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The progression of photographic image manipulation in communication: An argument against the "revolution" of technological change

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Wood, Cynthia Lynn, M.A.

University of Nevada, Las Vegas, 1992

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THE PROGRESSION OF PHOTOGRAPHIC IMAGE
MANIPULATION IN COMMUNICATION:
An Argument Against the "Revolution" of
Technological Change

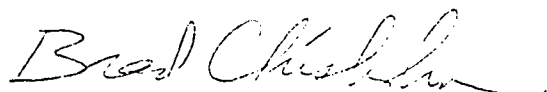
by
Cynthia Lynn Wood

A thesis submitted in partial fulfillment
of the requirements for the degree of

Master of Arts
in
Communication Studies

Greenspun School of Communication
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December, 1992

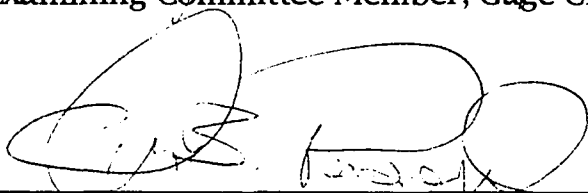
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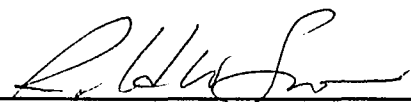
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Abstract

The technology of photographic image manipulation has evolved faster than our ability to consider its implications. This thesis looks at the recent evolution of image manipulation, which some regard as a "revolution." The various stages of technological progression are examined using examples according to Brian Winston's model of technological change. These stages include: scientific competence, ideation, prototypes, supervening necessity, invention, the 'law' of the suppression of radical potential, and technological performance. A review of literature on the topic of photography in communication is included as well as an examination of the early photographers who used image manipulation in their work. A discussion of the "revolution" theory verses the "steady progression over time" theory is presented. The thesis concludes with a discussion on the impact of the current technological capabilities upon the viewers, which results in a change in our understanding of photographic reality.

Table of Contents

Abstract	iii
List of Figures	v
Acknowledgments	vi
Chapter One: Introduction	1
Definitions	3
Image Manipulation	5
Winston's Model	8
Current Debate over the Implications of Photography	11
Outline and Procedure	15
 Chapter Two: Phase One: Scientific Competence	 18
 Chapter Three: The Ideation Transformation	 26
 Chapter Four: Prototypes and Beyond	 45
Second Transformation: Supervening Necessity	48
Phase Three: Invention	50
The Third Transformation: The 'Law' of the Suppression of Radical Potential	53
Phase Four: Technological Performance	57
 Chapter Five: Progression or Revolution?	 62
Conclusion	65
 Works Cited	 71

List of Figures

Figure 1	Winston's Model of Technological Change	9
Figure 2	Model: Scientific Competence	18
Figure 3	Model: Ideation Transformation	26
Figure 4	O.G. Rejlander, "The Two Ways of Life, 1857	29
Figure 5	H.P. Robinson, Preliminary Sketch with Photograph inserted, c. 1860	31
Figure 6	H.P. Robinson, "Fading Away," 1858	33
Figure 7	E. Steichen, "Rodin," 1902	39
Figure 8	A. Stieglitz, "The Steerage," 1907	41
Figure 9	P. Strand, "Wall Street," 1915	42
Figure 10	Model, Prototypes	45
Figure 11	Model, Supervening Necessity	49
Figure 12	Model, Invention	51
Figure 13	Model, The 'Law' of the Supression of Radical Potential	54
Figure 14	Technological Performance	58
Figure 15	S. Seeger, Title unknown, 1991	60

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Chapter One

Introduction

People throughout history have used images to depict their world, and to communicate their experience to others. Technology has allowed communicating with images, particularly photographs, to develop into a large part of our culture. Today, people rely upon photographs to provide them with information about the world. The ability of the photograph to communicate a complex message is used commonly in advertising, journalism, education, business, and scientific study, among others. Interestingly, the technology of photography has always evolved faster than our ability to consider its implications.

There are currently many people who feel that the technology of photographic image manipulation has evolved dramatically within the last few years. The term "revolution" is being used to describe the recent developments in photography. It is anticipated that we will soon not use images in the same way, nor will photographs be considered a viable documentation of a scene due to the virtually undetectable manipulation capabilities.

Few scholars have conducted research on the ability of the photograph to communicate, or on how the continual changes in

photographic technology will affect the way our society communicates in the future. Much of the existing research addresses the age old discussion of photography in comparison to painting. However, among those who do discuss photography as a separate medium, there is little agreement (Barthes 1981, Brook 1986, Sontag 1977, Wicks 1989). While these studies are interesting for abstract or philosophical thinking, they do not consider the current dilemma in the use of technology for image manipulation.¹

This thesis looks at the recent evolution of image manipulation, which some regard as a "revolution." The various stages of technological progression are examined using examples according to Brian Winston's model of technological change. Winston's model, a schema for understanding technological change put forth in 1986, is more sophisticated than previous models. This model is used to support the argument that there has been a steady progression of technological development over a period of time, not an over-night revolution. The thesis examines the early photographers who used image manipulation in their work, comparing their theories with those who opposed their practices. Where possible, examples of the images discussed are included.

The objectives in analyzing manipulated images in photographic communication are: 1) to conduct a thorough review of literature in order to establish a base from which to build, 2) to provide a summary of scientific achievements and research that has contributed to today's technological capabilities in photographic

¹ The topic of image manipulation and its ramifications upon society is discussed by Fred Ritchin, 1990.

image manipulation, and 3) through the application of Winston's model, analyze the digital "revolution" in the photographic industry, concluding by 4) further expounding upon the relationship between photography and communication. It is also the intent of the author to bring about an awareness of the technical capabilities currently available to create any type of image photographically, whether based on reality or completely fabricated.

It should be noted for the reader that this thesis does not attempt to discuss the entire history of photography, nor does it address image manipulation from a sociological perspective. The primary area of concern is the manipulated image and how it has progressed both technologically and conceptually in communication. The historical information and the arguments presented address those inventions and processes specifically contributing to image manipulation. A common ground between the past and the present image manipulation issues are established through the application of Winston's analytical model. After considering the history, the progression of technology, and the current discussions, the question is posed: Is our understanding of photographic reality on the verge of a fundamental and irreversible change?

Definitions

Definitions are included at this point in order to establish a common basis from which to build the thesis. There are many variables when discussing imagery, photographic or otherwise. In

the following definitions, these variables are either included or excluded in an attempt to narrow the scope of the topic.

To clarify for the reader, a *photographic image* is one that has been acquired with a camera. The resulting image can be captured either electronically (analog or digitally), or with sensitized materials such as film, glass plates, etc. Images created entirely with a computer, without the input of an original camera image, are not considered photographic images for the purposes of this thesis. This is differentiated here because an image created entirely with computer graphics may be recorded onto photographic film, thus appearing to be a photographic image.

A *straight photograph* is considered one that is a representation of the scene itself as the photographer viewed it without intervention. It is a single negative, or transparency, printed to the highest quality available to the photographer. Photography has gone through stages where straight photographs were the accepted technique. During these periods, the alteration of photographic images was considered an inferior technique. Prints that were considered straight images may have been printed using different methods, thus appearing slightly different due to the varying approach of the printer. Some of the widely known images that would fall into this category are those taken by Ansel Adams or Edward Weston. For example, the Adams' image "Moonrise over Hernandez" has been printed by several people over the years using different materials. However, the objective of these prints is to reflect the original scene as accurately as possible, not to alter the scene or combine the image with other images.

A *manipulated photograph* is considered an image that may be made up of a single image or multiple images combined into one final picture. The photographer, printer, or computer operator may have altered the inherent qualities of the scene in some way after the image acquisition. Physically altering the original scene before capturing the image is not considered within the scope of this definition of image manipulation. This is because changes in the actual scene before the image is created has been a practice from the onset of photography and is still a practice for those using any type of photographic capturing device. This has little affect upon the technological capabilities of photographic equipment and how the images are manipulated after they are captured.

IMAGE MANIPULATION

The practice of photography began in the early 1800's primarily by scientists. As methods became easier, more people began to create ways to use these new images. The two main approaches in methodology by the end of the nineteenth century were the Daguerrotype and the Calotype (Rosenblum 194). The first was an image on a glass plate which was viewed by placing backing behind the glass. The second was a glass plate which after exposure and development, was placed in contact with sensitized paper, resulting in a photographic print. The latter became the principle behind the negative and print method employed by most

photographers until recent times. The early cameras were very large and cumbersome. Some designs were on carts with wheels, others were large boxes requiring two people to set-up. Improvements made the boxes smaller, allowing a single person to handle the equipment, however, a large tripod was required to hold the cameras motionless.

Shortly after the turn of the century, the first hand-held cameras became available. This is attributable to the development of more sensitive films and less bulky equipment. This marked the beginning of the "snapshot" or the candid image. Such photographers as Paul Strand, Alfred Stieglitz, and Lewis Hine were key contributors to the development of photography into a widely used communication tool (Rosenblum 267).

Image manipulation, first came into being after the year of Daguerre but before hand-held cameras. In the 1850's, O.G. Rejlander created a very controversial image titled "The Two Ways of Life." He used a combination printing technique to arrive at a complicated final image (Rejlander 78). This was accomplished by exposing two or more negatives and printing them on a single sheet of photographic paper. Another such experimenter was Henry P. Robinson. He had a similar philosophical approach to Rejlander, but utilized different techniques to create his final images (May 10, Robinson). Both photographers received criticism for their use of the photographic medium in this manner. There were those that felt a photograph should not have the qualities of a painting, but should be a straight representation of the scene photographed. Rejlander and

Robinson were just two of the early pioneers in presenting a story or message through their photographs utilizing image manipulation.

The first World War accelerated the need and use of documentary photography. This type of photography did not employ manipulation techniques. In fact, it was during this time through the 1930's when straight photography became the accepted approach to the medium primarily due to Modernism. The prevalent thinking and influence from the art world was evident in advertising and journalism which contained industrial scenes, documentary scenes of people and their way of life, and other images which conveyed a glimpse of "the way it really is." The popular practice of making a photographic image or print appear as close as possible to the original scene was the Modernist approach. People began to rely upon the photographic image as a view of reality in a past time. The popularity of the straight image continued well into the 1970's.

During the 1960's, Modernism waned, particularly in the art world. Post Modernism brought about new attitudes towards photography. One photographer who began creating manipulated images in the 1960's was Jerry Uelsmann who continues to use similar techniques to those of Rejlander, 100 years prior (Uelsmann). During the 1970's, several photographers incorporated techniques of image manipulation into their artwork. However, image manipulation was not common outside the artworld with the exception of advertising retouching on models, products, etc., using mostly non-photographic techniques.

