the brain the tanks. In addition, respiration and other similar natural and ordinary actions of this machine which depend on the course of the spirits, can be compared to the movements of a clock or of a mill which the flow of water can render continuous.¹⁰¹

This model of the eye as "an inanimate piece of mechanism pinned down upon the board of the scientist,"¹⁰² and of the human
body as machinery was an idea that ran directly parallel to Kepler's invention of "celestial mechanics".

Descartes' greatest fame is the result of his writings as a philosopher, even though these are often treated apart from his interest in anatomy and optics. A pious Catholic with a Jesuit education, Descartes nevertheless reversed medieval epistemology by starting with "methodic doubt" instead of faith as the means to ultimate knowledge. After wrestling with the difficulties of this project Descartes had a series of dreams and visions which inspired the concept that the basis of all truth lay in mathematics. The basic axioms of mathematics, Descartes felt, were self-evident and irrefutable, and they satisfied his criterion for knowledge - that it be "clear and distinct". Using an optical metaphor Descartes specified his meaning:

I term that "clear" which is present and apparent to an attentive mind, in the same way that we see objects clearly when, being present to the regarding eye, they operate upon it with sufficient strength...the "distinct" is that which is so precise and different from all other objects that it contains within itself nothing but what is clear. 103

The implications were obvious: knowledge of a natural object, and proof of its divine origin, were no longer to be the result of its symbolic associations with other members of an invisible hierarchy. Knowledge was to be a rational, methodic, cerebral and introspective process of defining differences based on "innate
ideas" (geometrical axioms) implanted by God into the human intellect. The many facets of the material world were to be accorded importance only insofar as they conformed to these intellectual preconceptions of their regularity and order as defined by mathematics. Moreover (the knower himself (not herself) was also an atomistic cogito, certain only of its own existence as a thinker, a detached "moi" formulated around the time that possessive pronouns first entered the French language.¹⁰⁴ It is hard to envision Descartes thinking of anything else but the telescope and microscope while writing his meditations. The fact that peasant and pope alike could look through their "objectives" and disprove Ptolemy and Galen strongly suggests the ideal of the "objective observer" that Descartes helped put at the center of the scientific discourse. This is the ideal meant to counter that of the believer who, at all costs, wanted to save the appearances, and even today one still hears of the dispassionate search for knowledge, conducted with allegedly neutral or value-free technology. For Descartes all this signified more than just an end to scholastic authority, but the possibility of creating a universal mathematics that would solve all problems in logic, ethics, metaphysics and natural science. His Discourse on Method (1637) was an attempt to start realizing that ambition.

As an important footnote to Descartes one also needs to note a distinction he took over from Galileo, a distinction between primary and secondary qualities later reiterated by Newton, and
of decisive importance for contemporary aesthetics. Primary qualities were held to be those inherent in an object and amenable to quantification - position, shape, number, size, motion - while secondary qualities were thought to be subjective properties existing in the mind of the observer alone - color, smell, odor, beauty and so on. As Galileo wrote,

To excite in us tastes, odors, and sounds I believe that nothing is required in external bodies except shapes, numbers, and slow or rapid movements. I think that if ears, tongues, and noses were removed, shapes and numbers and motions would remain, but not odors or tastes or sounds. The latter, I believe, are nothing more than names when separated from living beings. 65

The construction of a Cartesian epistemology necessitates, as Descartes himself knew, a view of nature in which the primary qualities were more "real" than the secondary ones and in which all events, from stars and comets to animals and human relationships, were to be known through a series of computable formulas or numbers. This mathematization of the natural environment was taken so seriously that it generated a series of disputes in seventeenth-century biology which were reminiscent of the geometrical proofs of Euclid: "find a known genus of plants (whether natural or artificial is unimportant) that stands exactly half-way between Dog's-bane and Borage." 66 There were even attempts to find these constructions somewhere in the vegetable kingdom.
The empiricist trend was more British in flavor and origin and its material foundations are vividly depicted in Holbein's famous painting *The Ambassadors* (1553). Made for the court of Henry VIII, the year the first joint-stock companies were incorporated in England, it demonstrates the relationships between science, technology and economic power that were demanding attention at that time. The ambassadors themselves, probably from Spain, Portugal or Italy, are clothed in furs and jewels from the New World and the Orient, and in the wool and silk fabric that slave-trading and textile machinery made commercially available; on the polished wooden cabinet behind them is a lute, one of the first instruments with fixed frets and one of the first for which standardized tablature was written; next to it lie maps rolled up to resemble gun barrels, a reminder that both used mathematics for the calculation of trajectories, of ships or projectiles; on top of the cabinet are the navigational charts and instruments which enabled the Iberians to establish mercantile colonies in South America, Mexico and the Caribbean. These connections were not lost to the British, who caught up to Spain through the defeat of the Armada (1588) and continued to use technology to maintain their naval supremacy throughout the Elizabethan era.¹⁰⁷

Francis Bacon (1561 - 1626) was Lord High Chancellor to James I, under whose reign England both staked out its first colonies in North America and issued a new edition of the Bible. Bacon was quick to realize that "Knowledge is power," and in *The New
Atfan+is (1627) he described a utopia (nouyou order secolurem) made possible by the conscious application of scientific and technological principles. As against the rationalism of Descartes, Bacon believed that the advance of knowledge depended on experimentation and the use of inductive reasoning, that is, working up from the particulars of nature to form conclusions on a more generalized level. This method of reasoning had been largely foreign to medieval philosophy which always began with the structural overview - God's dominion - and then proceeded to deal with individual instances. Bacon however wrote in the same country and century in which Robert Boyle (1627 - 1691) revived the atomic theory of matter first announced by Democritus; Robert Hooke (1635 - 1703) described the cellular nature of plant tissue seen under the microscope; Isaac Newton (1642 - 1726) strengthened the theory that light consists of minute little particles; and Thomas Hobbes (1588 - 1679) argued that the machinery of social organization had the individual man as its basis. Thus the atomistic principle that nature was e pluribus unum, the direct contradiction of the Trinity, lay at the center of the empiricist tradition.108

Bacon's method of induction rested on the hope that generalizations about phenomena would appear if the data about them were organized into lists or categories; the correspondances between items in different columns would suggest automatically,
11. Engraved title page from the first edition of Francis Bacon’s

*Instauratio magna* (London, 1620)
to any observer, the appropriate feature that various characteristics had in common. The method never worked in the way that Bacon wanted but the categorization of nature and knowledge it embodied inspired him to propose the writing of a vast encyclopaedia which would cover all aspects of technology, science, natural history, philosophy and learning. Bacon himself completed only a small part of his design for this project but it was taken up more comprehensively by many others immediately after him, including the authors of the Encyclopedia, one of the leading products of the French Enlightenment. Before this period natural history was

the inextricable and completely unitary fabric of all that was visible of things and of the signs that had been discovered or lodged in them; to write the history of a plant or an animal was as much a matter of describing its elements or organs as describing the resemblances that could be found in it, the virtues it was thought to possess, the legends and stories with which it had been involved, its place in heraldry, the medicaments that were concocted from its substance, the foods it provided, what the ancients recorded of it, and what travellers might have said of it. The history of a living being was that being itself, within the whole semantic network that connected it to the world. 09

But after Bacon, though not just because of him, the fragmentation of nature required a new and decentralized organization of knowledge, best represented by the flood of dictionaries and encyclopedias that publishers released throughout the eighteenth and nineteenth centuries, and which continues today as Collier's, Larousse, The World Book, The Book of Knowledge,
The history of optics reaches one of its great heights in the discoveries of Isaac Newton, a man who also typifies the assumptions, directions, methods, and psychological outlook of the modern scientific discourse. Newton's all-encompassing synthesis of algebra, calculus, geometry, optics, astronomy, kinesthetics, mechanics and theology is a summing up of all that had gone before him from Giotto onward, and a definitive end to the medieval cosmos as an operational Weltanschauung. Despite Newton's personal intentions his writings signified the replacement of religion by science as the foremost means of organizing and assessing the nature of all experience, and the influence of the Newtonian system today is still obvious in the fervor to which the social sciences and humanities, including philosophy, still adhere to mechanistic definitions of "truth" and "knowledge". That Newton is deeply embedded in our political thinking, our legal
system, our concepts of health, disease and insanity, and our
notions of beauty is perhaps best measured by the failure of his
most outstanding critics in physics - Heisenberg, Planck, Einstein
- to lead the way to the formation of an alternative cosmology.

As with Descartes the path of research for Newton began with
math and optics, especially in the analysis of light to support
a corpuscular theory of its action. Working with diaphrams and
prisms Newton studied refraction and dispersion, designed and built
the first reflecting telescope, and succeeded in breaking white
light down into its monochromatic elements. Though Newton himself
never tried to measure light in terms of wavelength, partly because
of his disagreement with wave theories, the Opticks (1704) does
suggest that the most qualitative aspect of light - color - could
now be assigned quantitative values. By defining color as a primary
quality Newton strengthened the connections between the physics
of light and the methods of classical mechanics.111

The same sort of reasoning, extended even further, enabled
Newton to introduce the theory of gravity into his system, the
one unifying principle which could be used to explain all types
of movement, from those of the smallest microscopic particles to
the paths of the planets in the remotest regions of the solar
system. As with Galileo and the telescope, Newton did not invent
the idea of gravity and many scientists "had spoken of gravity,
levity, force, power, velocity, resistance, tendencies, sympathy,
antipathy, impetus, quantity of motion, mass, the centrifugal force of a revolving body, and the force of an impact before him. Strict mechanists like Boyle and Hobbes rejected all such talk as a return to the animistic "unmoved movers" of Aristotle's universe, but Newton's religious temperament required it because, "It is inconceivable that inanimate brute matter should, without the mediation of something else, which is not material, operate upon, and affect other matter without mutual contact." Unlike Descartes, who tried to reduce the physical world to matter and motion, Newton needed to reintroduce the concept of force into physics and accomplished this by demonstrating that, like light, it was quantifiable according to the inverse square law. It was this precise mathematization of gravity that made it an exacting law that applied equally well to projectiles, planets, falling apples, the moon, tides, comets, and many other phenomena whose behavior seemed otherwise unconnected. By using a combination of mathematical theory and empirical observation Newton was able to codify the three laws of motion: the law of inertia, the relationship of force and momentum, and the symmetrical nature of action and reaction. These laws, together with universal gravitation, formed the backbone of physics until the discoveries of Einstein.

Unfortunately Newton did not stop there and he and his followers quickly applied these same laws to biology, psychology
and aesthetics, in an effort to reduce the entire world to concise arithmetic formulation. For Newton and others physics was merely the best introduction to metaphysics, especially since the concept of gravity as the action of an invisible spirit within matter (like the Cartesian soul inside the machinery of the body) led back to the image of an all-pervading divinity. By this line of speculation Newton was brought to conclude that space and time were absolute and infinite, reflecting the omnipresence and eternality of the Deity who incorporated all existence. Far from advocating pantheism, Newton was thinking of a God who was absolute and transcendent, who could only be known "by his most wise and excellent contrivances of things, and final causes,"115 which is to say, through the rigorous mental discipline of the sciences. "And this much concerning God; to discourse of whom from the appearances of things, does certainly belong to Natural Philosophy."116 As the ultimate creator and ground of the perfect, mechanical cosmos Newton's God was so above matter that Immanuel Kant (1724 - 1804) and Pierre Laplace (1749 - 1827) later showed that he was a superfluous hypothesis; all that was left of "reality" were the laws of physics as expressed in mathematical equations. God, if he had a place at all now, was no longer King of the Universe, but its Absolute Geometer. With the giving of Kepler's three laws of planetary motion, Descartes' four rules of philosophical method, and Newton's explication of gravity and movement, the medieval world-view, with its central drama of man's
sin and redemption, was shattered. As for what took its place,

the great Newton’s authority was squarely behind the view of the cosmos which saw in man a puny, irrelevant spectator of the vast mathematical system whose regular motions according to mechanical principles constituted the world of nature... Space was identified with the realm of geometry, time with the continuity of number. The world that people had thought themselves living in - a world rich with color and sound, redolent with fragrance, filled with gladness, love and beauty, speaking everywhere of purposive harmony and creating ideals - was crowded now into minute corners in the brains of scattered organic beings. The really important world outside was a world hard, cold, colorless, silent, and dead; a world of quantity, a world of mathematically computable motions in mechanical regularity. The world of qualities as immediately perceived by man became just a curious and quite minor effect of that infinite machine beyond. 

One wonders if Newton ever noticed the striking resemblances between the cosmology of science and the reduction of use-values (quality) to exchange-values (quantity) by a market economy: the transformation of land into real estate (rents, taxes), productivity into labor (wages), natural resources into utilities (rates), and wealth into money (capital). A world which is "hard, cold, colorless, silent, and dead" could describe one in which everything has its price, as well as one in which everything has its number.

And beneath the perfect order of the geometrical universe, or alongside of it, stood a world in chaos. Descartes, Kepler, Galileo and other astronomer-philosophers turned their thoughts to the heavens while the earth around them was racked with all
79. Allegoric representation of the Four Horsemen of the Apocalypse: War, Hunger, Plague and Death. From Albrecht Dürer's Apocalypse, Nuremberg, 1498.
the horrors of the Counter-Reformation, religious wars and wars of imperialism made more destructive by military technology, the revival of slavery, the burning of dissenters by the Inquisition, massive unemployment and disruption of rural economies by capitalism, and a variety of other upheavals; Kepler's research was punctuated by the arrest and threatened torture of his own mother, charged with witchcraft.\textsuperscript{118} If one asks what the artists were doing while optics was making advances, the answer is that a few of them, like Pieter Brueghel (c. 1525 - 1569) were recording the terror of their times in grim and realistic detail. In terms of epistemology Brueghel occupies much the same position as Descartes or Newton, using the rational framework of perspectival space for the purpose of recreating medieval allegories. In "Big Fish Eat Little Fish" (1556), a comment on capitalism, and "The Massacre of the Innocents" (1566-67), a scene out of the Spanish war against Holland, Brueghel succeeded in revealing the sheer irrationality at the core of "enlightened" modernity.\textsuperscript{119}

This brief excursus into epistemology and cosmology - into the meaning of "truth" - hopefully begins to explain where the photograph came from and why, even in its infancy, it was often identified with a depersonalization of artistic vision. The objectification of the eye as an instrument of rationality, measurement, control and technology, along with the devaluation of other sensory experiences, was part of a specific historical context whose influence is still upon us. The line that connects
perspective, the eye as vanishing point, the anonymous audience, art as technique, and art as commodity, has its parallels on many other levels, as with astronomy, the telescope, the objective observer, philosophy as technique (epistemology), the universe as mechanism, and knowledge as commodity and number. European civilization was seeing "photographically" long before the actual invention of photography, and this meant equating visibility with susceptibility to quantification. (The epistemological consequences of the optical revolution can be summarized by saying that the eye became the new standard of rationality and knowledge, the defining point of "the clear and distinct" in a number of areas, as in the transformation of "natural history" into "biology".