The late 1980's and 1990's produced new technology that has changed photography and the manipulation of images once again.

The graphics capabilities of computers provide a new array of possibilities for image manipulation. Image digitization provides the computer operators, whether they are the original photographers or not, with endless capabilities. Film is no longer required to capture still images, and photographs may be transmitted over telephone lines to anywhere in the world. The technology is still changing rapidly in this area of communication (Ritchin 4).

Inventions originally intended for other purposes are now incorporated within image manipulation techniques. Many of these were applied to the photographic process during the 1980's and 1990's. These include the development of video and computer technologies, electronic imaging devices, and film recording devices. Many stages of scientific research contributed to the technology available today as well as to the knowledge for new applications of technology. It is these phases that Winston addresses in his model of technological change which are used in this thesis.

WINSTON'S MODEL

Brian Winston, in his book Misunderstanding Media, describes a model with which to measure technological changes within an industry over its history (See figure 1). It is this model that is used to analyze and demonstrate the steady progression of the photographic technology contributing to image manipulation. Winston's model draws connections between events within

technological developments which may not follow a chronological pattern.

The purpose for Winston's model is to provide a tool for analyzing changes which occur. Some technological achievements are viewed as "revolutions," such as the alleged "information revolution" we are now said to be experiencing. Winston defines the term "revolution" as that which goes through "alteration and change," and states that the word is over-used.

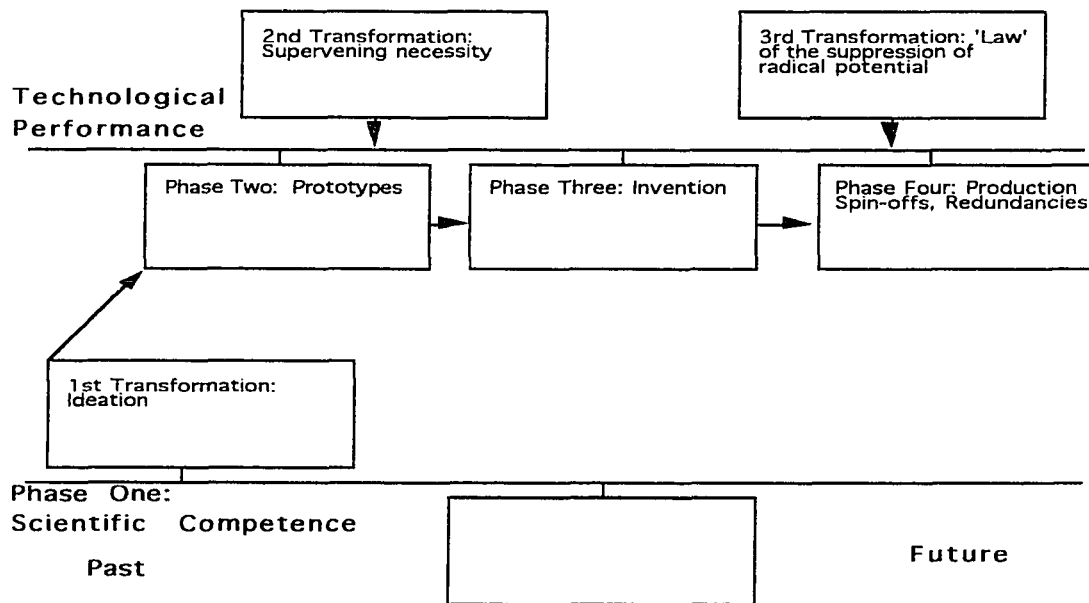


Figure 1. Winston's Model of Technological Change

The model has several categories or phases contained within two parallel timelines. The first timeline runs from past to present

and contains phase one: "Scientific Competence." This includes the scientific principles established centuries ago (18). Phases are considered categories that are acted upon and transformed. The second timeline also runs from past to present, and contains the phases and transformations which make up "Technological Performance."

Transformations move technology from one phase to another. During the first phase of scientific competence, the first transformation occurs. This is called "Ideation." This is the transition from science to technology. Thus, technologists become involved, instead of scientists. The transformations can interact with the phases and also occur simultaneously with them.

The next step in the progression is in the area of Technological Performance. This consists of three phases: Prototypes, Invention, and Production. In the prototype phase, (considered the second phase in the model), the technologist starts to build those items that developed from the ideation transformation. During the prototype phase, the second transformation occurs, that of "Supervening Necessity." This is the social need for the items. The prototypes become "inventions" in this transformation.

The third phase is "Technological Performance: Invention." This is the next step in the progression from the prototype to actual items that are produced to fill a need.

The fourth and final phase is "Production, Spin-offs, and Redundancies." This occurs in conjunction with the third transformation, "The 'Law' of the Suppression of Radical Potential." The "law" consists of the various social constraints that may prevent

an item from "radically" changing our current lifestyles. This is a balance system for the production phase of an item. The spin-off development period occurs when items are produced as a result of the technology from the design of the original item. The redundant items are rejected from widespread production.

CURRENT DEBATE OVER THE IMPLICATIONS OF PHOTOGRAPHY

While the technological capabilities provide opportunities in communication, human beings are the senders and receivers of that visual communication. Some scholars have theories about how communication is achieved using photography. Roland Barthes suggests that photography has the potential for raising metaphysical questions and also has the communicative ability to provide information about a subject at a certain point in time. As discussed in Camera Lucida, the photograph causes the viewers to realize the existence of things past and to question their own existence. This occurrence is primarily attributed to the subject matter within the photograph instead of the process itself. However, because the subject had to exist in order for the photograph to exist, unlike painting, photography has a unique ability to communicate the passage of time by revealing subjects in a past moment. This corresponds with the theory that the photograph is transparent, that the viewer sees through the photograph to the subject matter. It is interesting to consider what is revealed to the viewer if the image is

a manipulated photograph which actually may not have existed at all, or perhaps existed in an entirely different setting.

Donald Brook in his article "On the Alleged Transparency of Photographs" challenges the theory supported by Barthes, that photographs, like pictures, are not transparent. He defines a picture as "an artefact [sic]. . . that represents a subject in a quite specific way" (278). He proposes that pictures represent things in three ways. These are symbolism, exemplification, and simulation. He argues that a picturing convention is used to create order within our visual sensories. While certain conventions are widely accepted, there are always exceptions to these rules which Brook refers to as "radical ambiguity." This position supports the concept that photography has the ability to communicate beyond the subject matter itself and that people have the capacity to view and comprehend this through the use of pictorial conventions. This theory is supported by the use of manipulated images because it relies on the viewer to receive and understand the message communicated by the image, even though it was fabricated electronically, and may not have actually existed.

Research has been conducted by Nigel Warburton addressing the communicative ability of documentary photography. In his article "Photographic Communication," he asserts that documentary photography is used to provide meaning through interpretation thus refuting Susan Sontag and Neil Postman's theories. According to Warburton, Sontag argues that photography cannot narrate, that it can only reveal how things or people appeared at a certain point in time, and that photographs cannot convey moral knowledge. Postman

asserts that photography simply documents someone or something without communicating disputes or conclusions resulting from them. This is supported by his concept that all photography is documentary. Warburton refutes these theories by stating that they do not "take into account the fact that both descriptions and depictions of states of affairs at an instant almost always imply facts about what has gone on before and about what will probably ensue" (176). He further points out that providing there is appropriate context, not unlike a word is set in the context of a sentence, documentary photography is used to provide meaning through interpretation. He draws upon Barthes' ideas which support the context argument that the documentary photography is a part of a larger communication system that ultimately determines its meaning.

Warburton in this way supports the theory that photographs imply facts in an historical manner, thus providing the possibility of interpretation. While this is a different approach to photographic communication, it is noteworthy of consideration within the thesis. Warburton has narrowed his study to concentrate solely on documentary photography. This type of photography has been, and will continue to be, greatly affected by the technological advances in photographic communication.

In their book, The Telling Image: The Changing Balance between Pictures and Words in a Technological Age, Duncan Davies, Diana and Robin Bathurst, discuss the history of images in all aspects of communication, including mathematics, the sciences, and education, and their role within society. They trace communication

back one billion years and show a progression of methods and uses to the present day (34). The technological advances are discussed. One point made regarding this is "elaborate equipment can become an end in itself, and produce results that are technically superb but lacking in content" (52). When considering the future, the authors select to analyze a list of activities that "pictorialization can encourage or create, and to examine likely new trends" (132). These activities include "simulation; measurement control; demonstration, illustration, explanation, display of the invisible, decoration and entertainment, education; exploration and investigation, research, recording and storage of information; and communication and collaboration" (132). They state in their conclusion that verbal and numerical communication must work in conjunction with pictorial communication in the future (153).

Fred Ritchin, in his book In Our Own Image: The Coming Revolution in Photography, regards the use of computers for photographic manipulation a part of the "revolution" occurring today. He presents many examples of primarily photojournalistic image manipulation. He discusses the ethical considerations for the recent technological advances, presenting opposing opinions regarding altering news photographs and the resulting impact on the viewer. Ritchin feels that "photography's linguistic potential has not been adequately valued or assessed, while its facile connection to reality has been overstressed" (7).

Through the application of Winston's model, this thesis argues that the technological advances in photography are not actually a "revolution" as Ritchin refers, but a natural steady progression of

ideas and capabilities. Each step of the model is discussed as it applies to photographic image manipulation. This provides a basis to argue against the position held by Ritchin, that technology is rapidly evolving, and that there is "a revolution in image-making underway" (3).

OUTLINE AND PROCEDURE

The methodology of this thesis involves studying historical literature, current technology related literature, and literature concerning the theoretical debate on this issue. The author's experience working with both traditional, and state-of-the-art electronic photography equipment is a contributing factor. The historical literature provides the data for the historical overview of the manipulation of photographic images. From this, definitions are established for the key concepts addressed in the thesis. The review of current technology related literature also involves research into the use of manipulated images in communication in recent times. The debate regarding the use of image manipulation and photographic communication in general found in recent literature as well as historical literature is the basis for a discussion of related theories.

The second chapter of the thesis consists of the application of Winston's model to the early photographic developments for the purpose of analyzing technological evolution and change. The scientific research and achievements that contributed to

photographic image manipulation technology is summarized. This provides the basis for further analysis.

The third chapter discusses the use of image manipulation in a historical context. The first experimenters in photographic image manipulation is presented. Their theories are compared with those who have opposing theories. A progression of manipulation and straight photographic practices up to the current day is included.

In the fourth chapter, the recent technological developments are applied to Winston's model for analysis. The current capabilities and their impact is discussed as well as proposed developments for the near future.

The fifth chapter presents a comparison of Winston's methodology with the contention that a "revolution" is occurring within the photographic image manipulation industry. The benefits of considering the historical implications are discussed. The "revolution" argument is examined.

The conclusion reveals how through the use of Winston's model, there is continuity in the progression of image manipulation throughout history and that it is not actually an over-night occurrence. It also includes a brief look at the current uses of photographs in communication. This leads to a discussion of future possibilities using photographs to communicate. The conclusion includes these possibilities along with a discussion of the impact of the technological capabilities upon the viewers.

It is the anticipated conclusion that because photography has the ability to communicate complex messages, the increased use of manipulated images creates new ramifications. Photography is

unique in that it can represent a subject while also communicating information about that subject that is not inherent within itself. The development of technologies that allow virtually undetected changes to be made to photographs of actual scenes opens up a new arena of visual communication. This is such that the viewer will never know if "the camera never lies." Consequently, today's viewer must become more sophisticated in order to keep up with the messages which are being communicated visually.

Chapter Two

Phase One: Scientific Competence

In order to develop the theory that the current "revolution" in visual communication is not in fact a revolution, but a steady progression of scientific research and technological developments, one must consider the history of the various elements involved with image manipulation. Scientific Competence in this instance refers to those areas of scientific study from the past that have contributed to the technological progressions of image manipulation (see figure 2).

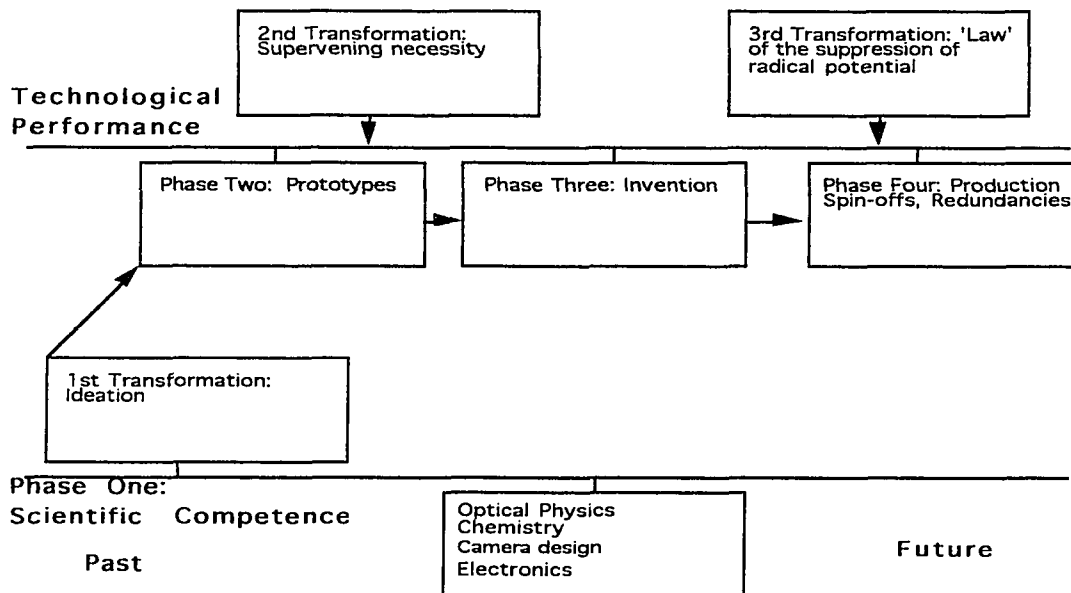


Figure 2. Scientific Competence

Photographic image manipulation is a process which derives from many disciplines in scientific study. It requires the practice of photography, and currently may utilize computers. Some of the key disciplines that provide a knowledge base and skill for photography include optical physics, chemistry, and electronics. A general overview of the scientific accomplishments in photography is included. While the development of computers will not be attempted within the scope of this thesis, a few critical points will be addressed later.

One common element to all of the techniques of image manipulation is the camera. Significant improvements have been made since the first cameras were designed. The most simple design consists of a small hole in a box, the pin-hole camera. From this point, lenses are incorporated. These can be single lenses or combination lenses consisting of several elements combined to produce different focal lengths. Further recent developments include auto-focusing and variable focal-length lenses.

Shutters were an important improvement to the camera. The shutter is a mechanical device designed to block the light from hitting the film, then open to allow the light to pass through during the exposure and then close at the end of the exposure. This replaced the technique of removing the lens cap for the duration of the exposure, then placing it back over the lens. Shutters have been made from a variety of materials and designs. The early shutters were constructed from cloth, metal or wood, and string or rubber

bands. The designs varied from flap or drop, to sliding plates or a window shade design (Rosenblum 447). Shutter materials have since progressed to aluminum, and titanium, among others. Several of the original designs are still in use today, including the focal plane shutter and the leaf shutter.

Another aspect of the camera to be developed was the single-lens reflex design. The early cameras and modern large-format cameras are designed without mirrors, therefore the images appear upside-down and backwards. The single-lens reflex design contains a series of mirrors which are placed inside the camera to reverse the image for the photographer. This allows the photographer to look into the camera and see the scene just as if it were not being viewed through a lens. Most small and medium format cameras today are made with this design.

The ability to measure light for determining exposure time was an important development. Chemical meters, called actinometers, and optical light measuring devices were the first to be developed and used (Rosenblum 448). Hand-held photoelectric cell meters were widely used by the mid-1900's, and were more accurate than the previous designs. Most contemporary cameras are designed with a built-in metering system. These systems have become very sophisticated, giving the photographers several choices in metering techniques, including a memory capability.

The camera and the various components required to obtain images progressed through many stages before becoming what is available today. The scientific research which contributed to the development of these stages has been ongoing for centuries. The

following is an overview of the various areas of scientific research which lead to the current capabilities.

Throughout history, there has been a fascination with the study of light and reflections. Optical physics, consisting of the study of lenses and the refraction of light, was the first scientific discipline to develop in photography. Without this preliminary investigation, the acquisition of images and consequently image manipulation, would not have evolved.

The use of mirrors made of polished metal and glass dates back to the Mesopotamian cultures in the 1500's BC (Williamson and Cummins 2). However, the scientific study to explain these phenomena occurred comparatively recently. Early experiments with mirrors and lenses were conducted in England in the 1160's by Robert Grosseteste (Hellemans and Bunch 76). The use of mirrors to reflect light and lenses to refract light provided a new understanding to Grosseteste about the nature of light and our own vision. These studies, as well as those similar from around the world, contributed to the development of the tool referred to as the Camera Obscura.

The Camera Obscura became a familiar item to artists, draftsmen, and scientists in the mid-1500's. Giovanni Battista della Porta was the first to describe this design as tool for drawing in 1553. It began as a darkened room with a small hole which allowed a projected image to be seen on an opposite wall or sheet of paper. As lenses were incorporated with this design, introduced by Daniello Barbero in 1568, the image could be directed to a desired location or sized for easier viewing (Newhall 9). Later, the Camera Obscura became portable and was widely used as a drawing aid.

A significant contributor to the principles of lenses was Hans Lippersley, a Dutch scientist. In 1608 he constructed the first telescope. He is also credited with one of the first microscopes in 1609, however, Zacharias Janssen is credited with the original in 1590 (Hellemans and Bunch 121, 125, Williamson and Cummins 11). These creations enabled other scientists to explore new avenues of the recently established light refraction principles. These principles were built upon to create better quality lenses, eventually leading to the combination of lenses used in photography.

The development of lenses provided a new way of looking at things for the scientists of this time. As improved lenses were used in the Camera Obscura, mirrors were added to increase its range of capabilities. This allowed the light to be reflected off of a mirror placed at the proper angle through a lens and onto the paper for the artist to view. This same basic design, though in a different context, is still used in single-lens reflex cameras today.

Optical physics also incorporates the study of light itself. Study of the electromagnetic spectrum contributed to our understanding of light and its behavior. Many early scientists theorized about the qualities of light. However, it was not until the mid-1600's that these theories which are the basis for our current scientific principles were proposed.

Experiments were conducted by Isaac Newton in 1665-6. Based on his studies with glass prisms and the visual spectrum of light, he established new theories of how light reacts and what color actually is. His theories included the "refrangibility" of light and also how white light was made up of many colors combined. Up until

this time, the accepted belief was that colors were made up from a combination of black and white light (Williamson and Cummins 4,11).

The study of lenses and light were not enough to bring about the practice of photography alone. During the seventeenth century, research was begun on the various chemicals that would be later used in photographic processing. Such chemicals included silver nitrate, silver chloride, and ferrous salts.

While experimenting with silver nitrate, professor Johann Heinrich Schulze, from the University of Altdorf, accidentally discovered that silver nitrate reacted to light. The substance would darken when exposed to sunlight without heat as a contributing factor. This was a very important step towards developing materials which would capture images on film. His findings were published in 1727 for the Nuremberg Academy of Natural Philosophers (Newhall 10, Roseblum 193).

It was not until the mid-1700's that the light sensitivity quality of silver chloride was discovered by an Italian, Giacomo Battista Beccaria. In Sweden, the same discovery was made independently of Beccaria by Carl Wilhelm Scheele in 1777. From this point on, testing was done to determine the reaction of silver chloride to various amounts and qualities of light.

It was Thomas Wedgwood who was the first to attempt to use the light sensitive chemicals to record an image using a camera as a tool sometime around the turn of the nineteenth century. He applied silver nitrate to paper and leather, then contacted objects or hand drawn transparencies. He attempted to utilize the camera obscura,

but was disappointed with the results. There was no method of fixing the image so that it would last (Newhall 13, Rosenblum 194).

Joseph Nicéphore Niépce, a French inventor, developed a technique to record direct positives on pewter or glass plates using a bitumen process. Niépce was using a small box with a lens to conduct his experiments, some of which were dated 1827. He referred his plates as 'Heliographs' (Newhall 14).

Niépce visited a painter, Louis Jacques Mande Daguerre, in Paris in 1827. Daguerre was experimenting with similar processes as Niépce at the time. They became partners, and continued to research the use of plates to record images. Niépce died four years later and Daguerre continued the experiments. In 1837 Daguerre had achieved a "successful photograph" on a silver-plated copper sheet. He used silver chloride to stop the reaction to light once the exposure was completed (Newhall 18).

Meanwhile, Henry Fox Talbot, an English scientist, had invented a process similar to Daguerre's, although not published yet. Talbot experimented with solutions that would capture an image on paper. This was actually a negative. In 1835 he described how this negative could be reversed. He also had developed a method of fixing the paper to retain the image using potassium iodide or strong salts. He used the Camera Obscura to expose the paper negatives to light. Talbot referred to this process as "photogenic drawing" (Newhall 20, Rosenblum 195).