Prior to the seventeenth century "the division, so evident to us, between what we see, what others have observed and handed down, and what others imagine or naively believe, the great tripartition, apparently so simple and immediate, into Observation, Documentation, and Fable did not exist."\textsuperscript{120} The new Cartesian-Newtonian epistemology limited itself to the domain of the visible so that "observation, from the seventeenth century onward, is a perceptible knowledge furnished with a series of systematically negative conditions"\textsuperscript{121}:

\textit{Heresay is excluded, that goes without saying; but so are taste and smell, because of their lack of certainty and their variability render impossible any analysis into distinct elements that could be universally acceptable. The sense of touch is very narrowly limited to the designation of a few fairly evident distinctions}
(such as that between smooth and rough); which leaves sight with an almost exclusive privilege, being the sense by which we perceive extent and establish proof, in consequence, the means to an analysis partes extra partes acceptable to everyone: the blind man in the eighteenth century can perfectly well be a geometrician, but he cannot be a naturalist.122

In other words, the current commonplace that "seeing is believing" was established as an an epistemic principle, to the exclusion of all other forms of knowledge. After 1600 herbals no longer show little men in mandrake roots, as accuracy in identification had become more important than artistic embellishment or legendary symbolization. As opposed to medieval hermeneutics, scientific literalism created a separation between man's investigations of nature and nature itself. Words and categories were now treated as abstractions from rather than extensions of a particular being. Moreover, the technological pay-offs for this shift were quite obvious. The slogan of the scientific revolution might have been, "voir, savoir, pouvoir", inasmuch as seeing, knowing, and manipulating were easily substituted for one another. The whole cultural attitude was neatly summed up in a famous statement:

To see life; to see the world; to eye-witness great events; to watch the faces of the poor and the gestures of the proud; to see strange things - machines, armies, multitudes, shadows in the jungle and on the moon; to see man's work - his paintings, towers and discoveries; to see things thousands of miles away, things hidden behind walls and within rooms, things dangerous to come to; the women that men love and many children; to see and take pleasure in seeing; to see and be amazed; to see and be instructed.
To see, but not to act; to see the women that men love, and
not vice versa; "to watch the faces of the poor and the gestures
of the proud," but not to make the connections between the two
of them; "to see and take pleasure in seeing," but never to be
outraged, depressed, disgusted, or undetached from what one is
seeing. Though these might have been the words of a Galileo or
Francis Bacon they actually come from Henry R. Luce (1898 - 1967),
the founding magnate of the TIME-LIFE-FORTUNE empire.¹²³

"Things not seen..."

But lastly, the entire history of science and optics would
remain incomplete without a discussion of the change in religiosity
that complemented and supported this identification of the visible
with the rational. Along with all the other changes it
encompassed, the rise of Protestant sensibility altered the
relationship of the visible to the invisible that had been central
to Catholic dogma throughout the Middle Ages. Historically, the
severe iconoclasm of Reformation leaders like Calvin (1509 - 1564)
had its roots in the Gothic, especially in the ambiguities and
extreme polarities between God and the Devil that characterize
that period. For religious leaders of the time, and for many of
their lower middle-class followers, the ravages of the Black
Plague, the corruption and hypocrisy of the clergy, the Great
Schism, and the noticeable breakdown of the feudal order
economically and politically presaged an end to the world such as prophesized in the Book of Revelations. The self-destructive enthusiasm of the Crusades, the fanaticism that lay behind the flagellants, Ranters, Anabaptists, Brethren of the Free Spirit, and other heretical movements, were partly due to a wide-spread sense that the Devil was increasing in power and presence, that the Prince of Darkness was gathering his earthly forces before the final reckoning. Yet even before the battle between Christ and Antichrist, God was surveying the world visually, in preparation of His ultimate judgement. Hieronymous Bosch (c. 1460 - 1516), not atypical of the era, painted a vivid tableau of the seven deadly sins with the Eye of God at its center, and the caption "Beware, God sees." The noted Cardinal Nicholas of Cusa (c. 1401 - 1464) issued a popular moralistic tract entitled De visione dei, warning that it was impossible to hide sins from His all-penetrating vision. And German churches often inscribed "God Sees!" over their entrances. The all-seeing Eye of God, looking from the heavens downward, became synonymous with the act of judgement. 

On the other side, Satan and satanic activities also had an important visual component, symbolized by the Evil Eye. A malicious eye of envy in antiquity and the Middle Ages, the evil eye assumed demonic proportions from the twelfth century onward. The Devil himself was pictured as many-eyed Argus; Jewish rabbis
were feared for the power to level buildings with their glances; an accusation of evil looks was sufficient to convict people of sorcery and witchcraft during the witch-hunting manias that began in the twelve-hundreds; toads, snakes, cats and other witches' "familiars" were abhorred for similar reasons. Gothic cathedrals, built with geometrical regularity to their structure, were topped off and studded with griffins and gargoyles to ward off the mauvais œil. Charms and amulets were designed to protect pregnant women and young children from the sight of the Evil One.125

Pride and envy also took on satanic dimensions. Jealousy and hatred of the upper classes and merchants were behind the Peasants' War (1524-26) in Germany, and contempt for the rich was reinforced by sermons contrasting Lazarus - the poor man who goes up to heaven - with Dives - the fat trader who goes to Hell, dragged down by his moneybags. Frequent agitation and rising crime rates in the slums just beginning to grow in Europe must also have contributed to the uneasiness of the propertied classes, and this fear was symbolically projected onto the Devil and sundry demons. Yet coincident with the newly-gained wealth of the financiers and industrialists, and its conspicuous consumption, was the movement among theologians to denounce pride as the greatest of all evils. In the early Middle Ages, under Augustinian influence, the deadliest sin of all was concupiscence, the lusting after earthly pleasure; from the Gothic onward it was pride. Love of self had caused the downfall of Lucifer, and any sign of narcissism or
THE SEVEN DEADLY SINS. Madrid, Prado [No. 2]
Panel of Pride: (actual size)
excessive self-approbation partook of that original rebellion.\textsuperscript{126} The chief symbol of this vanity of vanities - of the idolatry of the flesh - was the mirror. Mirrors throughout antiquity and medieval times had been small, hand-held pieces of polished metal relatively unchanged since the Egyptians first produced them. In the sixteenth century the Venetian glassblowers discovered a method of polishing glass and backing it with an amalgam of mercury and tin, enabling mirrors to become bigger and brighter, and less expensive. Preachers quickly denounced them as "the hiding-place of the Devil," and in a famous woodcut a woman was shown preening herself in front of a glass in which is reflected the anus of a demon standing behind her. Cosmetics and fashionable clothing were condemned for similar reasons.\textsuperscript{127}

It was in this frenzied atmosphere that the Reformation was conceived and initiated. Its chief catalyst, Martin Luther, claimed to have frequent conversations with Beelzebub himself and two of his minions. Luther also saw the growth of capitalism as a fulfillment of the Book of Revelations, and the disruptions around him as the work of forces preparing the final apocalypse. Calvin, even more of a religious extremist than Luther, was perhaps less sure that the end was at hand, but took political steps to prepare for it anyway by taking over and terrorizing the city of Geneva in the name of Christian love and religious purification. Calvin was also more of a systematic thinker and codifier than other
Reformers, and it is in his written words that one can trace the major currents in Protestant theology.128

Calvin's first bone of contention with the Church was the allegorical interpretation of Scripture. Calvin regarded the hermeneutic method as anathema, a method of reading the Bible that led away from what God actually said instead of clarifying His meaning. For the early Protestants faith was everything and this conviction elevated the Bible to a position of ultimate textual authority, to be taken literally. For Calvin, God was pure Truth itself and only the Devil, the Prince of Deceivers, would attempt to interpose between man and God by means of false words and appearances. Since the Devil is everywhere, nothing can be trusted except the Word of God Himself, which is to say the Bible. In explaining why God gave man Scripture, Calvin again uses the ubiquitous optical simile:

Just as old or bleary-eyed men and those with weak vision, if you thrust before them a most beautiful volume, even if they recognize it to be some sort of writing, yet can scarcely construe two words, but with the aid of spectacles will begin to read distinctly; so Scripture, gathering up the otherwise confused knowledge of God in our minds, having dispersed our dullness, clearly shows us the true God.129

Carrying this attitude even further, Calvin also applied the "negative test" to the Bible: anything not explicitly mentioned in it was automatically prohibited.130

The step that follows literalism is iconoclasm, and Calvin
was not hesitant in taking it. Interpreting the second commandment in the spirit of the letter, and insisting that only "God himself is the sole and proper witness of himself," Calvin thundered against the use of any images in religion. The chapter headings of *Institutes of the Christian Religion* (1536) tell the entire story: "It is unlawful to attribute a visible form to God, and generally whoever sets up idols revolts against the True God...Every figurative representation of God contradicts his being...Images and pictures are contrary to Scripture...Any use of images leads to idolatry." "...the Lord forbids not only that a likeness be erected to him by a maker of statues but that one be fashioned by any craftsman whatever, because he is thus represented falsely and with an insult to his majesty." Even secular images were tolerated only to some extent, though Calvin contradicts himself in this matter:

Therefore it remains that only those things are to sculptured or painted which the eyes are capable of seeing...Within this class some are histories and events, some are images and forms of bodies without any depicting of past events. The former have some use in teaching or admonition; as for the latter, I do not see what they can afford other than pleasure...I only say that even if the use of images contained nothing evil, it still has no value for teaching.

Calvin thereby gave intellectual support and encouragement to the more active iconoclasts who burned paintings, smashed statues, stripped the churches of their vestements, and issued injunctions against the theatre, painting, sculpture, and almost
every other type of artistic activity. Where the Catholic Church had tolerated and used art to celebrate God and indoctrinate believers, the Protestants opposed it as an insult to His purely spiritual existence.

The source material from which Calvin drew his fire has a much deeper background, one worth examining for a moment.

The deity of the Old Testament is Jehovah, literally "He who sees all," and whose vision is his chief symbol of control, judgement, and omniscient. When this God first creates the world He sees that "it is good" rather than feeling its perfection. The fall of Adam and Eve out of paradise came about when "their eyes were opened" and "they saw that they were naked." "The eyes of the Lord are in every place watching the evil and the good," but "no man can look at His face and live." One of the most common forms of punishment in the Old Testament is blinding, and one of the most frequent miracles is the restoration of sight to the blind. Both the Psalms and the Proverbs equate God's gaze with moral assessment: "For the ways of man are before the eyes of the Lord and He watches all his paths"; "The eyes of the Lord are upon those who fear Him, upon those who hope for His kindness"; "The Lord has eyes for the just..."; "The eyes of the Lord are toward the righteous...The face of the Lord is against evildoers to cut off the memory of them from the earth."133 This last passage is perhaps the most telling, containing as it does an
equation between vision and memory which is often repeated in the Bible. The souls of the damned in the Old Testament are exiled to Sheol (Hell), the "nether world" or "shades", sometimes identified with Gehenna, the valley where idolaters sacrificed their children to Moloch, god of fire. In Sheol sinners "shall be utterly laid to waste and shall be in grief and their memory shall perish," or as the psalmist says, "My couch is among the dead, like the slain who lie in the grave, whom you remember no longer and who are cut off from your care." In the Book of Wisdom sinners justify their hedonistic attitudes by admitting that, "Even our name will be forgotten in time, and no one will recall our deeds...For our lifetime is the passing of a shadow." And once they do pass on their lament is as follows:

What did our pride avail us? What have wealth and its boastfulness afforded us? All of them passed like a shadow and like a fleeting rumor; like a ship traversing the heaving water, of which, when it passed, no trace can be found, no path of its keel in the waves...Or as, when an arrow has been shot at a mark, the parted air straightaway flows together again so that none discerns the way it went through - even so we, once born, abruptly came to nought and had no sign of virtue to display, but were consumed in our wickedness. Yes, the hope of the wicked is like thistle-down borne on the wind, and like fine, tempest-driven foam; like smoke scattered by the wind, and like the passing memory of the nomad camping for a single day. But the just live forever, and in the Lord is their recompense..."

For Calvin, "that human life is like smoke or shadow is not only obvious to the learned, but even ordinary folk have no proverb more commonplace than this." Similarly, the fate of Calvin's
damned was precisely this condition of being totally alienated or "cut off from all fellowship with God," and in describing Hell he quotes St. Paul that the faithless "shall suffer the punishment of eternal destruction, excluded from the face of the Lord and the glory of his power." No wonder that the entire issue of grace and salvation was, to Calvin, an abundantly visual one.

At the core of Calvin's torturous theology was the concept of predestination. Citing numerous Scriptural references, Calvin made it an article of faith that God had pre-ordained a small number of souls to be saved and the majority put into perdition, even before the Creation. The basis of this divine election was known only to God himself and the justice of the irrevocable decision was so absolute that it could not be questioned by mere human beings, nor was there anything they could do in this life to alter it. The net effect was to create a "community of the invisibly elect" who, on the basis of superficial appearances, were not to be distinguished from the sinners around them. In fact, the elect "wander scattered in the wilderness common to all, and they do not differ at all from others except that they are protected by God's especial mercy from rushing headlong into the final ruin of death."

The concept of predestination raised two practical questions which Calvin anticipated and tried to settle. The first was the problem that if the elect were inviolately chosen, there could
be no barrier to keep all men from sinning, since both the damned
and the chosen would go to their separate rewards regardless of
earthy actions. And the second objection was that the
invisibility of election was a constant source of doubt and anxiety
to all who wanted to be saved from damnation. To the twin
challenges of fatalism and insecurity Calvin replied that the
recognition of God's majesty, even as revealed in the plan of
predestination, made it incumbent on all to live in a manner
prescribed in the Bible, and cultivate the moral perfection that
befitted a Christian. This meant, first, accepting the gifts that
God bestows in this world despite its vain existence: "If we must
simply pass through this world, there is no doubt we ought to use
its good things in so far as they help rather than hinder our
course. Thus Paul rightly persuades us to use the world as if
not using it: and to buy goods with the same attitude as one sells
them." Second, all must take up the burden of the cross,
striving after the virtues of "abstinence, sobriety, frugality,
and moderation," and avoiding "excess, pride, ostentation, and
vanity," thereby emphasizing the "economic virtues" - the kind
that made for successful businessmen, often recommended also to
the intellectual. And thirdly, all must take up a calling since,
"Those whose whom he appointed beforehand, he also called; those
whom he called, he also justified." Unlike Luther, who saw
capitalism as the instrument of the Devil, Calvin taught that God
has appointed duties for every man in his particular way of life. And that no one may thoughtlessly transgress his limits, he has named these various kinds of living "callings". Therefore each individual has his own kind of living assigned to him by the Lord as a sort of sentry post so that he may not heedlessly wander about throughout life... From this will arise also a singular consolation: that no task will be so sordid and base, provided you obey your calling in it, that it will not shine and be reckoned very precious in God's sight.\textsuperscript{147}

But ultimately justification and salvation came from one thing alone - faith - the grace that God imparted to all the chosen to dispel their doubts and anxieties. In Calvin's own thought worldly success was not a sign of election, but the faith that made a calling a form of spiritual fulfillment was the signal of "things not seen, but hoped for". In later Calvinism, which degenerated considerably from this stand, success in the calling, the net effect of "good works" done according to virtue, took the place of this signal. According to Max Weber, "...however useless good works might be as a means of attaining salvation, for even the elect remain beings of flesh, and everything they do falls infinitely short of divine standards, nevertheless, they are indispensable as a sign of election. They are the technical means, not of purchasing salvation, but of getting rid of the fear of damnation."\textsuperscript{148} And in its final version, the kind adopted in Britain and transferred by the Puritans to America, it was success alone that finally mattered. Thus in its assimilation of economic life with religion, Calvinism fostered the merger of morality and bookkeeping, and the reassurance of election with fiscal profits.
those invisible and abstract signs of salvation.

Summing up, the heritage of Calvinism included literalism, iconoclasm, a hatred of anything even suggesting idolatry, and a series of warnings against withdrawing from the world entirely or taking it too seriously either. The ambivalence of Calvinism about worldly appearances is illustrated by two persistent examples: the continual controversies over church vestments, and over personal clothing. In the former case, Calvinists had to try to walk the thin line between avoiding "Romanish idolatry" and failing to glorify the House of God sufficiently. In the later, they had to tread anxiously between no apparel at all, which led to nakedness and immoderation, and clothing which was too costly and ostentatious. These disputes, trivial as they may seem today, were important outgrowths of the basic Protestant dilemma: that of being in the world but not of it, of avoiding the demons of sloth and dirt and laziness through the work ethic, while trying to resist the temptation of indulging in the fruits of one's labor.

As a sidenote to Calvin it is interesting that the Puritans, who brought Calvinism to the New World, were enthusiastic supporters of scientific inquiry, and were the liberal humanist founders of institutions like Harvard University. The Puritans condoned just two activities as appropriate to the Sabbath: reading the Bible and performing scientific experimentation. Calvin himself called science "a gift from heaven," and it is
The creation of the world.

THE FIRST BOKE OF
Moses, called * Genesis.

T H E A R G U M E N T.

M O S E S in his 2d book declareth the things, which are here chiefly to be considered: First, that the world & all things therein were created by God, & that man being placed in the great tabernacle of the world to be deale with God, & of all his wonderful works, & to praise his Name for the infinite grace, wherein he had endued him, & likewise from God throughout his whole life, even till he restor'd him to life, & confirmed him in the same by his promes of Christ's come, & by which he shulde overcomhe & thane his worldly life. Secondly, that the wicked, unmindful of God's great excellent benefits, esteemed not his works, & so fell in his sin & estate, pronoun'd God to his people, that they continedly repentance, & that the whole world, from the creatures to man, & also their salvation & destruction, was 2dly, the children of Israel, to shew the operation of God, & to shew his mercy, & to shew how the profane led him to perdition, & how the true led him to salvation. 3dly, the history of the world from Creation to the Deluge, to shew the progression of the world, & to shew how the world was destroyed & to shew how the world was renewed.
indicative that the countries in which the Reformation flourished—Britain, Germany, Holland, Sweden, Switzerland, America—are those in which optical instruments such as the telescope, microscope, camera obscura, navigational aids, printing press and other extensions of analytic vision had their greatest developments, and which led the world in photographic optics and technology well into our own century. It is noteworthy as well that the archetypal symbol of modern capitalism—the American dollar bill—still employs the Eye of God as one of its prominent symbols.

Having now traced the disintegration of medieval religion, cosmology, epistemology, and accompanying imagery, one is still left with the task of assessing this change in terms of experiential dimensions which are still with us. The difference between medieval and modern cultures is frequently described as the shift from an oral/aural society to an eye-minded one, and the transition has been treated by commentators like McLuhan as a redistribution in the balance of the sense-ratios; McLuhan compares this process to the increased sensitivity to sound in those who lose their eyesight, but in reverse, and has suggested that increasing reliance on the eye for information necessitates a closure of the other senses, leading to their numbing or anaesthesia. Whatever the merits of McLuhan’s general theories, this particular thesis begins to make more sense experientially
when linked to the Freudian notion of repression as forgetting, as amnesia and loss of awareness of the body. This specific theme has been studied in some depth by Ernest Schachtel, a psychoanalyst who observed changes in sense-ratios from childhood to adult maturity:

Phylogenetically as well as ontogenetically the distance senses, sight and hearing, attain their full development later than the proximity senses, smell, taste, and touch. Sight and hearing are more highly differentiated and more closely linked up with the human mind than smell, taste, and touch. The latter senses, especially smell and taste, are neglected and to a considerable extent even tabooed by Western civilization. They are the animalistic senses par excellence.

Schachtel also noted that "both pleasure and disgust are more intimately linked with the proximity senses than with the distance senses".

The pleasure which a perfume, a taste, or a texture can give is much more of a bodily, physical one, hence also more akin to sexual pleasure, than is the more sublime pleasure aroused by sound and the least bodily of all pleasures, the sight of something beautiful.

Vision, according to Schachtel, is not only a more detached means of sensation than any other, but it also involves the least amount of risk during interaction with an environment, and the highest degree of intellectualization. Vision is "less immediately related to its objects than the proximity senses of smell, taste, and touch, and more influenced and moulded by the categories of the mind. This makes vision more amenable to standardization
and stereotyping, and easier to fit into culturally-sanctioned schemata of experience: it seems easier to conventionalize tastes in painting and photography than tastes for food, or preferences for certain odors, since the latter are more personal, idiosyncratic, or subjective. Visual stimuli also seem more prone to translation and reduction into words and numbers than tastes and odors, both of which resist abstraction and over-intellectualization. 156

The critical dimension of Schachtel's findings is that while the biological development of the human infant leads to greater dependence on distance senses, certain cultures - notably our own - hasten or short-circuit the process unnecessarily.

The proximity senses, which play such a great role in relations between animals and, if not repressed, in the sexual relations of man, are otherwise tabooed in interpersonal relations the more a culture or a group tends to isolate people, to put distance between them, and to prevent spontaneous relationships and the "natural" animal-like expressions of such relations. The emphasis on distance and the taboo on smell in modern society is more outspoken in the ruling than in the laboring class, distance being also a means of domination and of imposing authority. 157

What McLuhan labels a historical change in the equilibrium of the senses due to technological innovation, Schachtel would describe instead as a cultural shift away from the proximity senses in favor of greater repression of the instincts. Although McLuhan's notion of technologically-induced narcosis has strong affinities to Schachtel's concept of the repression of pleasurable
and vivid stimuli, psychoanalysis would locate that repression not in technology per se, but in the quality of interpersonal relationships made available by a specific culture. The scientific revolution, with its enormous emphasis on vision and intellectualization, would therefore represent a higher level of repression than any known previously.

The historical evidence seems to confirm this interpretation. Between the late Middle Ages and the Reformation there were definite changes in patterns of socializing children. In Holland, Britain, and later Germany, where optics, mechanics, capitalism and Protestantism flourished, childhood among the upper and middle classes was generally characterized by sensory and emotional deprivation. Many parents during the seventeenth and eighteenth centuries acted indifferently to their offspring, lived physically separated from them, or abandoned their infants to institutions or wet-nurses. When adults did express an interest in their children's upbringing it was usually to insure sufficient - and more than sufficient - discipline. Infants were tightly swaddled to restrict their motor activity and as they grew older children were forced to wear halters, stocks, and iron collars. After a certain age many children were denied the companionship of pets, and their daily routines included cold baths (often fatal), bland diets, and a regimented program of exercise, sleep, feeding, and bowel movements. Education stressed the three R's and a fourth
In psychoanalytic terminology this sort of childhood best prepares infants for one thing only - a thoroughly neurotic adulthood. Psychoanalytic studies of the Reformation, the Protestant work ethic, the lives of Calvin, Luther, and other religious leaders, generally wind up using the words "compulsive-obsessive personality," "anal-sadistic character," "the authoritarian personality," and so on. The common thread is a terror of repressed emotions, anxieties, and hostilities, which can be manifested as ritualistic attention to detail: perfectionism; meticulous cleanliness and precision in measurement, spelling, punctuation, and classification; a fascination for death (corpses and preserved or stuffed animals); and an ambivalent attitude toward authority which involves identification, submission, obedience, and jealousy and envy also. These qualities surface in art as well as technology, as can be seen in the realistic Dutch painting of the seventeenth century - their role in shaping photographic aesthetics will be examined shortly. For the moment it suffices to make the connections between repression and technology which is brought home by one of the important but unpublicized footnotes to the scientific revolution, namely that its major figures - Descartes, Kepler, Galileo, and Newton - were all orphaned or abandoned by their mothers during their infancy or boyhood. It cannot be mere coincidence that the new cosmos they described was lacking in
maternal, nutritive, sympathetic, warm or hospitable qualities, except as secondary and wholly psychological elements with no "objective" existence.
The Aesthetics of Rationality

The wholesale application of geometry to all natural phenomena did not stop at optics and astronomy, and concepts derived from classical physics were transferred directly and indiscriminately into areas of political science, political economy, psychology and aesthetics. The mathematical axiom that "the whole equals the sum of its parts" reappeared in eighteenth and nineteenth-century theories which stated that social organization did not proceed from above (feudalism), but from an aggregation of many separate individuals (Housseau's "social contract", Lockean and Jeffersonian democracy, Hobbes' bellum omnium contra omnes). The uninterrupted and smooth uniformity of Newtonian time and space suggested a uniformity in nature and human nature, that became a cornerstone of botany, zoology, geology, history and anthropology. The study of forces in motion without regard for final purposes produced the concept of cause-and-effect which found its way into economics (supply and demand), politics (action and reaction), and a behavioristic psychology (stimulus and response). Since this is still the dominant vocabulary and world-view of the natural and social sciences of our day, one would expect to find similarities in the realm of aesthetics also. All things considered, it is not too surprising to find the essence of modern photographic criticism in the intellectual discourse of the
eighteenth century.\textsuperscript{161}

A brief glance at the institutional settings in which these ideas were germinated and published gives one some insight into the class origins of modern critical activity. In France the formation of a standing professional army deprived the feudal aristocracy of its military ranks and honors. This, and the growth of Paris commercially, generally led to a move toward the city and the evolution of salons as centers of social activity, and regulators of taste and fashion. The salons were also open to select members of the bourgeoisie, whose financial support was vital to a class which could or would not stoop to earning its own living. These early discussions about art were therefore characterized by relatively little philosophy and a great deal of wit, as jousting with words - \textit{bon mots}, puns, epigrams - replaced the more physically violent means of proving the nobility of one's heritage. Exclusive as they were in their own terms, the salons were considerably more liberal than the monarchical courts which, as political instruments, were the headquarters of a centralized, absolutist, and bureaucratized state government to which even the Church became subservient. With the founding of the Royal Academy in 1648, and the construction of Versailles under Louis XIV, the state took over effective control in all areas of artistic activity: the education of artists and craftsmen, the assignment of professional commissions, the elevation of
particular artists, the sale of their products, and the standards of judgement and approbation. The state itself became organized more and more around the lines of a huge mercantile corporation, monopolizing every aspect of social life so that it became almost impossible to avoid conformity with those standards. The Academy, whose chief was "the lawgiver of Parnassus", codified the standards for *la grande maniere*, *le bon gout*, and *la belle nature* of French Classicism, and had the political power to enforce them. Their criteria for judgement are a mixture of aristocratic self-control and deportment with middle-class rationality and the scientific method of analysis.\textsuperscript{162}

In England the route to prescriptive aesthetics was somewhat different, though the end results were similar. The civil wars, which weakened the monarchy and strengthened Parliament, led to a greater blending of class interests. Court life was not exclusively aristocratic and the upper classes, mainly a rurally-based squirearchy, took active part in the expansion of industry and commerce. This squirearchy, along with the urban bourgeoisie, was the first mass market in terms of a reading public, a status which parliamentary government helped foster. High social life was organized around the political clubs of London, which engaged in active campaigns of literary propaganda, and in which aesthetic questions were hotly debated. Again, the growth of state power, its encroachment into all spheres of private life, taste and morality, combined with puritannical religiosity, gave rise
The most important idea to come out of this gestalt of interconnected concepts is that of *mimesis*. The mimetic theory, in one form or another, has overshadowed Western thinking about art since it was first elucidated; it is a logical consequence of any identification of vision with reason. The subservience of aesthetic judgement to epistemological considerations begins with Plato, who simultaneously glorified sight as the highest of the bodily senses and claimed that art is a mirror of nature. Plato’s condemnation of illusionistic artists - "that band of imitators" - and their banishment from the ordered community of the Republic, underlines the mystical and metaphysical core of his conception of mimesis. For Plato the world itself is a divine work of art, an image, and a material imitation or representation of a higher spiritual reality, into which only philosophy can penetrate. That art is an imitation meant, for Plato, that it strives for fidelity to the essential ideal of the physical world, which exists beyond corporeal appearances.

For Aristotle, whose *Poetics* helped carry the concept well into the seventeen-hundreds, mimesis was more of a naturalistic phenomenon. "Imitation is natural to man from childhood, one of
his advantages over the lower animals being this, that he is the most imitative creature in the world, and learns at first by imitation." For Aristotle, who mistakenly described the optic nerve as part of the brain tissue, the cognitive element in art was the basis of its appeal and value since, "to be learning something is the greatest of pleasures not only to the philosopher but also to the rest of mankind, however small their capacity for it," and "the delight in seeing the picture is that one is at the same time learning." Aristotle used the principle of mimesis to categorize the various types of poetry and drama, judging them according to the moral elevation of their subject matter. The tragic and epic were given top honors for being "the greatest forms of imitation," in that they dealt with the noblest personages and emotions. Thus the idealist trend in Plato's thinking was extended, beyond metaphysics, to an aesthetic based on the highest levels of moral behavior.  

In the Middle Ages mimesis as an aesthetic doctrine was secondary to the Augustinian belief that all things tend toward God, and that the proper aim of art was therefore not imitation but beauty. During the Gothic this attitude began to shift, and by the time of the Renaissance it completed its reversal. The claim that art was a form of intellectual knowledge was crystallized by Leonardo, Alberti, the Florentine Academy, and the Humanists. Imitatio in the Renaissance was a program to
reclaim fidelity to the ancient models of artistic perfection, and to the models of perfection provided by nature. Using the laws of nature—proportion, perspective—painting especially was to reproduce, in idealized form, the world of appearances. As Leonardo commented, "That painting is most praiseworthy which conforms most to the object portrayed." In his own time, and in the decades afterward, this was understood to mean that the artist must not slavishly copy nature, but select from it those portions most worthy of representation. Imitatio was the philosophical articulation of the Renaissance artists' interest in optics, anatomy, anthropometry, and instruments like the camera lucida and camera obscura.

Imitation was also one of the major foundations of classicism in all the arts, not just painting, though the trompe l'oeil style favored by the French Academy was its strongest manifestation. Classicism, which later hardened into academicism, was imported into France from the painting of Italy. Its emphasis on an art strictly governed by rules and reasons, and chiefly dedicated to the ordered study of nature, appealed to the philosophers' struggle against Baroque and Mannerist emotionalism. For le grand siècle, during which reason was epitomized by science, a mimetic theory of art was vital to every aesthetic, and it was pushed to the limits. Mimesis was the singular and central concept in the creation of the system of the fine arts, that division of labor among them formed for the benefit of aestheticians, connaisseurs.
and collectors, which assigned to painting the job of replicating nature without distortion. The most influential thinker of the period, Abbe Batteux, who introduced the system, published a landmark essay on *Les Beaux Arts Reduits a un Meme Principle* (1747), that of imitation. Following Aristotle directly, music was said to imitate the sounds of nature, the theatre to represent human actions, and so on, and all non-imitative activities such as cooking, gardening, pottery and even architecture were excluded from the original system. The conception of mimesis as the key to the *beaux arts* was picked up unquestioningly by Montesquieu, Diderot, and the *Encyclopédie*, and remained practically unchallenged until the art-as-expression theories of later Romanticism.\(^{16}\) As such, the significance of mimesis in modern thought derives mostly from the epistemological models of representation developed by science: "a meticulous examination of things themselves for the first time, and then (a) transcribing...in smooth, neutralized, and faithful words."\(^{165}\) The principle that art should be a precise but elevated map of reality is consistent with other intellectual efforts aimed at reducing the world into a series of clearcut words, numbers, formulas, diagrams and blueprints.