In 1841, Talbot announced the "Calotype." This was an improved version of the earlier design. The idea behind the improvement was that the latent image on the paper could be

developed chemically, not requiring the long exposures of light to alter the silver salts. This lessened the exposure time considerably (Newhall 43). It is this principle that the resulting process improvements have built upon. These negatives were then printed on paper by contacting them. The calotype process became widely used for landscapes, architecture, and some portraiture.

These people, along with many others, contributed the scientific foundation required to establish photography as a feasible, and attainable practice by the beginning of the twentieth century. From the first curiosities of the principles of light to the actual capturing of images on paper, at least 700 years passed by. Once certain basic principles were established, the science of photography moved rather quickly, thus progressing towards technological innovation.

Chapter Three

The Ideation Transformation

Once the Scientific Competence for technology is established, as the second chapter addressed, the first transformation occurs. This is referred to as the Ideation transformation. According to Winston, "transformations address the operation of factors external to the actual performance of technology, factors which work to transform a scientifically grounded notion into a widely diffused device" (17). Winston includes three such transformations in his model (see figure 3). The first being the Ideation Transformation, which he describes

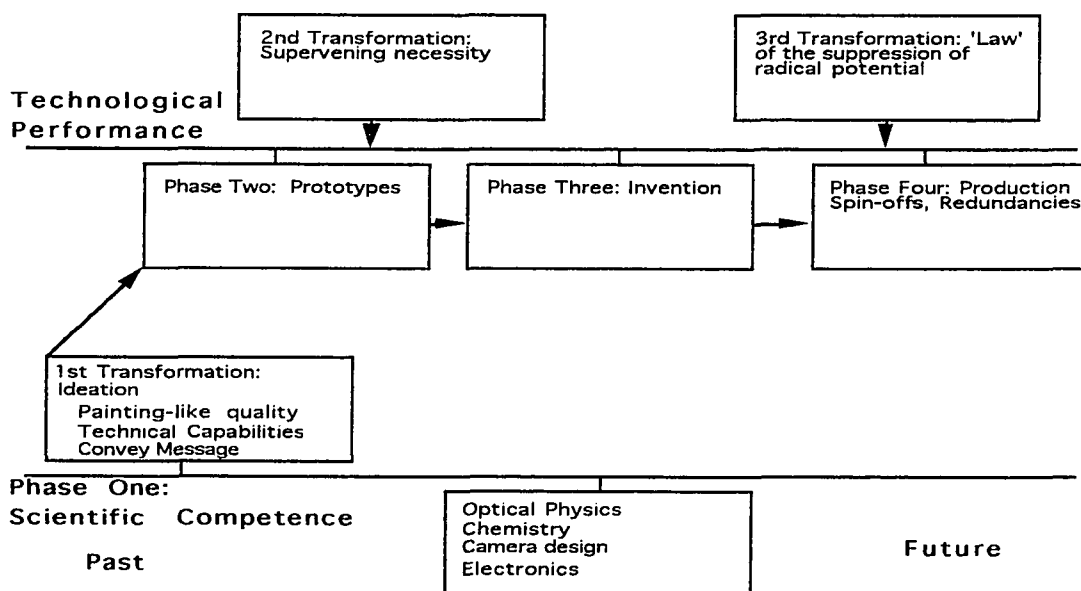


Figure 3. Ideation Transformation

as that which "moves the technology from the phase of scientific competence into the phase of technological performance. The first transformation thus moves from science to technology, its effect being to activate the technologist" (17). The scientific competence phase established basic photographic capabilities and the beginning of a variety of uses for the medium. It is at this point where the ideation of photographic image manipulation occurs.

The pioneers in the new visual medium of photography explored the various methods available to them. The early and mid-nineteenth century was a time of testing and improving photographic materials. Along with technical achievements, many opinions about the proper use of photography were forming. Some of the strongest opinions were held by painters, who felt threatened by the use of photography especially in portraiture. The art community also had strong opinions that because photography incorporated mechanical devices it could not be considered a fine art.

Several photographers, some painters themselves, set out to contest this point of view. One of the inspirations to use manipulation techniques was to make photographic images appear more like paintings. In order to gain acceptance in the art world, photographers strove to make their photographs have the qualities of paintings. This was in response to the claim that photographs were not expressive, but just a record of how a scene looked at the time it was taken.

Another aspect to the beginning of manipulated images was the technical capabilities of the time. Many photographers, especially landscape photographers, would print a scene with a separate sky.

This was deemed necessary because of the tonal range of the materials at the time, the long exposures required, and the viewer's expectations of what the sky should look like. Thus, the photographer combined two negatives together when printing to communicate a more "realistic" record of the scene. One such photographer was Gustave Le Gray. He combined negatives to add the cloud effect as early as the mid-1850's. This was commonly used by the photographers of the 1860's, and even drew criticism from some who complained about the "indiscriminate use of cloud negatives" (Borcoman 17).

A few photographers began combining negatives in order to convey a desired message. Two such photographers were O.G. Rejlander and Henry Peach Robinson. These will be discussed in greater detail later. They chose to photograph separate scenes or people and combine them together to create an allegory, a mythological scene or symbolically convey a message.

Some of the manipulation done during the mid to late nineteenth century was in conjunction with the current art trends of the time, specifically, Impressionism. The Pictorialist trend in photography had similar qualities in the romanticism, symbolism and mythical attributes to the Impressionistic painting of the time period.

O. G. Rejlander is considered one of the first to use combination printing techniques. In the 1850's, he experimented with methods to photograph several different subjects, then print the different negatives onto one piece of photographic paper. His best known piece is titled "The Two Ways of Life." (See figure 4)



Figure 4. "The Two Ways of Life," O. G. Rejlander, 1857

"The Two Ways of Life" was created with the intent to show it in the Art-Treasure Exhibition in Manchester in 1857. Rejlander had six weeks from his initial concept to actual completion. It was rejected by the judges of the show, but did not go unnoticed. This print was produced from approximately 30 different negatives. It was the most complicated photographic print known up to this time. Rejlander discussed the process he underwent to create "The Two Ways of Life" in a paper delivered to the photographic society in 1858 where he states that his "ambition has been that this composition should be wholly photographic" (Bunnell 194).

This image created controversy at the time for several reasons. He included several nude figures which was deemed inappropriate by viewers at the time. He used combination printing techniques in order to convey artistic expression allegorically. This was not widely accepted in the art community. His main criticism consisted of painters claiming that because the image was created and manipulated by mechanical means, and not solely by the human hand, that it could not convey self-expression.

Rejlander broke new ground with the image "The Two Ways of Life." Other photographers incorporated his techniques into their work. One photographer who was heavily influenced by Rejlander's work is Henry Peach Robinson. Robinson used several negatives per one final photographic print. His works were more diverse and numerous than Rejlander's, although they were similar in philosophical approach. Robinson, like Rejlander, preplanned his images using sketches. (See figure 5) The quality and control of lighting was preplanned. He depicted mostly people in group scenes,



Figure 5. Preliminary sketch with photograph inserted, H. P. Robinson, c. 1860

both indoors and outdoors. His images had mythical qualities. Unlike Rejlander, Robinson printed each individual image separately, then composed them onto one piece of paper, re-photographed them and printed the new negative onto one final print. (See figure 6)

Robinson received criticism for his approach to photography. His manipulation of the scene artificially created a record of something that did not actually occur. Some people felt that this was outside the realm of the photographic medium. However, not everyone criticized his work in that manner. In 1892, he formed a group called the "Linked Ring." This group was made up of Robinson's colleagues who practiced similar manipulation techniques, or other methods of photography that were "conceived and constructed in the manner of paintings" (May 10). Their main emphasis was to justify photography as an art form.

Robinson was active in presenting his belief that photography is an expressive medium and was a main contributor to the theory that photography should be included in the fine arts. His book The Pictorial Effect in Photography, was a technical guide to making photographs appear to have similar qualities to paintings, including manipulation using multiple negatives for one scene. Pictorial photography is defined as "photographs which were intended to be beautiful, or tell a story, and which appealed directly to the emotions of the viewer" (Doty 11).

These photographers drew upon the established scientific basis to accomplish these results. Meanwhile, the first transformation continues to occur. "The ideation transformation," according to Winston, "interacts with the first phase and occurs concurrently with



Figure 6. "Fading Away," H. P. Robinson, 1858

it" (19). The use of image manipulation was becoming more widespread, and as with any new idea, the first practitioners of photographic image manipulation drew some opposition.

One of the most vocal critics to the philosophy of Robinson and the Linked Ring members was Peter Henry Emerson. Emerson did not embrace the painter-like approach to creating photographic images. In fact, he actually referred to those with ideology in line with Robinson as "daubers and splogers" (May 11).

Emerson wrote a book describing his theory of Naturalistic Photography. In it he describes the techniques necessary to as closely as possible replicate human vision in a photograph. One of the most unique aspects of this theory was the idea that the focus should be sharp in one area of the photograph and soft in the rest of the photograph to correspond with how the eye sees, according to Emerson.

He practiced his theory in his own work in the farming areas of Norfolk, Great Britain. His photographs have a pastoral quality. Emerson deliberately placed the focus in his composition to draw the eye to the central figure. Even though there is an area of sharp focus in the image, the overall effect is soft.

This theory had widespread effects in the photographic community. Robinson criticized it stating, "the naturalists willfully ignore the fact that the eye changes its focus so automatically and instantaneously to adapt itself to vision that we are not conscious of it" (Turner and Wood 21). Emerson responded in a letter to the editor of the Photographic News that the critic was "ignorant" and

questions "when did the critic become an authority in physiology?" (Turner and Wood 21).

In further debate, Robinson added a chapter to his book entitled Picture Making by Photography which criticized the Naturalistic theory. Emerson responded by writing a letter to the British Journal of Photography, in which he discusses the differences between the theories as he sees it.

One finds with its admiration for representations of nature excited by the truth with which the subtleties of a beautiful scene are rendered, the other lays greater stress on the decorative cleverness with which the space devoted to the picture is filled by lines and masses. The one finds its poetry in the scene, the other claims that it is added from without. The one must work under the inspiration of the subject, the other can grind out its combinations according to rule in the studio, because it is not nature, it is so-called art that is wanted, as though art were past pictures and not capable of change and development in its principles. (Turner and Wood 21)

It is interesting to note that in the chapter on combination printing in the Pictorial Effect in Photography Robinson writes "It is certain that *a photograph produced by combination printing must be deeply studied in every particular, so that no departure from the truth of nature shall be discovered by the closest scrutiny*" (Robinson 198).

This type of banter went back and forth for several years, with Emerson's ideas continuing to gain support from the photographic community. Many people used some of his ideas, selecting to drop his focus rules, which produced multitudes of

"fuzzy" pictures. In 1890, preliminary sensitometry testing was conducted by Hurter and Drifffield which revealed the tonal range of photographic plates and prints. This proved to Emerson that he did not have as much control over the materials as he had originally thought. He then withdrew his theory in a pamphlet he printed called "The Death of Naturalistic Photography." In this he claims "the limitations of photography are so great that, though the results may and sometimes do give a certain aesthetic pleasure, the medium must always rank the lowest of the arts" (Emerson 197). Despite this announcement, his original theories were so widespread that soft focus photography continued to be practiced until after the turn of the century.

Several things occurred to change the direction of photography around the turn of the century. The first World War accelerated the need and use of documentary photography. The rise of industrialism in the United States created a different attitude towards mechanization which brought some acceptance of the camera into the art world, and the rise of Modernism in art.

These changes in society brought about an acceptance of photography as a medium. People began to utilize photography for the qualities unique to the medium. One of the uses which became widespread at this time was to record events, people, and places through documentary photography. While some documentary work had been done years before by Hill and Adamson in the fishing villages, and Matthew Brady and his assistants in the Civil War, among others, it was not until the turn of the century that it became commonplace. Lewis Hine photographed the emigrants, August

Sander created portraits of people in their own environments, and some of the most recognized work of the time was done by the photographers in the Farm Security Administration during the 1930's and 1940's. The general public were able to see these images published in newspapers and magazines.

The attitude of photographers changed from striving to make photographs look like paintings to making photographs look like photographs. This was an effort to establish photography separate from painting. Some of this was accomplished by a concentration on the representation of the subject matter. Many photographs from this time were of industry, machines, details of working environments and people in the factories, etc.

By this time many technical achievements had occurred to provide better materials and cameras to photographers. The ability to photograph using a short exposure provided opportunities that were not possible previously. The hand-held camera brought another range of possibilities to the photographer. The dry plates and paper negatives continued to improve as well as the printing papers.

The influence of the art movements had an impact on photography. Abstraction, Cubism and Modernism were all evident in the Straight photographs of the 1920's through the 1950's. The photographs of Paul Strand, and Edward Weston are examples of this influence.

Two prominent figures of the transition from the Pictorial era to the Modernist era were Edward Steichen and Alfred Stieglitz. Both of these men practiced traditional Pictorial style photography in the

beginning of their careers. They were founding members of the Photo-Secessionist society, and both eventually transitioned into using Straight photography.

Edward Steichen, a painter and photographer, photographed people and some landscapes using a Pictorial style, incorporating symbolism by his choice of subject matter. His techniques included moving the camera during the exposure, misting or using glycerin on the lens, and the manipulation of negatives or prints. These were common techniques employed at the time to create a soft focus image. (See figure 7) He considered photography a "direct competitor of painting" (Kelton 5). His work changed after the first World War. He started doing mostly commercial work which used Straight photographic techniques, and continued to use this methodology throughout his career.

Alfred Stieglitz was a supporter of good quality Pictorialist style photography. He was a member of the Camera Club of New York, where he published the club journal titled Camera Notes. It was at this time that he drew the distinction that photography should be a method of graphic representation. Each issue of Camera Notes contained images which contributed significantly to the Pictorialist style. His early work consisted primarily of New York street scenes, and portraits. He left the Club and went on to establish the Photo-Secession. This group was founded with the intent to establish Pictorial photography as a fine art. The publication for this new group was the Camera Work.

After several years of successful gallery shows of both photographic and non-photographic art, and Camera Work



Figure 7. "Rodin," Eduard Steichen, 1902

publications, the Photo-Secession dissolved. This marked a change for Steiglitz as well as pictorial photography. The next gallery show which included Steiglitz's work showed his straight photographs, not his pictorial work. He began to use unmanipulated printing techniques as well as utilize the inherent qualities of the photographic materials. During this time he was also testing his own materials to create better papers and negatives. He now viewed photography as a medium that should be pure, free from any manipulations of the process. He became a strong proponent for straight photography. One of his most recognized images was "The Steerage" (See figure 8). This captured the life aboard ship for emigrants.

One photographer who had significant influence upon the changes in the direction of photography was Paul Strand. Through his photography and his writing on the subject of straight photography, many photographers were drawn into a new approach to photographic art. Strand, himself, was influenced by Lewis Hine, who was a teacher at the Ethical Culture High school which he attended. This inspired Strand to pursue photography. He was also influenced by Alfred Steiglitz's work and the artwork displayed in the 291 gallery. The influence from abstract painting can be seen in his work (See figure 9).

Strand felt that quality in one's work was absolutely essential. He believed that those photographers with a lack of understanding of their materials, thus mixing photographic and painting techniques by manipulation, accounted for "the lack of respect by the public and the notion that photography is but a poor excuse for an inability to



Figure 8. "The Steerage," Alfred Stieglitz, 1907



Figure 9. "Wall Street," Paul Strand, 1915

do anything else" (Strand 153). It was this high standard which Strand subscribed to that established him as a pioneer in modern photography.

According to Strand, objectivity is what sets photography apart from other arts. "This objectivity is of the very essence of photography, its contribution and at the same time its limitation" (Uelsmann). Those who did not understand this, or chose not to adopt this doctrine obscured the purity of the medium by incorporating manipulation into their work. Strand felt that with a few exceptions, the majority of photographers were caught up in this dilemma. This thinking is what is now known as the "New Objectivity." Strand felt that for photography to be considered art the "mechanical element involved must be transcended," and that the vision of the artist must reveal itself to the viewer (Jewell 35).

For Strand, the former practices of Rejlander, Robinson, Emerson and the early works of Steichen and Stieglitz in the Pictorialist and Naturalistic traditions were not within the scope of what he considered to be pure photographic art. Strand's theories were widely accepted. He is given credit by Beaumont Newhall for influencing Ansel Adams, who originally followed the Pictorialist doctrine. After seeing Strand's negatives in 1930, Adams decided to use the "straight photography" approach full time" (Jewell 35)

The popularity of straight photography continued well into the 1970's. However, in the photographic art world change was taking place. A renewal of manipulated images occurred. Photographers were rejecting the confines of Modernism. Techniques such as montage (combination printing), collage, and scenes set-up

specifically for the photograph (fabrications) were being utilized. These techniques can be seen in the works of Jerry Uelsmann, Harry Callaghan, Bill Brandt, and David Hockney, among many others. These photographers were in the beginning of the Post Modern era.

Jerry Uelsmann combines several negatives together onto one print, similar to the technique of Rejlander. He began exploring this technique in the late 1950's, approximately 100 years after Rejlander. Uelsmann continues to refine his vision even today, though many of his strongest images were produced in the mid to late 70's.

The intention of the Post Modernists was not to make the photograph look like a painting, as was the purpose of image manipulation in the nineteenth century. It was to explore the medium beyond the previously set boundaries; to experiment and create something new; to criticize that which has gone before. Image manipulation was one process which could make a statement different than that of straight photographs. The renewed interest in image manipulation techniques during this time period coincided with other technological progressions. This leads to the next phase in Winston's model, Prototypes.

Chapter Four

Prototypes and Beyond

The next phase of the model addresses the prototype development stage of technological performance (See figure 10). This enables the technologist to "begin to build devices working towards fulfilling the plans which emerged from the ideation transformation" (Winston 19). By the 1960's, the use of manipulated images had been common for many years. The techniques up to this point, however, had been time consuming and labor intensive. As the

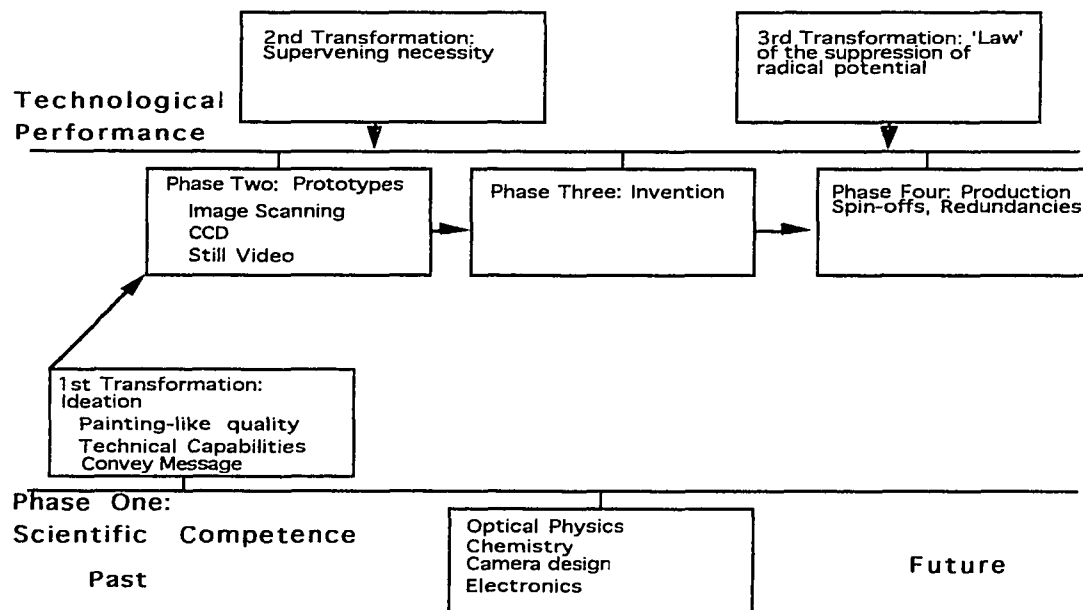


Figure 10. Prototypes

technology of electronics developed, the possibilities of improved methods unveiled.

The development of the hardware for facsimile machines, which could scan a printed page and transmit the information to other facsimile machines across the telephone lines, lead the way for image scanning devices. The technology for this was developed by George Stamps in the 1950's (Frye). Today, image scanning is used as an input method for a computer. An image, either on film or printed on paper can be scanned and stored on the computer for manipulation.

Image scanning is only one element within image manipulation. The software must be able to alter the image with the quality close enough to the original that it is not noticeable to the viewer. The hardware of the computer must be able to store the image and the alterations within its memory, and have the appropriate input, and output capabilities. A camera must capture the image either on film or on electronic media in order to provide an image to be manipulated.

The use of computers to process, manipulate and transmit images has actually been ongoing since the 1960's. The Jet Propulsion Laboratory of the California Institute of Technology developed the basic image processing techniques for the space probes. Images that were taken in space, then transmitted and processed electronically, could be viewed by the public on television or in the newspaper. According to John Larish, author of Digital

Photography: pictures of tomorrow, "many of the basic image processing techniques developed by JPL have been carried over into software for personal computers" (57).

The development of electronic image capturing devices for use in other areas contributed to the development of analog still video systems, which are used in conjunction with computers to manipulate images. In the late 1960's, the new invention called the charge-couple device (CCD) was made available by Bell Laboratories. It was developed for use as memory for computers, however, it was discovered to be light sensitive. This led to the replacement of image tubes in the 1970's for such items as video cameras and image sensing devices. This technology contributed to the development of the still video camera which relies on charge-couple devices to capture images.