It seems more than obvious that the bulk of photographic aesthetics has been founded on either affirming or negating the idea that the photograph is or should be a representation of
reality, or a "mirror of nature". On the whole, those who agree with the former have held sway, especially during the first few decades of the photograph's existence. The mimetic theory was clearly evident in the first official announcement of Daguerre's invention:

M. Daguerre has at length succeeded in discovering a process to fix the different objects reflected in a camera obscura, and also, to describe, in four or five minutes, by the power of light, drawings, in which objects preserve their mathematical delineation in its most minute details, and in which the effects of linear perspective, and the diminution of shades arising from aerial perspective, are produced with a degree of nicety quite unprecedented...Draughtsman and painters, even the most skillful, will find a constant subject of observation in this most perfect reproduction of nature.166

Fox Talbot, Daguerre's rival and inventor of the calotype, also boasted that "one advantage of the Photographic Art will be, that it will enable us to introduce into our pictures a multitude of minute details which will add to the truth and reality of the representation."167 And Edgar Allen Poe expressed his enthusiasm for the new process: "In truth the daguerreotype plate is infinitely more accurate in its representation than any painting by human hands...the closest scrutiny of the photographic drawing discloses only a more absolute truth, more perfect identity of aspect with the thing represented."168 The mutual reinforcement of photography and mimetic theory was so strong that Charles Baudelaire, one of the new medium's earliest enemies, was moved to pour out his wrath on the discovery by satirizing the popular
public attitude:

I believe in nature, and I believe only in nature, I believe that Art is, and cannot be other than the exact reproduction of nature...Thus an industry (photography) that gives us a result identical to nature would be the absolute art...since Photography gives us every guarantee of exactitude that we could desire, then Photography and Art are the same thing.169

Probably without knowing it those photographers and critics who have been most concerned with preserving the purity of the unmanipulated image have based their credoes on some variety of artistic mimesis. Paul Strand (1890 - ), one of the foremost photographers in the history of the medium, once wrote that, "Photography, which is the first and only important contribution, thus far, of science to the arts, finds its raison d'être, like all media, in a complete uniqueness of means. This is an absolute unqualified objectivity."170 And Edward Weston (1886 - 1956) declared,

I am no longer trying to "express myself," to impose my own personality on nature, but without prejudice, without falsification, to become identified with nature, sublimating things seen into things known - their very essence - so that what I record is not an interpretation, my idea of what nature should be, but a revelation - an absolute, impersonal recognition of the significance of facts.171

Photographic critics have also perpetuated the idea of representation, often in unconscious detriment to photography. An example can be drawn from the purist writing of the 1920's:
The photograph has two qualities capable of stimulating the aesthetic faculties. The first of these is concerned with the rendering of textural distinctions; the second lies in the simple reproduction of the physically beautiful, that is, of the beauty which nature has so lavishly provided...When a photographer opens his lens upon a given scene he leaves behind him the emotional force of direct experience, and has nothing to substitute for this indispensable factor. The interest in the transfer is determined entirely by good taste and by the intelligence and by the ingenuity manifested in the selection of the subject matter. As emotional creation it is comparable to the activity of a sentimentalist before a beautiful sunset.  

More recently an article in praise of Walker Evans evaluates his work as follows: "...he makes a photography not only a statement of fact but a statement in sheer representation, of which the facts are necessarily an important aspect, indeed, the very aspect which gives photographic form its particular configuration."  

The strongest expression of these ideas is in the field of photojournalism, where phrases like "objective reporting" and "the detached observer" have common currency. Dorothea Lange (1859 - 1965), who documented the Great Depression of the 30's, had a quotation from Francis Bacon posted on the door to her darkroom: "The contemplation of things as they are, without substitution or imposture, without error or confusion, is in itself a nobler thing than a whole harvest of invention." Commenting on her own work she said, "Documentary photography records the social scene of our time. It mirrors the present and documents for the
future... It records (man's) customs at work, at war, at play, or his round of activities through twenty-four hours of the day, the cycle of the seasons, or the span of a life." The idea that the photograph is a mirror through which one can see the thing-in-itself is a corollary of mimetic theory.

Some of the most forceful statements of this view came from the editorial management of LIFE magazine. Wilson Hicks, LIFE's picture editor and later executive editor (1937 - 50), gave photographers fairly stringent guidelines.

In photojournalism the photograph is derivable only out of reality itself. The photographer in relation to the subject matter of his picture does not have a choice between staying with or departing from realism. Reality is the master of the photographer. Only what appears before his camera - nothing else - finds its way into his picture... Whether his "model" is a person, place or thing, he cannot change it by an intermixture in the emulsion of his negative of images past and present, imagined and real...

It is interesting that Hicks' insistence of photographic literalism as a measure of the medium's integrity may have been meant as disciplined and heroic, but it was constantly undermined by his marriage of words and images. Hicks' explicit justification for LIFE's captions was that, "The basic unit of photojournalism is one picture with words."

When a newspaper or magazine prints such a unit, the subject of which is news or within the vast bounds of matter related to news, it is practicing photojournalism in its simplest form. But it is practicing it in the true sense only if the photograph
and the words which accompany it constitute "a single expressive statement" or produce a unity of effect within the reader's consciousness. In a single expressive statement it is essential that the complementary relation between picture and words, in terms of subject matter, be fully realized."

For many LIFE photographers the matter was not quite so simple. LIFE often used written captions which distorted and negated the impact of certain photographs. A prime example is W. Eugene Smith's photo of a soldier holding an infant. Smith's own response to the scene was direct and brutal: "A baby was found with its head under a rock. Its head was lopsided and its eyes were masses of pus. Unfortunately, it was alive. We hoped that it would die." LIFE's caption told a cheerier story: "Plucked alive from a Saipan cave filled with corpses of hundreds of Japanese civilians and soldiers, this baby was rushed to a G.I. hospital." Not only did LIFE's caption steer viewers away from the actual image, but it formulated a ready-made and optimistic reaction to it, one which transformed the luckless soldier into a hero in the midst of bloodshed.

Taken historically the surrounding of images with words can be traced back to the eighteenth-century doctrine of *ut pictura poesis*, "as in painting, so in poetry." The phrase originally came from the Roman poet Horace, and was intended to identify the strong affinities between painting and poetry, as distinguished from music and architecture. The idea was reinterpreted by the Renaissance and Enlightenment so as to put a heavy literary
emphasis onto representational painting. French Classicism and its German and British adherents insisted that the two forms of art were not simply parallel but had complementary and overlapping functions. This concept also had its roots in the humanistic view of the painter as an educated student of history and man of letters. With the increasing rate of literacy among the bourgeoisie and aristocracy, and the encouragement of imperial sensibilities, the Greek and Roman authors became a snobbish and more exclusive alternative to the literature of the Bible, whose scenes most peasants could have recognized and comprehended. This tendency supported that genre of literary painting which tried to accurately reconstruct and illustrate passages from Homer, Virgil, Ovid, Cicero, Livy and Plutarch. Even at the height of their success, literary paintings were felt to be incomplete or insufficient without extensive inscriptions which were more than simple titles.

As with mimesis, the idea of *ut pictura poesis* contained a subordination of the image to intellectual or scientific (i.e. archaeological) knowledge, and perhaps like some of today's "modern art" it was meant to mystify the ignorant masses, thereby increasing the status and value of ownership. 

Seen from another angle, the theory of *ut pictura poesis* incorporated Aristotle's belief that art has a narrative function, and it is clear that Aristotelian action, not Platonic contemplation, is the style most appropriate to an expansive and
progressive society such as developed under capitalism. The narrative, unlike the icon, also demands Aristotle's three unities - time, space and action - and they were rigorously upheld by the academies. It is significant that it was the Enlightenment which witnessed the birth of plot-oriented representational literature: the novel and the historical romance.¹⁸¹

The uneasy ghost of *ut pictura poesis* still lives on in modern photography, though the intent now seems to be the democratization of the image by making it accessible to a common verbal vocabulary. Essays on the subject of "visual language" and "visual grammar" often try to analyze viewing as a form of reading in the sense of linear, logical scanning.¹⁸² Many critics have tried to treat photography as a species of literature: "The art in photography is literary before it is anything else. Its triumphs and monuments are historical, anecdotal, reportorial, observational before they are purely pictorial...The photograph has to tell a story if it is to work as art."¹⁸³ Or, "...photography seems to be the most literary of the graphic arts. It will have - on occasion, and in effect - qualities of eloquence, wit, grace, and economy; style of course; structure and coherence; paradox and play and oxymoron."¹⁸⁴

The opposing view, that the photograph is more pictorial than literary, has led to the conclusion that photography is weaker than literature, or at least less comprehensible. This seems to
be a standard canon in the theory of photojournalism.

Without (words) there arises the question of how far human perception and patience can be taxed. The more relevant question is whether in a picture story the nondiscursive photographic medium can be put to discursive use. So used, it would be necessary for each picture to present clearly and completely a fact, idea or feeling which the reader could comprehend in a single visual act. This perfection in itself is not attainable. But if it were, could the reader's mind retain the idea conveyed by each picture through a varied progression of pictures and co-ordinate all into a meaningful whole? The answer is no.\textsuperscript{185}

\textit{Ut pictura poesis} is still a controversial issue because, in opposition to this dependence on words for visual comprehension, some photographers have pointed out that the limitation of "human perception and patience" may be a specifically cultural problem. As Walker Evans put it,

The meaning of quality in photography's best pictures lies written in the language of vision. That language is learned by chance, not system; and, in the Western world, it seems to have to be an outside chance. Our overwhelming formal education deals in words, mathematical figures, and methods of rational thought, not in images. This may be a form of conspiracy that promises artificial blindness.\textsuperscript{186}

And Minor White was once so fed up with words being attached to photographs that he felt moved to pin a comment to a gallery exhibit: "Look, To See Is To Stop Talking."\textsuperscript{187}

One of the prominent by-products of this perceived logorrhea is the assimilation of individual photographs into universalized abstractions. This is another characteristic feature of the
ideology of mechanistic science, and its historical antecedents are once again to be found in the "knowledge explosion" of the seventeen-hundreds. If the universe is considered as a mechanism, each of its parts must be standard, uniform and replaceable. Scientific taxonomy, as experienced in museums, botanical gardens, dictionaries, encyclopedias, formularies, and tables of classification, exhibits a preference for the general over the specific, the type over the individual, and the rule over the exception. The diversity of natural phenomena gives way to efficiency in classification at the same point in history when standardized commodities began to replace the works of individualized craftsmanship. The scientific discourse, following the economic realities, created the notions of type (as in "typography") and species, of which the individual and the particular are the representation. The technique of sampling obeys the principle of "If you've seen one, you've seen them all..." except for minor variations. The scientists following Newton assumed not only that nature is uniform in its operations, but that science itself, a product of the rational mind, would eventually produce a standard and immutable philosophica perennis, or sapientia universalis.

The final destination for this train of thought is a belief in the uniformity of human nature, another basic concept in the edifice of liberal humanism. Scientific knowledge rejected the
old ecclesiastical dichotomy between Christian and heathen since Greeks like Pythagoras and Euclid were among its pioneer workers. The liberal image of human dignity was built on the assumption that reason separates man from the animals, and that is is distributed without privilege to every human being, regardless of race, religion, or social situation. To this picture of man as the thinking animal more pessimistic writers, taking their cue from Original Sin, counterposed another image, that of the selfish, willful creature which uses reason only to further its own blind and egotistical motives. Again, few of the intellectuals who took part in the dispute - including Machiavelli, Hobbes, Jonathan Swift, Calvin and Luther on the side of the pessimists - felt any compunction in generalizing about the entire human race on the basis of what they observed about them in European civilization.¹⁸⁹ This ethnocentricity, based on "science", allowed them to label agrarian, nomadic, and non-technocratic cultures "primitive", "undeveloped", and visually "picturesque". The conception of a universalized "human nature" is the means whereby bourgeois class-consciousness projected itself into history, allowing the middle classes to see themselves as the type and representative of all mankind, or as the class of all classes. Definitions of intelligence, culture, progress, wealth, rationality, and family structure were transposed, with astonishing facility, from the drawing rooms of Europe to the colonies of Africa, India, the Pacific, and the Americas.¹⁹⁰
In regard to its aesthetic dimensions, the idealization of the norm was supported by many artists and critics, beginning during the Renaissance, and reaching its apogee in the period of Classicism. Typical of this attitude was the famous society painter Sir Joshua Reynolds (1723 - 1792), who managed to mass-produce over two thousand canvases during his lifetime. As first president of the Royal Academy in Britain, and influential spokesman for fashionable attitudes in England throughout his career, Reynolds continually upheld the principle of normative idealism in his Discourses, delivered to the Royal Academy for the edification of its students:

There is an absolute necessity for the painter to generalize his notion; to paint particulars is not to paint nature, it only to paint circumstances. When the artist has conceived in his imagination the image of perfect beauty, or the abstract idea of forms, he may be said to be admitted into the great council of Nature.¹⁹¹

The sentiment was seconded by Samuel Johnson (1709 - 84), the leading literary figure of his age: "The business (sic) of a poet is to examine, not the individual, but the species: to remark general properties and large appearances; he does not number the streaks of the tulip, or describe the different shades of the verdure of the forest."¹⁹² The same attitude has been transplanted into the twentieth century so that in 1970 Ernest Haas made perfect sense to his hearers when he described his photograph of a "little Austrian girl waiting at the train station, hoping for the return
of her father, who was a prisoner of the Russians. She was clutching an old snapshot of him in one hand."

...this picture of the little girl was abstract...because I was seeking a certain universality. I wasn't interested in a specific little girl, nor did I want to know her name...I simply wanted my subject matter to be universal. This girl became the idea of all little girls who are looking for their fathers.193

The liberal humanist elevation of universality also guided the formation of The Family of Man, easily one of the most important exhibits of modern photography ever assembled. Carl Sandburg's introduction to "the greatest photographic exhibition of all time - 503 pictures from 68 countries...an alphabet and a multiplication table of living breathing faces," completely glossed over the very real differences between industrial societies like our own and the tribal cultures they are steadily exterminating.

Everywhere is love and love-making, weddings and babies from generation to generation keeping the Family of Man alive and continuing. Everywhere the sun, moon and stars, the climates and weathers, have meanings for people. Though meanings vary, we are all alike in all countries and tribes in trying to read what sky, land and sea say to us. Alike and ever alike we are on all continents in the need of love, food, clothing, work, speech, worship, sleep, games, dancing, fun. From tropics to arctics humanity loves with these needs so alike, so inexorably alike.194

But the steadiest practitioners at universalizing photography were the caption-writers of LIFE magazine. Like Bacon, Diderot
and the compilers of the *Encyclopedic*, the editors of LIFE sought to compartmentalize and present the world of experience in a series of compact but comprehensive segments: "The Athletes, The Leaders, The Black Cause, The Land, The Soldiers..." and "Miscellany".¹⁹⁵ LIFE's title itself indicated its ideological orientation, but the captions made it even plainer: while the photographs showed vivid particulars of individual experiences, LIFE consistently categorized them as broadly as possible. Alongside the picture of a seaman kissing an apparent stranger LIFE wrote, "On V-J Day, (Alfred) Eisenstaedt caught this sailor and girl who summed up the nation's victory spree," as though V-J Day meant only one thing to all Americans, and as though the sailor's sexual release was a display of patriotism.¹⁹⁶ LIFE also leaned on the word "classic": "In a classic example of panic, Shanghai citizens converge in a tangle of arms and legs..." (though many of the subjects are amusedly smiling); "A procession of Sikhs stretches like a classic frieze across the Indian landscape as they flee east..." (a comparison of flesh and blood with polished stone); "This 1969 combination of miniskirt, well-groomed long hair and sunglasses is a modern classic" (begging the question of enforced conformity in mass-merchandised fashions).¹⁹⁷ One is tempted to read these captions and dismiss them as the rhetoric of dramatization but they actually cut deeper, partly by making this dismissal too easy. A famous LIFE photograph entitled "The Piano Recital" showed a boy under ten years of age straining away at the instrument, while
a crowd of relatives and neighbors listens critically. LIFE's caption: "What made this picture an American classic was that everyone could see himself in that Iowa parlor, as nervous parent, soloist at the point of no return or, worst of all, the terrified next-in-line." Though some of us might look back on those terrifying ordeals as cruel and barbaric, LIFE wanted its readership to merely to chortle at the collective recollection of American childhood. That children probably grow up hating music as a result of these trials is, one would guess, too specific a fact to intrude on the purity of the abstraction.