In this respect, the basic image capturing device, the CCD, is considered a parallel prototype. Winston defines a parallel prototype as occurring when "the device which will become the parallel prototype is already in existence solving another technological problem. Its potential use for a secondary purpose is realised [sic] only after the operation of a supervening necessity" (20). Once the light sensitivity of this device was discovered, new possibilities for its use were developed.

One such possibility was the still video camera. The Sony Corporation and Canon, Inc. both displayed still video camera prototypes in 1981, Canon being the front-runner. This was the first step towards electronic photography and eventually electronic image

manipulation. Shortly after the first prototypes, many other companies attempted versions of still video cameras. These included companies such as "Casio, Fuji, Konica, Chinon, Copal, Olympus, Pentax, Sanyo, Vivitar, and Yashica" which designed either still video cameras or still video backs for film cameras (Larish 29).

By 1983, the Electronic Still Camera Standardization Committee had established a standard format, NTSC, to enable still video to use the same format as a television set. Consequently, an image could be recorded on a still video floppy diskette and played back on a television, provided a still video player is available.

Technological development in the early 1980's was progressing in order to improve the quality of the images produced by the still video systems.

Second Transformation: Supervening Necessity

As with any technological progression, there has to be an actual need for the prototype developed in order for it to be mass produced. The second transformation in Winston's model is the supervening necessity (see figure 11). Winston describes three types of supervening necessities: "the consequences of other technological innovations," "the social forces working directly on the processes of innovation," and "the commercial need for new products and other commercial considerations" (22).

The progression of electronic photography had a combination of two of these supervening necessities working to develop its technology. The first category of other technological innovations follows along with the development of image processing with

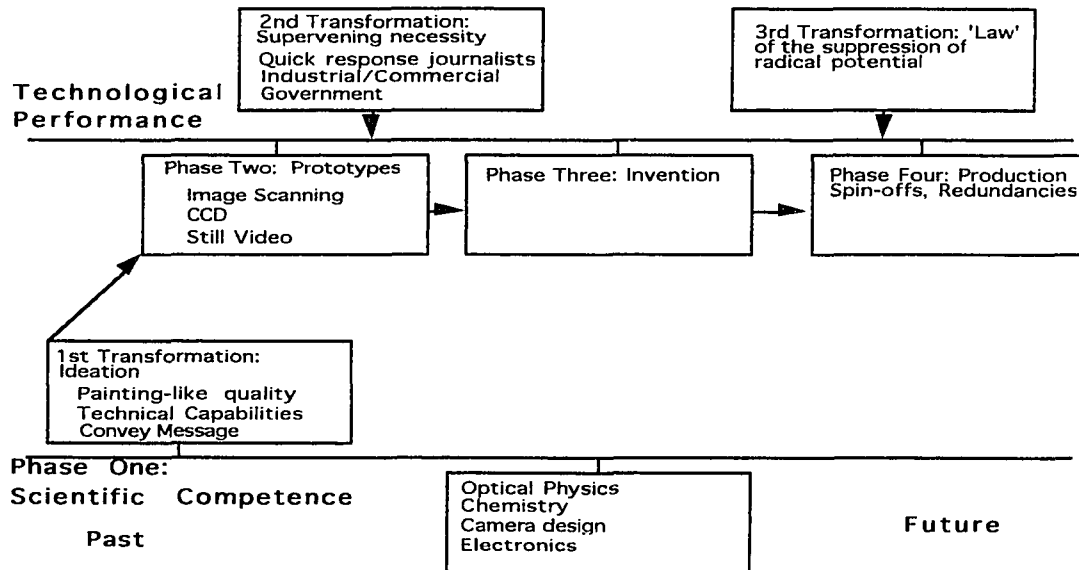


Figure 11. Supervening Necessity

computers. Another innovation that furthered electronic photography was the immediate need for visual information, such as images from the 1984 Olympic Games in Los Angeles transmitted for publication in the same day's national newspaper in Japan.

Most of the various necessities surfaced in the mid-1980's in the industrial and commercial areas. The types of needs identified have been "public relations, destructive testing, and scientific and medical areas" (Larish 27). The US. Government and its contractors have used the still video systems from their onset. Some of their

uses include inspection, testing, visual information communication between locations, surveillance, location documentation, and military combat. Another commercial need was quick response for photojournalists who transmitted their images to the newspapers. An environmental need arose as stricter regulations have been placed upon the residual contaminants found in the waste water produced from photographic laboratories and graphics facilities.

Phase Three: Invention

The late 1980's and the early 1990's produced better quality still video cameras, and the invention of the digital camera. The third phase of Winston's model is "Invention" (see figure 12). The still video technology available during these years provided more variety for photographers. This included special backs for cameras which were originally designed for traditional film, but had electronic image capturing capabilities. This type of technology is now available for some small, medium, and large format cameras. Sony Corp. produced a still video camera which contains two CCD chips, one used for luminance and the other for chroma (Larish 26). The use of two chips allows for increased horizontal resolution. This was the first still camera to use more than one chip.

These later models of still video cameras are capable of recording images on small floppy diskettes which could then be played on a still video player and inputted into a computer for

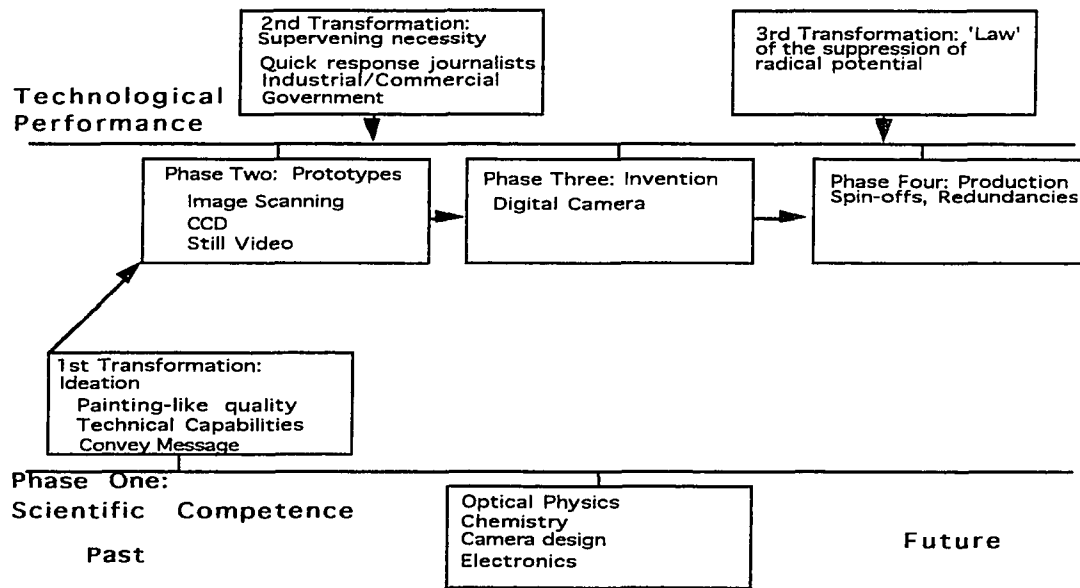


Figure 12. Invention

manipulation and printing. This technique is used in publication due to its quick results.

With the improved image capturing capability of the still video cameras, computerized image manipulation improved as well. The scanning capability of the late 1980's and early 1990's has also made vast improvements over that of the 1970's.

Photographically printed images can be scanned into a computer and manipulated with little loss of quality. Colors in the original image can be matched and blended in areas that are changed allowing the computer operator to hide any traces of alterations to the image. The images can be recorded back onto traditional film, if desired. The quality of scanners and recorders vary as do their costs.

The next generation of electronic photography is the digital camera. These do not use the floppy diskettes like the still video camera. Digital cameras record images digitally onto either a portable hard disk which can hold up to 158 images, or a memory card which may hold approximately 50 images. The prototypes of these cameras were presented by Fuji, Toshiba, Olympus, Ricoh, Chinon, Konica, Minolta, and Kodak, at the Photokina show in Germany in 1990 (Larish 33). Some of these designs allow the photographer to download their images directly to a computer (either a PC or a Macintosh) without the use of a separate player.

The digital format allows the image to be stored, transferred to a computer, then manipulated without loss in quality. This is an improvement over the analog system that the still video technology utilizes, which does have image degradation from multiple generations.

The CCD is used in the digital cameras as well as the still video cameras. The Sony Corporation developed a camera which utilizes three CCD chips, which capture the three colors: red, green and blue. Other cameras use one chip, however, some have designed special capabilities for the single chip. The CCD chips are also used in scanners. Many chips placed in an array provide the measurement of the reflected light and determine the resolution of the final image. Scanners provide a method of digitizing printed material and film.

The input devices using CCDs are of relatively high quality for acquiring an image onto a computer. The next step is the software to manipulate that image. Provided the computer is a Macintosh or a

PC, there are numerous software packages which can be purchased from an average computer store which will manipulate images. There are, of course, software packages for computer workstations specifically designed for image manipulation which vary from inexpensive to very expensive.

Third Transformation: The 'Law' of the Suppression of Radical Potential

While technology is progressing with new, improved designs and inventions, other elements within society attempt to keep the status quo. Winston states that "understanding the interaction of the positive effects of supervening necessity and the brake of the 'law' of the suppression of radical potential is crucial to a proper overview of how media develop" (24)(see figure 13). New inventions and technologies are faced with mixed reactions, some who will be put out of business from the improvements and others who will capitalize upon the new opportunity. As Winston explains, "the same authorities and institutions, the same capital, the same research effort which created today's world is trying also to create tomorrow's" (23). One example of this is Eastman Kodak Company. Their primary product and advantage over foreign companies is their photographic film and paper production. With the onset of electronic photography a threat to those products was evident.