One could go on with endless examples. The photograph of an army physical with a statement that the draft was "a rite of passage for a generation of war-bound American men," but that generalization obscuring the specific function of rites-de-passage which is to turn boys into men, while the draft can be seen as designed to do just the opposite. Or the constant anthropomorphisizing of animals: "With a piercingly human expression of terror, this howler monkey is trapped between approaching rescuers and death by drowning..." or, "In unconscious human imitation, a red-haired orangutan... seems to pose like The Man with the Hoe," though Charles Darwin demonstrated that human expressions are simian, and not vice versa. One sentence alone might take a full book to analyze: "An Eagle's Swoop: Nature's ruthless law is captured in this photograph as surely as the ground squirrel in the talons of the California golden
eagle." Without actually writing that book one could point to the assumptions that "Nature" (an abstraction) operates by a "law" (another Newtonian abstraction) which is "ruthless" (a human value), a law of competition instead of ecological cooperation (a "naturalistic" justification for capitalism dating back to Hobbes); and to the strange equation between the act of prey and the activity of the photographer.

The trend toward universalizing and abstracting photographs is played out in another manner, also grounded in the world-view of the Enlightenment. Mechanistic, behavioristic psychology, conceived by Hobbes, Hume, Spinoza, Locke and the neurologist Hartley, pictured the process of thinking as a linear series of cause-and-effect chain reactions (like billiard balls knocking each other), regulated by the principle of association; this was also seen as the basis of all learning. Associationism was picked up by most British and continental aestheticians of the period and one its leading proponents wrote of art that,

...the beauty of colors is, in most instances resolvable into association: those being approved, which either by a natural resemblance, or by custom, or opinion, introduce and are connected with agreeable ideas of any sort; and those being disapproved, which have any way become related to disagreeable ones.

Despite the advent of Gestalt psychology and all that Freud wrote about the limits of free association (due to repression), photographic critics still write as though the purpose of the image
was to set off an unlimited stream of association, which begins at the photograph and ends back at the grand universals: associationism is therefore the key to the modern critic's hermeneutic. A photography magazine recently told its readers to

Evolve imagination with nature. In his nature pictures (Eugene) Atget deepened his statement regarding the photographic problem of the lens: the closer one looks at and knows the real world, the less it seems to be simply what it is and the more it suggests other possibilities. Weston's peppers were a later statement of such a transformation. Is that just a tree root or the leg of an enormous bird? Almost all his tree and nature pictures are an open provocation to associate and daydream. 202

Daydreaming aside, in its extreme form this hermeneutic resembles a pebble cast into a pond, with the mental ripples extending toward the edges of imagination. In actual practice the critic's game of "reminds me of" seems to have two varieties. In the democratic version, as exemplified by LIFE, the pebble is thrown into an ocean of memories and associations reaching to the timeless, boundless horizon: the e eternities of birth, death, growth, decay, love, childhood, man's inhumanity to man, and so on, all mental abstractions without specific experiential or historical content. For the more exclusive version the body of water would have to be something smaller and more prestigious, as when John L. Ward compared photographs to the works of relatively minor painters and sculptors like Brancusi, Arp, Mark Rothko,
and Adolph Gottlieb, works known best to the readership of a highbrow journal such as *Artsforum*. The range of ripples is often a measure of the critic's audience: references to Weston's peppers as reminders of "the sensuousness of nature" are likely to be found in *LIFE* or *Popular Photography*; associations with the paintings of Mark Rothko are more often found in academic reviews with a more restricted number of subscribers.

Mimesis, *ut pictura poesis*, normative idealism, universalism and associationism - all grew out of the same historical and ideological framework and all continue in support of definite socioeconomic functions. But the frame itself, the common basis for all these ideas is the powerful, complex, and prestige-laden theory of art which has long been known as formalism. Formalism, as was seen at the beginning, is essentially the theory that art is a specialized human activity, with its own aims and object, and its own specific modes of action and procedure, all of which are amenable to intellectual analysis and interpretation. That *ars* was a set of orderly, repeatable, teachable methods of dealing with matter was a concept well established in antiquity, accepted in the Middle Ages, and given new impetus by Renaissance theorists. But as the Age of Reason began to separate the "fine arts" from those that were merely decorative or useful, the need simultaneously arose to distinguish the varying principles that supposedly underlay them. The formalism of that century had a number of other sources, all of which form an interesting
commentary on its continued survival and influence in our own period. Besides the notion of art as craft, the regularization of all activities, especially those related to polite society, etiquette and culture, was a vital part of the aestheticization of courtly society in general, and it is not surprising that people who wrote handbooks about the proper method of setting a dinner plate should write about art in the same vein also. The habitues of Paris salons, where the term beaux arts first emerged, were aristocratic amateurs, neither artists nor writers, who nevertheless saw aesthetics as the key to models of behavior for the gentilhomme; to the world of art they applied the same standards of cultivation, deportment, grace, restraint, wit, propriety, courtesy and polish. J'ai des raisons pour tout was the appropriate byword not just for the first of the French classicist painters, but for an entire group of people to whom formalism was an everyday set of prescribed and correct behaviors.

Incidentally, those who concerned themselves with the arts at that time were operating in an intellectual vacuum created by the success of the natural sciences. The major philosophers to the year 1700 - Descartes, Hobbes, and the lens-grinder Spinoza - had relegated beauty to the realm of secondary qualities, which made of art a subjective and psychological issue. To a large extent this was, in an age of science, felt to be a denigration, and the connoisseurs were moved to argue that their field of
interest was also objective, absolute and rational. The defense of art was to make of it a science, which also meant subjecting it to strict rules and regulations. In Britain especially, formalism was supported by the psychological theories arising out of Locke’s empiricism. As David Hume (1711 - 76) saw it, "in the production and conduct of the passions there is a certain regular mechanism which is susceptible of as accurate a disquisition as the laws of motion, optics, hydrostatics, or any other part of natural philosophy." It was on this basis that Edmund Burke (1729 - 97) was able to conclude that, "Beauty is, for the greater part, some quality in bodies, acting mechanically upon the human mind by the intervention of the senses." It was specialized knowledge of these mechanistic laws which allowed the royal academies to dominate the art scene for so long, and to give art an aura of exclusiveness. Sir Joshua Reynolds, instructing his students, said it best:

Everything (beautiful) which is wrought with certainty is wrought upon some principle. If it is not, it cannot be repeated...every object which pleases must give us pleasure upon some certain principles...the idea of beauty in each species in an invariable one... It is very proper that...rules should be given in the Academy: it is proper the young students should be informed that some research is to be made, and that they should be habituated to consider every excellence as reducible to principles.

One of formalism's inevitable byproducts necessarily included the uniquely modern position of the art critic, the supposedly impartial observer whose function is to uphold the rules and
reprimand when they are violated. Just as in the liberal theory of politics, where government exists to uphold the laws of free enterprise, the critic—a Consumer's Guide to the arts—is to keep unfair (faddish, forged, pornographic) competition off the art market (thereby protecting art as an investment).²⁰⁷

Photography has had more than its share of rules and rule books, most of them issued during the heydays of the purist-pictorialist battles. Pictorialists like Henry Peach Robinson (Pictorial Effect in Photography, 1869) drew heavily on the Dutch masters—Rembrandt, Van Dyke, Vermeer—and also Reynolds.²⁰⁸ The purists developed rules about camera size (the bigger the better), depth-of-field, minimizing grain, maximum degrees of enlargement, the use of glossy (non-ferreotype) paper, printing for full tonal scales, and the exclusion of retouching or hand coloring.²⁰⁹ Contemporary purists like Beaumont Newhall and Helmut Gernsheim are still concerned that the photograph look "photographic", a quality assumed to reside in "the inherent characteristics of the medium," rather than on historical reconsiderations of the term "photographic". Even today one still finds rules, though they might be considered old-fashioned: Kodak's advice on S and C curves and "the rule of thirds", or Ansel Adams' "Geometrical Approach to Composition".²¹⁰ Rules are in fact the mainstay of the mass-circulation photo magazines, though presented as "picture-taking ideas": rules also guide the style
and tenor of more sophisticated formalist criticism. An indication of the range of this trend is afforded by juxtaposing two comments on two different photographs, appearing in widely different sources. The first is from Modern Photography, a pulp magazine which carries a high percentage of consumer-oriented advertising.

Blank canvas of snow can serve as a foil for selected colors and at the same time emphasize the geometry of nature, as in this picture of a maple orchard belonging to one of (Richard) Brown's Vermont neighbors. Out walking after the year's first snowfall one November, Brown was attracted by the freshly fallen leaves, which dotted the white snow with muted colors. A Nikon FTn, 28mm f/3.5 Nikkor lens and KII film were used. The photographer doesn't remember the exact exposure, but he used a small enough aperture to keep foreground and background sufficiently sharp.211

And the second is quoted from Looking At Photographs (196?), written by the Museum of Modern Art's director of photography, John Szarkowski:

The profile of the body on the right side of the picture draws a beautiful line. The effect of this line depends on its closeness to the frame, the baseline against which its undulation is measured. A teacher of drawing once pointed out to his students, in trying to persuade them to use the whole sheet of paper, that a peanut in the bottom of a barrel was merely a spot, whereas a peanut in a penny matchbox was a piece of sculpture.212

Both captions are examples of nuts-and-bolts analysis, formulas for successful imagery which describe the expressiveness of photographs in terms of technical accomplishment ("use a small aperture" and "fill the frame are the two lessons). Questions
regarding the photographer's personal relationship to nature, in the first case, are answered by the phrase, "Brown was attracted," a metaphor which is apt for gravitational forces between inert objects, and negates the possibility that attention and inattention are inwardly directed. In neither case is the readership told why the critic found that particular image meaningful or moving as a personal experience. Taken at this level of operation then, formalism is the intellectual reduction of art to a kind of Popular Mechanics, at different levels of sophistication. As Joshua Reynolds believed, "Art is not a divine gift" - it is more a matter of studying the right rules and using the best equipment.

Understood historically, it is obvious why formalism has been photography's dominant aesthetic to date, since it represents the extension, into the field of art, of what Jacques Ellul tellingly named la technique: "the totality of methods rationally arrived at and having absolute efficiency in every field of human activity." In art, la technique is not simply the aesthetic of The Machine (as the Futurists interpreted it), but that of the entire Cartesian-Newtonian universe: controlled, orderly, clean, efficient, regular, mechanistic, predictable, uniform, stable, and rational - and institutionally white, male, middle-class and intellectual. The pursuit of la technique in art has given our culture not only photography itself but formalism also, a cool, cerebral, objective, "value-free" approach to photography, which sees its "job" as the interpretation of photographs so that they
are "profitably analyzed". The ring of the mental cash register is a suitable reminder that formalism, with its constant emphasis on competence, accomplishment, technique, and efficiency of methods, is the entrance into art of what Herbert Marcuse called the performance principle, the manner in which means-whereby are converted into autonomous ends-in-themselves, and evaluated according to detached measurements of technical perfection.  

One last element is needed to complete the basic picture of the liberal humanist theory of artistic quality, the element concerned with meaning. Though the Romantics later deplored the barren, inhospitable precision of the Newtonian cosmos, its originators and spokesmen firmly believed that they were actually discovering what gave the world its ultimate purpose and value. Descartes, Newton, Bacon, the philosopheś and philosophers of the Enlightenment were generally not atheists but fervent believers in a new and idealistic faith known throughout the eighteenth century as deism, or "natural religion". The clockwork regularity that science thought it found in nature convinced Newton, and many of his contemporaries, that the universe had been purposefully constructed by a Higher Intelligence. The immediate implication was that science had uncovered a moral order in the universe, with definite imperatives for human conduct and behavior: (the use of technology for noble aims was one of them. Since a high moral and quasi-religious value was not put on business
professions, engineering, scientific research, law, government and medicine, the arts were expected to make their contribution also. Photography was quickly subjected to these standards of valuation especially because, in the days of its infancy, early fears that it was "an invention of the Devil" had to be discredited. The first mass-produced photographic book, Talbot's The Pencil of Nature (1844), paid due homage to organized religion - of twenty-four plates, eight are of churches or related monuments. One of the first major photographic undertakings, the calotypes of David Octavius Hill (1802 - 1870) and Robert Adamson (1821 - 1847), were commissioned for the sake of recording the "Disruption" of the Church of Scotland (1843). The early French daguerreotypists photographed cathedrals and the Stations of the Cross in Jerusalem.

Contemporary photographers, especially those working in the classical or straight tradition, have often expressed faith in the connections between photography and moral virtue, often in terms that are unconsciously derived from established or natural religion. Yousuf Karsh, who was brought up in a religious household, and who considered a career in the ministry, is perhaps the best example, and books like Faces of Our Time and Portraits of Greatness reflect this background. The famous Sierra Club books are filled with the sentiments of natural religion, as perhaps most strongly expressed by Ansel Adams' speech on the role of photography in conservation:
Pre-Renaissance and Renaissance art was almost entirely based on religious motivation; there was an all-pervading cause. Art was dedicated to the Glory of God. I think it is time that the Glory of God be revived; only now, instead of saints and angels, myths and legends, ritual and dogma, we have the vast and luminous evidences of God in the realities of the cosmos in which we live. We are on the threshold of a new revelation, a new awakening. But what we have accomplished up to this time must be multiplied a thousandfold if the great battles are to be joined and won. Man must affirm his spiritual kinship with the eternity of Nature.  

Another example is Ernst Haas' The Creation (1971), a series of photographs prefaced by the story of Genesis, King James version. In discussing the difference between art and science in the introduction Haas wrote, "Science, while enlarging our view of the solar system, has never solved the mystery of the universe itself. This quest, a spiritual one, has always been within the realm of religion and of the highest forms of art and literature." Or, as Ralph Hattersley put it, "Photography has come closer to being a religion than anything else most of us have ever had."