This is carried further with image manipulation accomplished by computer where changes are viewed on a monitor without the

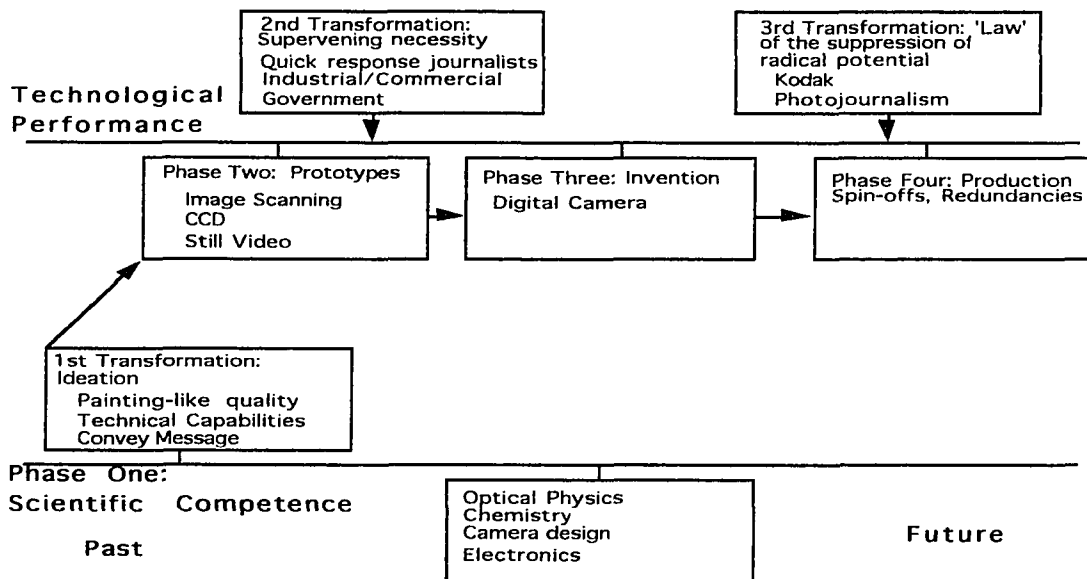


Figure 13. The 'Law' of the Suppression of Radical Potential

need to produce numerous prints in attempting the alteration. Because of the computer's ability to correct what have in the past been considered mistakes, fewer photographs are taken per final image. The computer operator can alter a less than perfect photograph to appear as the client desires. While on one hand, this may seem like a redeeming option for photographers, on the other hand, fewer photographs mean less work for photographers.

There have been several pieces of equipment that Kodak produced in the last several years which contributed either to the still video or digital photography technology. The Eastman Kodak Company joined the technological innovation ranks by creating the "Photo CD" system. This creates "digital negatives" from images

taken on a camera with standard photographic film then transferred to a disk which can be played on a television monitor. Once the images are recorded onto the CD, they may be manipulated by exporting them to a computer. This encourages consumers to continue to buy film even if they don't order as many prints. In this way, Kodak has contributed to the electronic technology without giving up their main product, film.

Additional social reactions to electronic image manipulation have occurred. Winston describes the 'law' of the suppression of radical potential in his model as "general social constraints (which) operate to limit the potential of the device radically to disrupt pre-existing social formations"(23). A form of this has become evident in the ethics debate over electronically manipulated images.

One group of users that is concerned about the widespread, potentially indiscriminate use of manipulated images is the photojournalists. The result of this concern is social constraints in the form of established standards in producing manipulated images. John Long, chief photographer at the Hartford Courant and former president of the National Press Photographers Association stated that photojournalists "need a more hard-edged statement of principle than magazine and commercial photographers" (Silverman 12). Consequently, the following standard was adopted at a NPPA meeting:

As journalists, We believe that the guiding principle of our profession is accuracy. Therefore, we believe it is wrong to alter the

content of a photograph in any way that deceives the public. As journalists, we have the responsibility to document society and preserve its images as a matter of historical record. It is clear that the emerging electronic technologies provide new challenges to the integrity of photographic images. The technology enables the manipulation of the content of an image in such a way that the change is virtually undetectable.

In light of this, we, the National Press Photographers Association reaffirm the basis of our ethics: Accurate representation is the benchmark of our profession. We believe that the photojournalistic guidelines for fair and accurate reporting to be the criteria for judging what we've done electronically to a photograph. Altering the content of a photograph in any degree is a breach of the ethical standards recognized by NPPA (Silverman 12).

The photojournalists have been the only main faction of photographers to adopt this type of standard for image manipulation. The photographs used in art do not need nor would it be desirable to have a standard of non-manipulation. Advertising is in between the freedom of art photography and photojournalism. Many liberties are taken to create an eye-catching image, including electronic image manipulation. This is situation dependent. There are cases in advertising where it would be considered misrepresentation to manipulate an image, and other cases where the image has no bearing on the actual item being advertised.

As with photojournalism, there are special considerations taken when commercial or industrial photography is manipulated. Images used in inspection or documentation of a process would be expected to be unmanipulated. While a standard does not currently exist for industrial photography, it would not be surprising if steps were made to establish some type of assurance that images have not been altered.

Phase Four: Technological Performance

The fourth and final phase of Winston's model is the Technological Performance (see figure 14). This consists of the actual production of the technology. It may also have associated activities such as spin-offs, and redundancies. During the production phase, according to Winston, "the acceptance of the device is to a certain extent guaranteed by the operation of the supervening necessity" (26). Which, as previously discussed, in this situation is primarily the commercial need for the capability of the technology. The physical production and widespread marketing occurs during this phase. The technology can still be changed by modifications or refinement. Actual alternatives are considered spin-offs of the technology. The products may also be rejected at this stage, and if this occurs, Winston considers them to be redundancies or products with no perceived useful purpose.

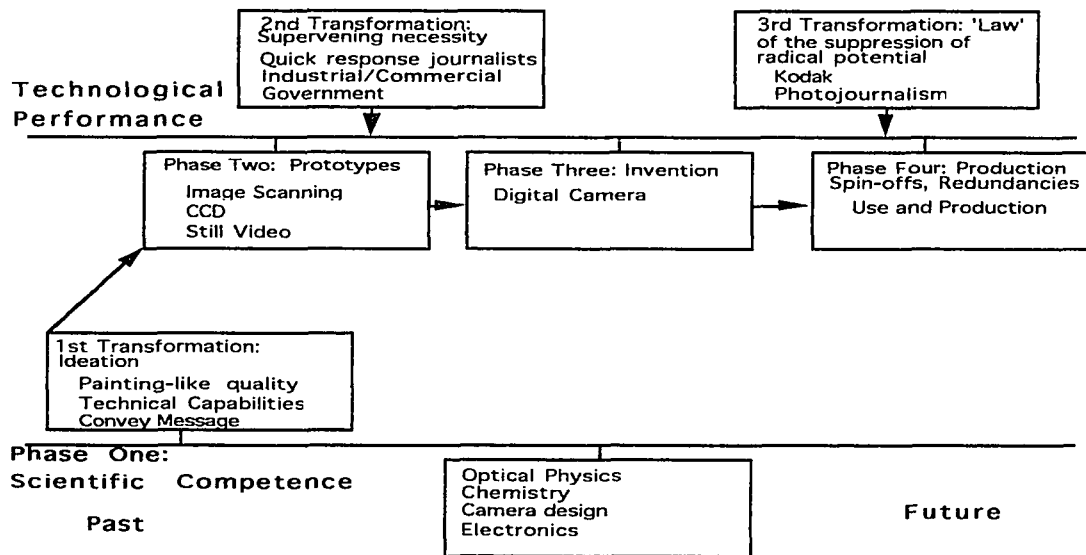


Figure 14. Technological Performance

It is at this stage in the model that examining a process, such as image manipulation, instead of a single product does not lend itself to the structure determined by Winston. The model should be modified to conclude on the success or failure of a process, instead of production. This success refers to general public acceptance and use. For the purposes of analyzing image manipulation, because it is comprised of many individual products, it would be more appropriate to judge the success of the process by its widespread use within society. Referring to the process as successful does not place time constraints on that success. A process will inevitably be improved as technology advances. This has been shown throughout the thesis.

Evidence of this phase occurring for image manipulation exists throughout the United States. There are companies in most states which provide services in digital imaging and manipulation. One example of this type of service is Meisel Photographic Corporation's ImageCenter in Dallas, Texas. Several different image manipulation systems are employed by Meisel. The president of the corporation, George Conant states "As the technology improves and becomes more widespread, its applications are multiplying rapidly" (Shaw 24).

Their main clients are "retailers, corporate marketing departments, display firms and advertising agencies" (Shaw 25). They provide for these clients a variety of capabilities derived from the developed image manipulation technology. Conant states, "For industries that rely on visual appeal for sales, digital imaging provides many competitive advantages. The final product is superior, we have greater flexibility and time effectiveness in solving problems, and often it actually is cost-effective versus traditional methods" (Shaw 25). Figure 15 is an example of their work (original in color).

Another company which provides image manipulation services calls those services "DREAM," which is an acronym for Digitally Retouched, Enhanced And Manipulated. Products such as these are occasionally called second generation originals. These images are manipulated and exported through high quality equipment and recorded onto standard film. The detectability of manipulated images is difficult if at all possible to prove with the negative alone.