Natural religion dispenses with the ritual, prejudice, and superstition of "revealed religion", and puts its trust in bringing all mankind closer to God through the dissemination of reason: science, philosophy, technology, education, literacy, a rationalized economy. But behind this all is the distinctly modern belief in progress, a concept largely foreign to the Greek sense
of history as tragic, and the Catholic cycle of sin-and-redemption.
The essential thrust of deism is that man is to work out his own
salvation and scientific knowledge, when not pursued as an end
in itself, became regarded as the key to the perfectability of
human society. For humanists like Descartes and Francis Bacon
there were few foreseeable limits to the growth of scientific
knowledge and its ability to elevate mankind materially and
spiritually. The idea of human history as a progression toward
utopia has been a central theme of liberal humanist thought since
Thomas Moore, and in writers as divergent as John Locke and Karl
Marx ("scientific socialism") one sees its connection to modern
theories of government and education. Progress in human affairs
became identified with the refinement of technology as early as
the Renaissance, though the ties now are so obvious as to seem
invisible - one has to think twice to realize that the declaration,
"A small step for man, a giant step for mankind," is a statement
of faith, one that the cultures of antiquity and the Middle Ages
would have found impious, if not incomprehensible. "Progress"
is still a magic word in contemporary liberal politics ("The New
Deal", "The New Frontier", "The Great Society"), economics (growth,
industrial development, rising standards of living, increasing
Gross National Product), and academe (replacement of "ignorance"
by "knowledge", improved instruments and methodologies, bigger
libraries, more research grants, increasing enrollments). Nothing
short of the threat of ecological disaster has brought about a
widespread reconsideration of our culture's faith in unlimited progress.\textsuperscript{224}

Moving from the sublime to the ridiculous for a moment, the idealization of progress runs rampant through most of the discussion in favor of technology, and photography is no exception. On the contrary, it surfaces here in the rhetoric surrounding the camera as an object of mass consumption. One hates to belabor the obvious but it is all too easy to overlook the deliberately pontifical quality of sales advertising - "Nikon: Elements of Greatness". It is this very seriousness which, presented as facile bourgeois optimist, also accounts for the mildly disresectful tone of voice used by columnists in \textit{Modern} and \textit{Popular Photography} when they evaluate the latest products of their advertisers - manufacturers like the Eastman Kodak Company, "The Great Yellow Father". The language of the ads stress the competence and reliability of the products; the columnists offer a fraternal kibbitzing of the authorities to whom they are beholden for economic survival and an influx of new subject matter. "Automatic focusing: gimmick strictly for the birds or practical possibility? Honeywell says it's real. Yeah?"\textsuperscript{225} Like the shop talk of retail camera salesmen, the jocular skepticism is of course a bluff - no magazine will antagonize its advertisers, and no columnist can be expected to know more about cameras and lenses than the experts who design them. What the columnists act out is not a critique of progress - which would amount to sacrilege - but a guide to
the faithful. Herbert Kepler, editor and publisher of Modern Photography, writes a prototypical column of mini-homilies addressed to the discriminating faithful:

Historically, the human animal has proved to be amazingly gullible in believing the impossible, and yet, many times, what has appeared to be impossible has actually been accomplished. No alchemist has yet turned dross metal into gold, nor has any knight found the Fountain of Youth. But man (sic) does fly, land on the moon, and see the world in his own home in color while sitting in his armchair. In terms of general fulfillment of wild prophesies, it's about 50 percent deliver and 50 percent not.226

Note that the 50 percent delivered refers exclusively to technological accomplishments. The line of demarkation negates non-rational methods like alchemy or magic, or as Bacon would have said, the Idols of Alchemy and Magick. The sermon, a paean of progress, continues:

But in photography, the percentage of success has been incredibly high. Nearly all of our most far-out ravings have come into being. We have color, stereo and instant (well, almost instant) pictures. In SLR hardware (well, you knew I'd getto that), we have compactness, speed of operation, ability to take pictures in any light, and viewing through the lens. Our frame counter counts automatically and returns to zero automatically. Our auto diaphragm closes automatically and reopens automatically, and the rapid-return mirror operates in like manner. We wanted cameras with automatic-exposure control, and lo, we have them. We asked to be relieved of the effort of winding the film and shutter, and this motor drives were born. Camera designers are now busy working to fulfill wants we haven't even wanted yet.227

The next step is automatic focusing. "Why, with it, the
subject would always be absolutely sharp. There would be no chance of human focusing error through bad judgement, bad eyesight or camera movement. What a glorious holy grail to seek!" Camera manufacturers have already "rubbed their magic lamps sufficiently hard to come up with" these devices (Freudians, take note). But human beings will still be needed in photography since "no camera has successfully framed our picture compositionally with creative taste (thank the Lord!)."228

Getting back to theory, the liberal faith in progress carries distinctly moral imperatives with it, imperatives which frequently dovetail with the Protestant work ethic, both in its hostility to the world of matter, and its emphasis on self and community improvement. To the major thinkers of the Enlightenment the removal of all inequalities between individuals, sexes, classes, and races necessitated a thorough, even radical reform of the existing social order in favor of something morally higher; their middle-class supporters went on to see their own struggle against economic privilege as an enabled prototype for all progressive political movements. Liberalism, especially in the nineteenth century, tended to cast all moral questions in the framework of a society which celebrated its highest material accomplishments as symbols of universal progress, which maintained social justice as its historical mission, and claimed altruistic self-sacrifice as its greatest virtue. The essentially moralistic attitudes of
liberalism as a credo are still evidenced in the current rhetoric on war, pacifism, free speech, the legalization of marijuana, abortion, welfare, economic exploitation, civil rights, ecology, and the defense of the Free World against the menace of Communism.229

The implications for photography are manifold since to liberal idealism "the temptation of art to betrayal of the social conscience is irremediable,"230 and art must therefore exist on the defensive. First, any religion of reason must prize intellectual comprehension over creations that speak to the emotions, and art is not a "reliable" form of knowledge in a technocratic society. As Francis Bacon put it, art "doth truly refer to the Imagination; which, being not tied to the laws of matter, may at pleasure join that which nature hath severed, and sever that which nature hath joined, and so make unlawful matches and divorces of things."231 Art can be tolerated only if it has didactic value, if it is educational, or part of a program of "cultural enrichment". Hence, LIFE's promise "to see and be instructed," and Steichen's introduction to The Family of Man, an exhibit which "demonstrates that the art of photography is a dynamic process of giving form to ideas and of explaining man to man."232

Secondly, progressivism inevitably makes social impact the measure of art's value, a problem which did not bother earlier
cultures in quite the same fashion. Cornell Capa, speaking apologetically in *The Concerned Photographer* 2 (1972), felt the need, commonly expressed, to prove that photography could fight the good fight.

No day passes without someone questioning the power of photographs to cause change. As a photographer, I have my own positive opinion. However, in response, simply consider the role of the written word, which has had a longer track record. Has it managed to cause change? Images at their passionate and truthful best are as powerful as words ever can be. If they alone cannot bring change, they can, at least, provide an undistorted mirror of man's actions, thereby sharpening human awareness and awakening conscience.  

Even landscape photographers are moved to write declarations that they are not just "doing their own thing," but contributing to the betterment of society. Minor White used an *Aperture* editorial to answer "the plea made...to photographers. Come to grips, make a statement or a commitment, take a stand in regard to the realities of war abroad and threatening riots at home." Comparing the landscape artist to a monk, White answered that

his photographs are prayers - for the rest of us. He takes his stand, aware of the futility of action. In full consciousness of the insanity of the world, he makes his action; his photographs a prayer. He turns his camera on rocks, water, air and fire, not to escape but to be in life, but not of it (sic). He acts to bring out the concentration of something without which man will blow out his heart.  

Returning one moralism with another, White's reply is a statement that the photographer needs to be as-holy-as-thou,
obeying the call, doing his duty. Perhaps this is why it is so refreshing to read a less guilt-ridden and more mature answer, such as the one offered by W. Eugene Smith after photographing mercury-poisoned Minamata.

Photography is a small voice, at best, but sometimes — just sometimes — one photograph or a group of them can lure our senses into awareness. Much depends upon the viewer; in some, photographs can summon enough emotion to be a catalyst to thought. Someone — or perhaps many — among us may be influenced to heed reason, to find a way to right that which is wrong, and may even be inspired to the dedication needed to search for the cure to an illness. The rest of us may perhaps feel a greater sense of understanding and compassion for those whose lives are alien to our own. Photography is a small voice. It is an important voice in my life, but not the only one. I believe in it. If it is well-conceived, it sometimes works...235

Finally, the hand of the Judaeo-Christian super-ego is felt throughout the debate on photography's formal characteristics, as is to be expected from any medium which has "truth" credited to it as an aesthetic feature. Photographers and critics have generally issued manifestoes not only on what photography actually is, but what it ought to be, especially those defending the purist position. While there may be a number of economically advantageous reasons for insisting on a clear separation between painting and photography, the purists have done so with a means-ends dichotomy that might have pleased a fundamentalist like Calvin. In Protestant theology the means are all-important — good works by themselves do not insure salvation. In the purist aesthetic, like the Puritan ethic, the power of an image is cancelled if the
technique employed was not a pure one. Thus Helmut Gernsheim, a Swiss defender of "The New Objectivity", accuses Moholy-Nagy of philistine indulgence: "The American photographer (Alfred Steiglitz) at least pursued the proper aims of photography, whereas the Hungarian painter was concerned with image-making for his own aesthetic ends."\(^{236}\) "I am all for expressing the spirit of our time in photography, but not at the expense of sacrificing one iota of its characteristics."\(^{237}\) Gernsheim, like all Puritans, seems to fear that someone will have a good time and get away with it: "The danger lies in...seeing in unconventional experiments the signal for a general license to do as they (photographers) please, and pass off sloppy workmanship as creative intention...Flirtation with art only pays for a limited period. Respect for the photographic image will always remain the fundamental principle of good photography."\(^{238}\) Historians like Van Deren Coke and Beaumont Newhall have also refused to deal seriously with images constructed as hybrids of painting and photography, as though the technical "purity" of their creation was an a priori aesthetic value.

Coming full circle now, it becomes apparent that in a culture where professional incompetence is still equated with personal defectiveness, formalism is de facto an aesthetic of moralistic judgement which strenuously avoid any suggestion that artistic connaisseurship relates to hedonistic indulgence. Unlike Freud,
Darwin, Dewey, Marx, the Surrealists, and some of the Romantics, formalism locates the "natural aesthetic impulse" in a philosophically higher region of human thought and action, rather than in the experience of the body, the unconscious, or the unresolved conflicts between performance and pleasure principles. It also distinguishes the fine arts from decoration and handicrafts by the supposed loftiness of their idealistic intent and spiritual elevation. And since what formalists look for in photography is mainly progress, perfection, mastery, and intellectual ideas given material expression - all summarized in the word "truth" - the student of photography is forced to ask whether or not this aesthetic actually repressed the viewer's power to appreciate an image to the fullest.

The real test comes when, with an image before it, formalist criticism is put into operation. A prime example is afforded by John L. Ward, author of The Criticism of Photography as Art, one of the clearest and most thorough statements of formalistic principles applied to photography, and one which avoids the dogmas of the purist position. Among the photographs that Ward scrutinizes is Edward Weston's Bed Pan (1930). In his critique, Ward claims that, "The paradox is that we recognize it as a bed pan - a mundane, even embarrassing object - but we simultaneously perceive it as an unbelievably pure form which rises and swells in space completely untainted by its use." Reiterating, Ward adds that, "The Bed Pan belongs to the same family of forms as
the best of Weston's peppers, shells, and nudes. Like them, it employs sensuousness, even sexuality, in its effects, but the forms are so purified, so raised above the mundane world, that one might better speak of holiness than sex." Comparing Weston with a sculptor of the Athenian Parthenon, Ward concludes that, "Both artists reach a classical purity not by avoiding the specificness and immediacy of physical objects or bodies but by directly confronting, totally embracing, and finally transcending them. The concentrated feeling which the viewer senses in Red Pan is not caused by any direct expression of emotion but by the moral rightness, the authority, the unchallengeability of the presentation." All three of Ward's statements convey the same message: that the tension and excitement of Red Pan has to do with the transformation of a physical thing into an elevated, purified, sanctified, morally righteous abstraction, a pure form which partakes of the sacredness of religion. The mundane, sexual, even embarrassing qualities of the object depicted are said to convey the "effects" of specificness and immediacy, but the truly aesthetic element is seen as an emotionless expression of unchallengeability authority. Ward therefore uses formalism as a "value-free" hermeneutic, a method of interpreting the image, rather than responding to it with his own emotions.

The psychological biases of this type of criticism clearly
stem from the major biases of the larger discourse from which formalism takes its bearings, a discourse which, with its noble image of civilized mankind, is bound to find bed pans, and other references to excretion, irrelevant and embarrassing.\(^2\) Ward's easy and open acceptance of this embarrassment, which rests on a body-mind dichotomy he glories in maintaining, precludes the possibility that the Weston photograph is what it appears to be on the surface—a bold statement of visual eroticism that draws its aesthetic and conceptual power from the deepest regions of natural bodily functions. Ward's reading does in fact deny the insight, which Weston himself might have realized, that children and adults in North American society are generally socialized into feeling ashamed of their genital and excretory organs, and that the Newtonian universe has little room for what Fritz Perls called the "explosive layer" of human emotions—those intense, unpredictable, uncontrollable outbursts of pain, ecstasy, grief, anger, laughter, tears, and orgasms, all of which are more "animal" than "rational" in quality.\(^3\) Ward's assessment of the Red Pan is really an argument that Weston, or at least the image, is part of that very process of sublimation and denial.

The operation of formalist criticism, as far as this example shows, is an almost Augustinian insistence that photographs work by referring to an invisible reality above and beyond the photograph itself, and the object or event it is said to be
representing. This insistence, articulated in the fossilized doctrines of normative idealism, universalism, associationism, imitation, ut pictura poesis, and religiously-inspired morals, is historically and ideologically part of the much older claim that this world, the world of flesh and emotion, is a shadow or inferior copy of an absolute and transcendent reality from which art and life derive their ultimate meaning. Perhaps the most immediate and telling critique of this belief is not just its record as the aesthetic of established social powers, but the fact that, even in its own terms, it makes art itself finally irrelevant - despite claims of autonomous value - to the comforts of religion. The working photographer is therefore brought to question the extent to which formalism, in theory and practice, is unconsciously hostile to the elements in his or her art which are fresh, spontaneous, and courageous affirmations of the world that we human beings actually live and love in.
IV

Image and Essence

The social history of photography, and the source of all of its meanings, has, in this thesis, been ascribed to changes in economic structures, social relationships, technology, epistemology, religion and aesthetics, mostly on the theoretical level. At this point then it becomes more important to relate intellectual discourse to the actualities of social practice, and to show how the ideas that Descartes, Kepler, Calvin, Newton and others were enunciating connect to the experiences of images that European culture was undergoing. Those experiences, which betray a deep ambivalence on the psychological level, can be described as the fetishizing of appearances in a capitalistic society. In this construct the term fetishizing has two overlapping meanings. The first, and root meaning, comes directly from Marx's description of the fetishizing of commodities in a capitalistic economic system, or the process whereby commodities "appear as independent beings endowed with life, and entering into relation both with one another and the human race." In the section of Capital which discusses the division of labor, Marx pictured the separation of producers and consumers which results in a situation where the former never see the final outcome of their labor, and vice versa, so that production becomes an absolutized process. Using an optical reference, Marx accounts for the magical sense of autonomy
that surrounds commodities as displayed in the marketplace:

A commodity is therefore a mysterious thing, simply because in it the social character of men's labor appears to them as an objective character stamped upon the product of that labor; because the relation of the producers to the sum total of their own labor is presented to them as a social relation, existing not between themselves, but between the products of their labor. In the same way the light from an object is perceived by us not as the subjective excitation of our optic nerve, but as the objective form of something outside the eye itself.245

Advertising, which continually obscures the nature and labor conditions under which commodities are produced, is the prime instance of this fetishization.

A second sense of the term "fetish" is the sexual one, which Sigmund Freud discussed at length in his Three Contributions to the Theory of Sexuality. Working with clinical evidence, Freud wrote that,

We are especially impressed by those cases in which the normal sexual object (i.e., person) is substituted for another, which, though related to it, is totally unfit for the normal sexual aim. The substitute for the sexual object is generally a part of the body but little adapted for sexual purposes, such as the foot or hair or some inanimate object (fragments of clothing, underwear), which has some demonstrable relation to the sexual person, preferably to the sexuality of the same... The case becomes pathological only when the striving for the fetish fixes itself beyond such determinations and takes the place of the normal sexual aim; or again, (when the fetish disengages itself from the person concerned and itself becomes a sexual object.) These are the general determinants for the transition of mere variations of the sexual instinct to pathological aberrations.246
Again, attention is drawn here to the process of objectification and depersonalization whereby one aspect of sexual relations is separated out and absolutized to represent all of them.

The emotional super-charge placed upon outward appearances, especially as indicators of invisible inward essences, has already been documented with regard to Newtonian science and Calvinistic religion. The study of the world's ultimate reality, whether material or spiritual, "from the appearances of things" was part of the Renaissance and Enlightenment program in art also. But this method of inquiry is preconditioned historically by the attempts to create a world of fine appearances distinct from and superior to everyday existence, and to bind all sensual experience into the one faculty of vision. This tendency, as expressed in capitalistic societies, seems to have arisen whenever the middle classes began to look socially upward to a courtly aristocracy for their models of fashion, taste, dress, and acceptable behavior. As a historical trend it became evident even before the Baroque, and manifested itself most readily when class lines were blurred or nearly extinguished in the course of economic and political alliances. When capital supplanted land as the primary source of wealth in Europe, the aristocracy often conceded its dependence on the bourgeoisie by ennobling financiers and industrialists. They in turn used their riches to buy into a lifestyle previously
restricted to the upper classes. The results were, and still are, the behaviors associated with upward mobility - snobbishness, pretentiousness, jealousy, envy, conspicuous consumption - all satirized and attacked by the leading novelists of the nineteenth century: Dickens, Balzac, Flaubert, Gogol and others. What these novelists realized was that new money does not buy the birth and breeding of its older predecessors. What the bourgeoisie buy instead are the appearances of a sophisticated and refined heritage, the commodity known as "glamour".

The quest for glamour expressed itself in many areas because of the fact that beauty and handsomeness - the attractiveness between the sexes - was traditionally a class question, aside from the other facts that involve the pursuit and display of social status. Cosmetics, banned by the Church, were reintroduced to Europe by the Crusaders returning from Arabic countries. Their initial cost and rarity meant that aristocratic women were not only healthier, better nourished, and freer from strenuous physical labor, but that they were now able to embellish their looks even more than lower-class women. This state of affairs remained constant until the seventeen hundreds when large cosmetic factories were first established in England and continental Europe, and both sexes were encouraged to the wholesale use of powders, pomades, perfumes, and perukes. The efforts of the upper classes to keep themselves elevated from the merchants, and their attempts in turn
to keep up with the latest fashion, eventually made the extensive use of cosmetics a norm, rather than extreme of social custom. The use of cosmetics was granted such importance that a number of famous beauties died of blood poisoning due to continuous use, despite medical warnings, of leaded face-powder. These practices flourished at the same time that food coloration by means of chemical additives was first begun in Europe.\textsuperscript{249}

The example of clothing is even more dramatic, and the emphasis on appearances accounts for the foppery and dandyism that existed well into the Victorian era. High-heels, pointed toes, stockings, leggings, corsets, wigs, earrings, jewellery, and similar features for men and women alike first appeared during the Mannerist period, as a response to the tremendous wealth and tides of individualism sweeping Italy at that point in history. The extremes of fashion in clothing go from the bustles and hooped skirts of the court of Louis XIV to the twenty-one inch corseted waist of Elizabeth I's ladies-in-waiting. Balzac's story of a woman who drives her husband bankrupt in order to buy a dress to be worn for one evening may have been a fictional tale, but it was hardly an exaggeration. It is also from court life of this period, with its uneasy admixtures of royal and mercantile elements, that one gets the entire gamut of double injunctions to both put on a good appearance ("Clothes make the man"), and not to be deceived by the appearances of others ("Never judge a book by its cover"). The lushness of Baroque art often overshadows the Shakespearean images of life as
an endless succession of conmen, hypocrites, frauds, cheats, impostors and seducers.

As some critics and historians have noted, the photograph often functions as a machine for the mass-production of glamour. One of portrait photography's oldest slogans is, "If you're beautiful we'll take you, if not we'll make you," and studio owners stressed the idea that the lowly could be photographed in the same postures, which the same props and backgrounds as their social superiors. For this reason early daguerreotype studios were veritable museums of high culture,

most elegantly furnished, perfect palaces, worthy of comparison with the enchanted dwellings of Eastern fabulous heroes. Marble, carved in columns, animated by the chisel of the sculptor, sumptuous frames enclosing costly paintings; the feet press without noise the softest carpets; gilded cages with birds from every clime, warbling amidst exotics of the rarest kind, which diffuse their perfume and expand their flowers under the softened light of the sun. This is the American studio.250

The connections to the social elite were made quite explicit. "Suspended on the walls, we find Daguerreotypes of Presidents, Generals, Kings, Queens, Noblemen - and more nobler men - men and women of all nations and professions."251 Even the display of the finished product was part of this process, as daguerreotype pictures "were encased in plastic copies of noted paintings or in carved leather or in stamped papier-mâché as a general rule", depending on the taste and budget of the subject. In fact, "styles
of picture cases usually determined picture costs" more than the quality of the actual images. In this manner photography was made to democratize the canons and trappings of aristocratic portraiture.

It is typical and interesting that the family photo album has its origin partly in the same class-conscious motivations. The earliest albums contain not only portraits of the immediate family but carte-de-visite and photos of political leaders and other celebrities. The idea of carte-de-visite was a visual outgrowth of the upper-class calling card which was an accepted part of social life for over two centuries. The photographic version was first initiated by the Duke of Parma in 1857, spread to Paris when Napoleon III made it fashionable, and reached America two years later when Baron Rothschild was the first so photographed. One American commentator aptly described card photographs as "the social currency, the sentimental 'green-backs' of civilization." Photo albums succeeded card trays and baskets as a method of collecting and presenting these "green-backs". Leafing through the family album became a standard ritual of Victorian home life, and photographs of the Queen, ministers, clergy, and athletic heroes were sources of emulation and identification.

As an important aside, the other origin of the photo album has its roots in Calvinistic morality, as the albums were frequently family Bibles with pockets into which portraits of the family could
be inserted. As a talisman of the family religion the photo album was venerated and kept alongside the Bible. A Montana settler of the 1860's wrote home that,

> Our cabin measured 16x20 feet in the clear. The logs were chinked and painted with clay. The floor was of earth, beaten hard and smooth - a box cupboard held our stock of dishes and cooking utensils. Beside it stood the churn. The flour barrel was converted into a center-table whereon reposed the family Bible and photograph album with their white lace covers.256

That the camera was somehow god-like in function was a commonly expressed opinion during the first decades of photographic history. Throughout the Victorian era the photograph was not spoken of as the work of man or machinery, but as "the pencil of Nature". Being photographed was not unlike the experienced of being scrutinized for one's morality. One photographer, praising his camera, claimed that it was praising his camera, claimed that it was

> truth itself. What he (sic) told me was as gospel. No misrepresentations, no deceits, no equivocations. He saw the world without prejudices; he looked upon humanity with an eye single to justice. What he saw was faithfully reported, exact, and without blemish. He could read and prove character in a man's face at sight. To his eye a rogue was a rogue; the honest man, when found, was recognized and properly estimated.257

The identification of the person with his or her photographic image created a number of superstitious beliefs, some of which still flourish. At the beginning of this century, "in parts of New Hampshire it is considered unlucky to have a photograph
enlarged while the original is still living." In a similar vein, "If the photograph of your husband, taken before marriage, fades, it is a sign that his love for you is on the wane." And if a photograph of someone fell from where it was hanging, it portended sure death for the original subject.

The moral dimensions of this identification also stem from the Eye of God in Protestant religion. Oliver Wendell Holmes (1809 - 94) used the camera as a metaphor in describing how sins committed in secret are eventually unearthed for judgement.

There is nothing that happens, you know, which must not inevitably, and which does not actually, photograph itself in every conceivable aspect and in all dimensions. The infinite galleries of the Past await but one brief process and all their pictures will be called out and fixed forever. We had a curious illustration of the great fact on a very humble scale. When a certain bookcase, long standing in one place, for which it was built, was removed, there was the exact image on the wall of the whole, and of many of its portions. But in the midst of this picture was another - the precise outline of a map which had hung on the wall before the bookcase was built. We had all forgotten everything about the map until we saw its photograph on the wall. Then we remembered it, as some day or other we may remember a sin which has been built over and covered up, when this lower universe is pulled away from before the wall of Infinity, where the wrong-doing stands self-recorded.

Nor was there anything uncommon in Holmes' equation of photography with a kind of immortality. The oldest slogan in studio photography is, "Secure the shadow 'ere the substance fade," and Samuel Morse, a friend of Daguerre himself, used this theme in his advertising:
How cold must be the heart that does not love. How fickle the heart that wishes not to keep the memory of the loved ones for after-times. Such cold and fickle hearts we do not address. But all others are advised to procure miniatures at Professor Morse's Daguerreotype Establishment.262

A few years after Morse wrote this, the daguerreotype industry in America received a tremendous economic boost from the outbreak of the Civil War as, "every boy called into the army wanted momentoes to leave the folks at home and it is more than likely that one or two similar momentoes when with him. More than one card photograph was found among the human wreckage left on the field after the smoke of battle had cleared away."263 At the war's end, a cemetery reform movement in America proposed that daguerreotypes of the deceased be placed on every grave.

If on every tombstone there could be seen the likeness of the sleeper, as with sparkling eye, and noble mien, he walked "a man among men:" or of some gentle lady, whose kindly and generous impulses could be read in every feature of the "face divine:" or of the angel-child, whose joyous laughter, and innocent smile speaks of the loss to its bereaved and loving parents - and of its passage from earth to heaven - how much more inviting would then be the last resting places of the departed, - could we thus seek the "living" among the "dead" and on every tombstone see the living representative of the sleeper.264

It is for all these reasons that the "truthfulness" of the photograph came to have important emotional meanings. As one historian remarked of Victorian portraiture,
could be filled accurately and much more quickly than they could have been without it, however skilled the hands of the fillers.

Though labour was still cheap, many other packers were to follow Horniman's lead by introducing labour-saving devices. By the 1880s, Cadbury Bros of Birmingham could, and did, boast of a packing machine that would measure out 12,000 packets of cocoa in a day (page 21); a decade later, the Quaker Oats Company in Ohio was using a machine that weighed out portions of oats and filled cartons with them at the rate of twenty a minute. One does not need to be a mathe-
There is a religious quality to these early portraits. Being photographed was a rite that was carefully performed. Existence itself was embodied in the image, and it had to be presented with the dignity and balanced propriety that the age gave to all its endeavors. Nothing could be left to chance or spontaneity. Being photographed required a serious and ennobling presentation of the self. For the Victorian, a person was what he seemed. The truest incarnation of "being" was found in the features of a face, in the posture of a body, and in the cut of the clothing. There is no movement. Gestures are at a minimum. These pictures portray their subject through the solidity of flesh, through the lines and expressions that are indelibly traced out in their material features.\textsuperscript{265}

Perhaps one needs to remember the historical fact that photography was invented at that moment in the Industrial Revolution when the rapid urbanization of European cities created the phenomenon of "mass man", the anonymous individual, the face in the crowd that had very few chances for anything but first impressions. The situation of the individual being photographed in a studio setting was not unlike that faced by manufacturers competing for attention on the open commodity market. Since consumers had almost no way of comparing one brand with dozens like it, business in the nineteenth century invented the idea of packaging and advertising, which meant that the outsides of products became more important, and often more expensive, than their inner contents. In a culture which alternately believed in physiognomy - judging a person's character by their face - and phrenology - judging it by the shape of their skull - it is not surprising that the experience of being photographed was fraught with anxiety.\textsuperscript{266}
Yet it would be a facile mistake to think that these attitudes are those of a less sophisticated century. Anxieties about the power of photographic representation still permeate the studio situation, and the Eastman Kodak Company advises professional photographers that, "the ordeal of having a formal portrait done is, to most people, one of the most agonizing experiences."267

The majority of adults who enter a studio for a portrait sitting are only half convinced that this is what they want to do. They enter with trepidation, anxious about their appearance and perhaps about the expense involved. If they manage some relaxation in the waiting room, their tenseness is likely to return at peak force when they face the camera lens. This tension is widely admitted.268

Portraiture, according to Kodak's findings, is rarely a self-initiated activity or exercise in narcissism. It is much more often an other-directed or family venture, which means that portraits will be given to the people who most define the subject's existence: "A person's portrait is intended to please some one else, not oneself."269 And that some one else may also be the depersonalized world of public relations, since portraits are often used for their commodity, i.e. business value. Kodak estimates that, "Business reasons account for thirty percent of all the studio portraits taken of men. Many are used for publicity purposes."270 As a consequence, "adult portraits are more commonly found in certain occupational groups - professional, technical, sales, managerial, and supervisory - as compared with farms,
machine operators, and laborers.\textsuperscript{271} It is therefore among these professional and educated groups that reports a high level of anxiety with regard to sitting in front of the camera in the studio situation. It is in full knowledge of what ends the portraits themselves serve that Kodak advises its professional clients that the aim of photography is not just to flatter, but to "idealize" the subject.\textsuperscript{272} In a society in which public relations grow at the expense of human relations, photography must assume the burden of creating a world of commoditized images. Perhaps the final word belongs to Richard Nixon's presidential campaign manager:

\begin{quote}
We have to be very clear on this point: that the response is to the image, not to the man, since 99 percent of the voters have no contact with the man. It's not what's there that counts, it's what's projected - and carrying it one step further, it's not what he projects but rather what the voter receives. It's not the man we have to change, but rather the received impression. And this impression often depends more on the medium and its use than it does on the candidate himself.\textsuperscript{273}
\end{quote}

This perceptive statement, made by one of the professionals of the business, is a fairly straightforward declaration that the techniques of modern media must be used to create a network of deceptive images whose explicit purpose is to mask disconcerting information. On another level, this statement confirms the argument that photography is constantly used by the institutional guardians of culturally-defined normality, such as the state, church, family, military, and scientific and medical professions.
I myself personally feel that personal jewellery is as committed as my heart... it's a statement all the time I wear it... I'm as individual as I understand about me and the world.
The use of photography as a handmaiden of political authority, the marketplace, and economic privilege surfaces most distinctly, in terms of both style and function, in the kinds of photographs that are made to reflect a socially-acceptable self-image, whether as promise or actuality, i.e., the wedding photograph, formal studio portrait, fashion or advertising lay-out. The supposed "truth" of the photograph in these instances is directly linked to the construction of politically-motivated images of a specific ideology, and it is against this vast construction of artifices that photographs exposing an uncounterfeited reality might then be measured.
Conclusion

This thesis began by asking the relatively simple question of what makes a photograph work, and has touched upon areas in sociology, the history of art and religion, the philosophy of science, and psychoanalytic speculation in search of an answer. The authoritative "truthfulness" of photography was shown to be a product, not just of the image's inherent characteristics, but of a set of cultural experiences and expectations which have to do with various models, primarily scientific, of visual representation. The epistemological core of this theory was then traced in terms of its implications for religion, aesthetics, and social practice. The "truth" of the photograph is a quality which spans from the most cerebral and deliberate interpretations of the photograph as a scientific document, to the anxieties that surface from the unconscious in the studio portrait situation. The "truthfulness" of photography must therefore be regarded, not as an absolute value, but as a phenomenon which assumes different values within specific contexts of meaning.

Finally, the photograph was considered within the framework of cultural attempts to create a world of commoditized and sexualized appearances above the world of unidealized realities. The thesis therefore concludes with the suggestion that the distinctive quality of photography as a creative art form involves the attempts by various individuals to break through this world
of contrived and counterfeited experiences. The precise means by which this has been successfully achieved lies beyond the scope of this particular thesis.
Footnotes

Preface

1 Readers are referred to *Photographer* magazine (formerly *B.C. Photographer*), Summer 1975 to Fall 1977; *West Coast Review*, January 1975 to September 1976; and *Psychocultural Review*, Winter 1978.


3 *ibid.*, p.2-3.

4 A.D. Coleman, "Because It Feels So Good When I Stop", *Camera 35*, Volume 19, Number 7, October 1975, pp.26ff.


8 ibid, pp. 28-29.

9 Though this item might be more suitable for "Ripley's Believe It Or Not", it appeared in an article by Robert Pincus-Witten entitled "Vito Acconci and the Conceptual Performance", in Artforum, Volume X, Number 8, April 1972.


Chapter I: The Photograph and the Icon

14 For a metaphysical overview of formalism see Stephen C. Pepper, World Hypotheses: A Study in Evidence (University of California Press, 1970); for its application to aesthetics, Pepper's The Basis of Criticism in the Arts (Harvard University Press, 1945). For contemporary trends on formalism, see Victor Erlich, Russian Formalism (The Hague, Mouton and Company, 1965), and Ewa

15 *ibid.*

16 Rudolf Arnheim, "On the Nature of Photography", *Critical Inquiry*, Volume I, Number 1, September 1974, pp. 149 - 161. Arnheim's essay deals with 35mm cameras exclusively, and completely ignores the larger, tripod-based formats, a bias which excludes the more formal and constructed methods of photography.


19 *ibid.*

20 Examples might include x-ray crystallography, cloud-chamber experiments, and meteorology.


Vision as experience differs in two important ways from "photographic projection". It does not register the complete set of individual detail contained in the retinal image. Evidence has been given to show that perception does not start from particulars, which are secondarily processed into abstractions by the intellect, but from generalities... Another distinction between retinal image and visual experience concerns perspective. The image created by the lenses of the eye shows the projective distortions of a photograph, whereas in vision not much influence of distance on size and shape is observed. Most objects are seen approximately in objective shape and size: a rectangular suitcase looks rectangular, and distant persons in a room look no smaller than those close to the observer.


ibid., pp.155 - 212.


Nathan Knobler, *The Visual Dialogue*, N.Y., Holt, Rinehart and


31 Arnheim, Toward A Psychology of Art, pp.149-161.


33 The term "ideal type" is defined by Max Weber for use in comparative sociology:

An ideal type is formed by the one-sided accentuation of one of more points of view and by the synthesis of a great many diffuse, discreet, more or less present and occasionally absent concrete individual phenomena, which are arranged according to those one-sidedly emphasized viewpoints into a unified analytical construct. In its conceptual purity, this mental construct cannot be found empirically anywhere in reality.


Perhaps much of the confusion about photography comes from the sloppy use of the word "photographic" as an ideal type; in this work a photograph is an any fixed image made the the purposes of representation by means of a camera, lens, and sensitized emulsion. This includes x-rays and photograms but not the cinema or video.

34 "...the essential features of early Christian art are...: its impulse towards spiritualization and abstraction, its preference
for flat, bodiless, shadowy forms, its demands for frontality, solemnity, and hierarchy, its indifference to the organic life of flesh and blood, its lack of interest in the characteristic, the individual, and the species." Arnold Hauser, *The Social History of Art*, translated by Stanely Godman, Volume I, N.Y., Vintage Books, 1951, p.123.


38 ibid., p.10.


41 H.P.L'Orange *Art Forms and Civic Life in the Late Roman Empire*, New Jersey, Princeton University, 1965.

43 ibid., p. 87ff.


50 ibid., #1, p. 59.

51 ibid.

52 ibid., #6, 7, p. 60.
53 ibid., p.62
54 ibid., #16, p.62.
55 John Scotus Erigena (c.810 - 880), ibid., #22, p.104.
58 Genesis 1:3 2:18, Standard Edition.
64 Tillyard, p.87ff.
65 "It should also be said that a holy image of Our Savior partakes in its prototype" (The Patriarch Nicephonus, c.262), and cf. Dionysus the Areopagite, St.Basil, John Damascene, and others,

66 Hauser I.168-176. 245-253, op.cit.


Chapter II: The Eye as Machinery

68 Hauser I,263 - 4.


71 Tartakiewicz, p.177.


73 Hauser II, p.15.

74 ibid, p.16.

75 Leon Baptista Alberti (1404 - 1472), De Pittura (1435), in Tartarkiewicz Volume III, p.98.

76 ibid., p.139, #14.

77 ibid, p.82.
78 ibid, p.60.

79 ibid, p.111, #17.

80 ibid, p.246.

81 ibid, p.257, #1, 2.


3 Tartarkiewicz, III, p.140.

84 Tyrwhitt, p.92.


86 Godfrey p.7 - 8.

87 Hauser II, p.41ff.


89 Paradiso. Cantos XXX.40 - 42, and XXXIII.100 - 102, translated by Dorothy L.Sayers and Barbara Reynolds, Baltimore, Penguin Books,
1962.

90 Cavendish, p.91.


92 *ibid*.


95 Ronchi pp.78 - 87.


98 Dijksterhuis p.362.


102 Tyrwhitt p.97.


105 Quoted in Koestler, p.476.

106 Foucault p.136.

a critic as Berger neglects to mention the death's head that Holbein painted into the bottom center - his metastatement on what province the ambassadors really came from, i.e. Death.

108 Dijksterhuis pp.396-403; Hall, p.192ff.

109 Foucault p.129.


112 Dijksterhuis p.464.

113 Quoted from Koestler p.344.

114 Dijksterhuis pp.477-491; Koestler pp.504-553; Hall, ibid.

115 Sir Isaac Newton, The Mathematical Principles of Natural Philosophy, N.Y., Philosophical Library, p.446.

116 ibid.

118 Koestler p.537.

119 Hauser II.140-3; Arthur H. and Mina C.Klein, Peter Bruegel the Elder, N.Y., Macmillan Company, 1968, pp.92-95, 162-165.

120 Foucault p.129.

121 ibid., p.132.

122 ibid.

123 The quotation is from Luce's 1936 prospectus for LIFE, reprinted in David E.Scherman, editor, The Best of LIFE, N.Y., Avon Books, 1973, p.3.


127 Robert Payne, Hubris: A Study in Pride, N.Y., Harper and
Brothers, 1960, pp. 84 – 97.


130 Institutes I.xi.1, 2, 4, 9.

131 ibid., I.xi.12.

32 ibid., I.ix.8

33 ibid.


135 Job 38:16; Enoch 18:11; Isaiah 26:19.


137 Wisdom 2:4-5.

138 ibid.

139 Institutes III.ix.2.

140 Institutes III.xxv.12.

141 ibid., III.xxxi.1ff.
142 ibid., III.xiv.1ff.
143 ibid., III.xxiv.10.
144 ibid., III.x.1.
145 ibid., III.x.5.
146 ibid., III.xxiv.1.
147 ibid., III.x.6.
149 ibid., pp. 168ff.
150 See Perry Miller and Thomas H. Johnson, editors, The Puritans, N.Y., Harper and Row , 1965, pp. 729 – 737. The Eye of God on the dollar bill is a Masonic symbol, quite apt for the Founding Fathers who included Washington, the land surveyor, Jefferson, the architect, and Benjamin Franklin, the experimenter in optics and electricity. The expression "Novou Order Seclorum" is the title of one of Bacon's volumes, and the quote, "annuit coeptis" ("He has favored our undertakings") is from Virgil's Aeneid.
To behold, use or perceive any extension of ourselves in technological form is necessarily to embrace it. To listen to radio or to read the printed page is to accept these extensions of ourselves into our personal system and to undergo the "closure" of displacement of perception that follows automatically. It is this continuous embrace of our own technology in daily use that puts us in the Narcissus role of subliminal awareness and numbness in relation to these images of ourselves.


152 "All repressions are of memories, not of experiences...", Sigmund Freud, _The Interpretation of Dreams_ VII., p.509 S.E.; _The Psychopathology of Everyday Life_, Chap VI.134ff.


154 *ibid.*, p.300.

155 *ibid*.

156

English vocabulary, and equally the vocabulary of other Western languages, is conspicuously poor in words for the description of smells and tastes. Even when it comes to the flavor of wine or of a dish, in spite of the great material and historical role of drinking and eating, language is quite incapable of expressing any but the crudest differences in taste. A wine is said to be dry, sweet, robust, fine, full and so on, but none of these words enables one to imagine the flavor and bouquet of the wine. Compared with this poverty of words, the vocabulary for the description of the visible world and its forms and colors is much
richer...For these reasons, the experience schemata for smell and taste sensations are relatively undeveloped.

Schachtel p. 98.

157 ibid., pp. 298 - 299.

158

The children were always put into a regular mode of living, in such things as they were capable of, from their birth; as in dressing, undressing, changing their linen, etc... a regular course of sleeping... (etc.) When they turned a year old (and some before) they were taught to fear the rod, and cry softly... as soon as they were grown pretty strong, they were confined to three meals a day... they were suffered to eat and drink (small beer) as much as they would; but not to call for anything... rising out of their places, or going out of the room was not permitted unless for good cause; and running into the yard, garden, or street, without leave was always esteemed a capital offence.

Quoted in Bogna W. Lorence, "Parents and Children in Eighteenth-Century Europe", *History of Childhood Quarterly*, Volume 2, Number 1, Summer 1974, pp. 1-30 (quotation from page 16). In the same issue see also the article on the childhood of John Wesley. Cf. also Steven R. Smith, "Religion and the Conception of Youth in Seventeenth-Century England", *ibid.*, Volume 2, Number 4, Spring 1975, pp. 493-516. Medieval pediatric authorities recommended sensory stimulation for infants including rubbing the body and limbs with oil, nursing, singing, rocking, and holding the child to keep it warm. See Michael Goodich, "Bartholomaeus Anglicus on Childhood Rearing", *ibid.*, Volume 3, Number 1, Summer
Chapter III: The Aesthetics of the Rational

That which is "according to nature" meant, first and foremost, that which corresponds to this assumption of uniformity...in the most frequent of the normative uses of the term "nature" in the Enlightenment, the principal element in the signification of the word is uniformity. Despite its sixty-odd other senses, it was primarily and chiefly because of this connotation that "nature" was the sacred word of the Enlightenment.

Arthur O. Lovejoy, Essays in the History of Ideas, Baltimore, The


165 Foucault p.131.


167 Quoted from Van Deren Coke, The Painter and the Photograph, p.7.

168 ibid, p.11.

169 ibid.


Thomas Craven, "Art and the Camera", *The Nation* 118, April 16, 1924, p.27.


In *Photographers on Photography*, p.67.

ibid., pp.67-68.


ibid.


Visual literacy skills, especially as defined in high school curricula in New York State, are mostly based on discriminating shape, form, and relative size, and arranging causal events in linear sequences. Comparatively little is said about color, texture, lighting, or emotional impact, or any of the other qualities that might distinguish the "visual language" from the written one. See John L. Debes, "The Loom of Visual Literacy" in *Proceedings of the First National Conference on Visual Literacy*, N.Y., Pitman Publishers, 1970, pp.1-16. In another sense "visual literacy" is associated with the concept of "reading" a photograph as Minor White used it:

Reading is an application to photography of the literary practice of explication - a long-standing method which was greatly elaborated at the beginning of this century through the emphasis which certain critics, such as I.A. Richards, William Empson, T.S. Eliot, and the group known as the New Critics, placed on a thorough analysis of the manner in which a piece of literature "works", how its subject, development, rhyme, etc. interrelate. This elaboration of the use of methodical analysis, ironically, seems actually to have stimulated extravagant and irrelevant interpretations of art works at the hands of insensitive critics. But when explication has been employed with intelligence it has been singularly successful in dealing with the special nature of each art work. As with reading, however, there has been a hesitancy on the part of some explicators to regard value judgement as part of their job.

Ward, *The Criticism of Photography as Art*, p.15. Note that
"reading" implies the performance of a value-free "job".


185 Hicks in Photographic Communication, p.32. Compare the remarks of another LIFE editor:

Photographic books don't appear to the potential buyer to represent the values which buyers must identify in order to purchase. So, you have to overcome the appearance of limited values...To the possible buyer, the subject of the book should meet a need, as a reference book. A book must also have values beyond those which the person gets as he ruffles through it. The average purchaser feels that words represent substantial values. We've been conditioned to this. The photographic book can be so easily consumed that you have to have more than an attractive photographic presentation.

Norman Ross, in Photographic Communication, p.145 (italics added).

186 Walker Evans in Quality, p.171.


188 Foucault p.116.


Samuel Johnson, Rasselas, Chapter 10, quoted from Beardsley, p. 144.

Ernst Haas, in Photographic Communication, p. 209.

Carl Sandburg, "Prologue" to The Family of Man, N.Y., Museum of Modern Art, 1955. See Roland Barthes, Mythologies, G.R., Granada, 1972, pp. 10-102. The same assumptions shaping The Family of Man are used in describing photography as a visual language:

The language of the photographer is truly a universal language in the world. It is unencumbered. One need not be born in a particular country to speak it, nor must one attend a school to read it at a basic level. It is the language most readily understandable to all and our most important form of communication among nations and cultures.

Marvin Koner, "The Photographer's Changing Vision" in Photographic Communication, pp. 59-60. Note that no part of Koner's statement has any support from anthropological or historical research.

TIME-LIFE has, like Diderot, gone heavily into the
encyclopedia business, and covers subjects such as art, history, travel, cooking and photography – all an indication of LIFE's involvement in the information industry.

196 The Best of LIFE, p.25.

197 ibid., p.29, 26, 137.

198 ibid., p.186.

199 ibid., p.109.

200 ibid., p.218, 219, 216.


203 Ward p.32, 50, 66.


205 Edmund Burke, A Philosophical Enquiry, p.112.
Discourses III.163, 167, 172; VIII.306.


John Szarkowski, Looking At Photographs, N.Y., The Museum of


215

The heart of the deist position may be expressed most simply in terms of five cardinal propositions: (a) All men possess the faculty of reason adequate to all the important needs of human life. (b) Reason, the image of God in man, can know God and God's will. (c) Man's duty is to do God's will = man's duty is to seek the happiness of all men. (d) Man has always had this possibility of knowledge of the good, or natural religion. (e) No religion can be higher than natural religion.


216

For it became who created them (the animals) to set them in order. And if he did so, it's unphilosophical to seek for any other Origin of the World, or to pretend that it might arise out of a Chaos by the mere laws of Nature; though being once form'd, it may continue by those laws for many Ages. For while Comets move in very eccentric Orbs in all manner of Positions, blind Fate could never make all the planets move one and the same way in Orbs concentrick some inconsiderable Irregularities excepted, which may have arisen from the mutual Actions of Comets and Planets upon one another, and which will be apt to increase, till this System wants a Reformation. Such a wonderful Uniformity in the Planetary System must be allowed the Effect of Choice.
Sir Isaac Newton, Opticks, p. 376.

The wish to capture evanescent reflections is not only impossible, as has been shown by thorough German investigation, but the mere desire alone, the will to do so, is blasphemy. God created man in His own image, and no man-made machine may fix the image of God. Is it possible that God should have abandoned His eternal principles, and allowed a Frenchman in Paris to give to the world an invention of the Devil?

Leipziger Stadtanzeiger 1839, quoted in Gernsheim and Gernsheim, The History of Photography, p. 72.


219 Yousuf Karsh, In Search of Greatness, University of Toronto Press, 1969, pp. 7-9. See the passages accompanying the portraits of Marian Anderson, Marc Chagall, Albert Einstein, Martin Luther King, etc.


Art is politically suspect - I mean, from the liberal point of view - not only because it evokes and plays upon moods of sensuality and passivity; not only because every creation involves a descent, at least temporary, into superstitions, fixed ideas, perverse fantasies, self-hypnosis, and other outlived areas of the psyche; not only because, no matter what advances are scored by science, technology, and social organization, art must still be fabricated by hand by a single individual in a manner no more efficient than in the temple of Pharaoh or a medicine man's hut. Art is above all suspect because its inherited reactionary tendencies, it
constantly arms itself anew against the world of fact; since for there to be a work of art, some degree of reality must have been conceded to form. In short, the temptation of art to betrayal of the social conscience is irremediable.


231 Quoted in Beardsley, p.170.


235 W. Eugene Smith, Minamata, N.Y., Alskog-Sensorium, 1975, rear cover.


237 ibid, p.204.

238 ibid.

239 Ward p.322.

240 ibid. p.32-33.

241 ibid. p.34.
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244 Karl Marx, Capital, translated by Samuel Moore and Edward Aveling, N.Y., Modern Library, 1906, p.83.

245 ibid.


247 See especially Dickens' Martin Chuzzlewit; Balzac's Pere Goriot; Flaubert's Madame Bovary; Stendhal's The Red and the Black; Gogol's Dead Souls; and of course Moliere's Le Bourgeois Gentilhomme.


51 Rudisill, p.200.

52 *ibid.*


56

57 Taft, p.138

58 *ibid.*, p.250.


60 *ibid.*

61 *ibid.*

62 The Works of Oliver Wendell Holmes, Standard Edition, Boston,

63 Rudisill, p.132.

64 Taft, p.240.

65 *ibid*.


69 *ibid*.

70 *ibid*.

71 *ibid*.


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