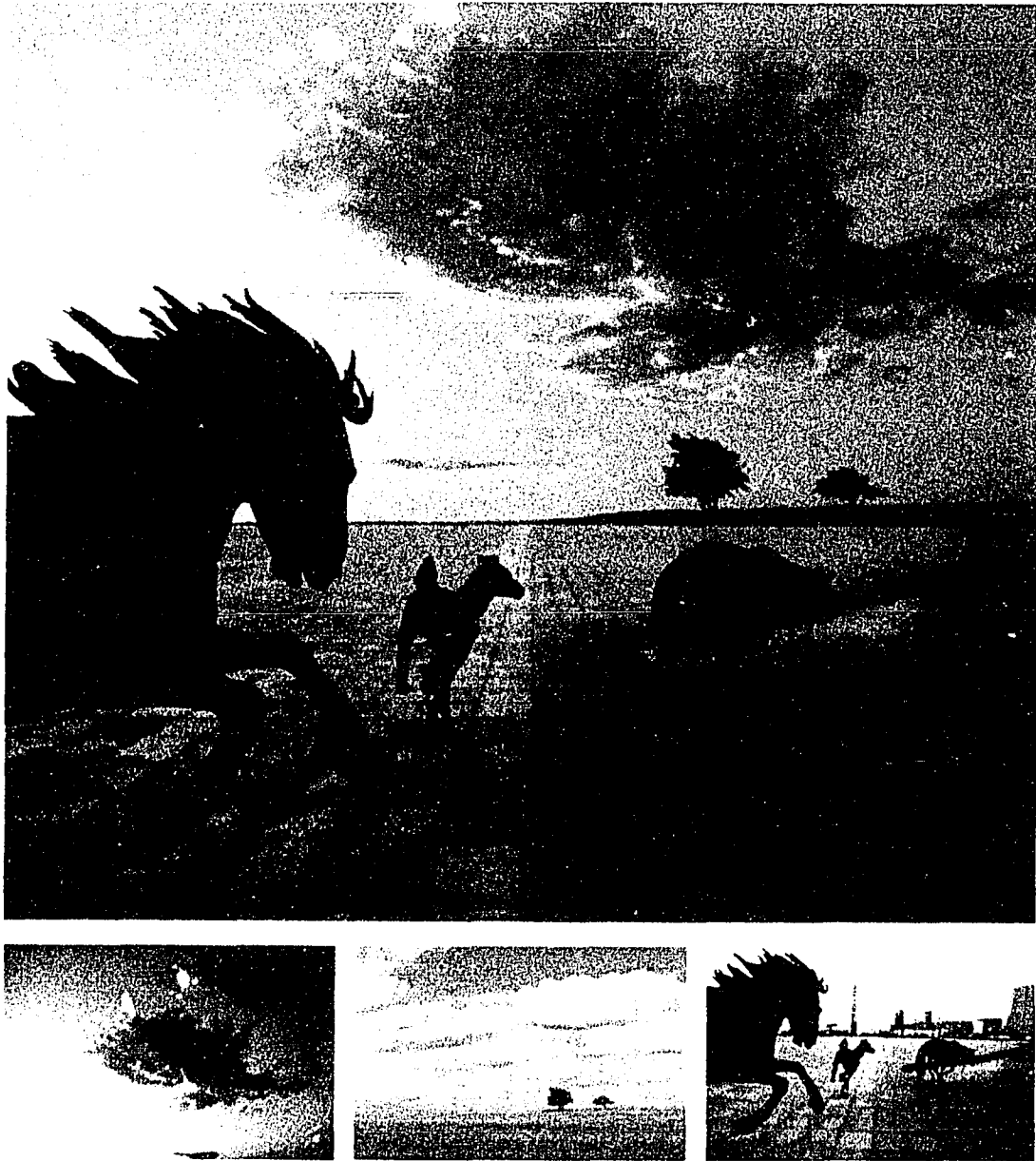


Figure 15. Title unknown, Steven Seeger, 1991

Several complete image manipulation systems are currently available. These include the hardware and software to input, store, manipulate images, and output to film or prints as desired. The capabilities range from software available for the home-computer user to the large scale publication applications. The quality of image manipulation technology is still improving in complexity and speed. Capabilities are being updated with each new model of equipment available on the market. However, the basic technology, as it has been demonstrated in this thesis, has been developing for at least a century. This supports Winston's theory that a "revolution" in communication technologies is not actually a revolution, but a progression of science and technological advancements.

Chapter Five

Progression or Revolution?

Consideration of the historical perspective for a technological advancement is important for an accurate understanding of the topic. By taking the phases set forth by Winston and applying them to the progression of photographic image manipulation, one realizes that to claim a "revolution" is occurring is short-sighted. Winston defends the position that "Western civilisation [sic] over the past three centuries has displayed, despite enormous changes in detail, fundamental continuity" (15).

Over the past few decades there have been many authors who contend that there are, in fact, technological revolutions occurring within our society. Some of these include Steward Brand, Robert Cohen, John Naisbitt, and Alvin Toffler. Each of these authors address technological "revolutions" of some type. There are also those who contend that the recent developments of the photographic image manipulation capabilities are the product of a "revolution" within the photographic industry. One such author is Fred Ritchin.

In his book, In Our Own Image: The Coming Revolution in Photography, Ritchin states "a century and a half after photography's debut there is a revolution in image-making underway that is beginning to remove the accepted certainties of the

photograph and to make the world newly malleable" (4). While recognizing the age of the photographic process, Ritchin fails to consider the progression of technology within the last century and a half. He further states "the initial wave of the revolution in image manipulation has first come to the mass media, due both to the originally high price of the technology and the desire by many editors to exercise greater control over the photographs they are publishing" (4).

Winston argues against this type of assertion by stating "there is nothing in history to indicate that significant major changes have not been accommodated by pre-existing social formations, and that 'revolution' is therefore quite the wrong word to apply to the current situation" (16). He is referring to the changes within the telecommunications technologies, however claims that the historical record he addresses is general enough to apply to all communication technologies. He asserts that the pattern of change over the years is expressed as "a field in which three elements -- science, technology, and society - intersect" (16). Through examining the various phases of development photographic image manipulation has undergone, it is evident that these three elements are present in the progression of change.

Ritchin credits the incorporation of the computer into the photographic industry as the instigator of the "revolution." Even though Ritchin recognizes that photographic manipulation has occurred since the mid-1800's, he claims that it is different now due to the capabilities of the computer (13). However, the computer itself could not be the cause of the change he is referring to as a

"revolution," the social need for the capability precluded the development of the technology. This is the same pattern as has been demonstrated in this thesis.

Winston addresses the development of computer technology at length in his book. He states that "the computer manufacturers convinced themselves, despite any evidence to the contrary, that what they had to sell was what the public really wanted" resulting in varying marketing success. Winston continues "this picture contrasts most vividly with the hype of the information revolutionaries for whom the home computer was a crucial step in the creation of the wired city. . ." (221). Instead of the intent to change the world, the computer simply made those tasks already performed easier, more convenient, or faster. It replaced the typewriter or manual graphic work in this manner. This is the same progression as the use of the computer within the image manipulation process. It allows the work to be performed easier, more efficiently, and more precisely. This improvement alone does not provide the change required to claim a "revolution" within the industry.

The two authors use an opposing approach for historical information pertinent to the progression of image manipulation. While Winston uses the past accomplishments to illustrate the continual growth over the years, Ritchin uses the past capabilities to contrast with the present. This is the fundamental difference between those who claim "revolution" and the approach that Winston is defending. After examination, Winston appears to have researched the historical progression methodically and logically, resulting in an argument which is substantiated. The same cannot be

said of Ritchin on his use of historical information, however accurate it may be.

This difference demonstrates the importance of considering the implications of image manipulation with a historical perspective. While it may be easy to be caught up in the excitement of new technological advancements, one must be reminded that advancements are derived from that which previously existed. This thesis has attempted to illustrate this point by describing some of the previously existing scientific capabilities. Winston's model has provided the structure in order to methodically analyze the progression of photographic image manipulation within communication.

When compared to the alternative, one can see the value of considering the historical implications related to photographic image manipulation. With this knowledge and perspective, the reader can be better prepared for the changes and accomplishments of the future.

Conclusion

The model for technological change created by Winston has provided a structure with which to analyze the progression of photographic image manipulation in our society. We are now faced with technological capabilities only dreamed of in the past. The original photographers who manipulated their images met with criticism for their techniques. Today, more sophisticated versions of the same communication concepts are becoming widespread. The

images created with currently available technology are not always obviously altered. This again, is attracting attention from selected groups of people.

Many of these same people are referring to this time period as the "photographic revolution" or the "digital revolution." As this thesis has described, the science which contributed to the image manipulation practices of today began centuries ago, and have been progressing ever since. Winston's model demonstrated the steps involved in developing a technology to the point of production. Recognizably there are more aspects to the technology required to manipulate photographic images than discussed here. This thesis has attempted to show the most prominent contributing factors to the technology under discussion, without belaboring the details.

Once one realizes the capabilities of current photographic image manipulation technology, many questions arise. The perceived role of photography and the impact of photographs in communication are important areas of exploration. Several authors have addressed these and related topics, some of which will be discussed here.

Historically, images were first viewed without the preconceived idea that the photograph was a representation of reality. When first seen by the non-scientist and non-photographer, there were no expectations. People were accustomed to drawing and painting as their visual mediums, therefore they were not expecting an actual depiction of reality. It was not until photographers began using a documentary style that people adopted new expectations. After photojournalism reached every household in America during the wars and even in the daily paper, people began to look upon

photography as a record of reality. The phrase "a camera never lies" was commonly referred to.

In her book, A Primer of Visual Literacy, Donis Dondis discusses the impact of photography upon visual communication. Dondis states that photography has ended the exclusiveness of the "artist" as having special talents and that, "It forms the final connecting link between the innate ability to see and the external capability to report, interpret, express what we see, without having to have special talent or extended training to effect the process." She continues, "there is little doubt that contemporary life style has been influenced, and crucially, by the changes enacted on it by the fact of the photograph" (7). Due to modern media, according to Dondis, "most of what we know and learn, what we buy and believe, what we recognize and desire, is determined by the domination of the human psyche by the photograph. And it will be more so in the future" (7). This has a significant impact upon the individual viewer. Those people whose profession it is to sell products to the viewers and persuade viewers have even more options at their fingertips with the currently available technology than when Dondis addressed the topic in 1973.

The primary reason for the impact of photography upon the viewer is its credibility above and beyond other visual media. Dondis states, "The photography has one quality it shares with no other visual art - believability" (174). Others have addressed the topic of photographic believability. Stephen Baker in his book, Visual Persuasion, when discussing the use of photographs in advertisements states, "Yet not only does readership go up if there is

a picture in the ad but so does believability" (5). From a journalistic perspective, Ralph Otwell of the Chicago Sun-Times feels that "Sometimes it's crucial to have the credibility and authenticity that photographs can give you" (Goodwin 177).

Accepting these premises, the question is then posed: What is to happen to the believability of the photograph if image manipulation continues to be used in an undetectable manner? Norway addressed this issue by employing a system which indicates if an image has been manipulated. This is simply a small symbol similar to a trademark symbol placed in the corner of the photograph upon publication. This practice has not been accepted in the United States. One reason for not adopting this standard, according to John Long, is the preservation of the integrity of the photograph. It is the opinion of the NPPA that "extraneous material" such as the symbol should not be mandatory within photographs (23). Some publications are, on their own accord, captioning the manipulated images with a specific label.

The use of some type of indication alerting the viewer that the image was manipulated could aide in preserving the credibility of photographs. Once the public realizes the widespread use of image manipulation, without differentiation non-manipulated images will naturally be suspect.

It can be argued that since photographic image manipulation has been used for such a long time that the viewer is already aware of the capabilities and practices used in the media. This may not be substantiated. While viewers are aware that certain capabilities

exist, they are not able to distinguish some manipulated images by viewing the images themselves.

This brings to light another variable, the context surrounding the image. The viewers do not have the same expectations or assumptions about photographs published in the National Enquirer as they would a classroom text book. This expectation becomes important when determining the message communicated by the image as well as the perceived validity of its representation. If a manipulated photographic image that appears to be a straight image was published in a "reputable" publication, the viewer would most likely expect that image to depict the original scene as photographed. If that same image were to appear with different surrounding context the expectations might be different. This perception allows for misjudgment by the viewer.

A photograph may be placed within a large variety of contexts. There are few areas in our culture which do not utilize photographic images in some manner. The areas that rely upon photographic images include: advertising, artistic expression, business communication, documentation, education, journalism, medical, military, personal snapshots, and all types of scientific study.

Many areas benefit greatly from the electronic manipulation technology improvements, especially the scientific disciplines. On the opposite end of the spectrum, some businesses have placed a camera and a computer in a beauty salon to provide the service of showing the customers their future hairstyle before it is done. It is this type of general public interaction which will continue to develop, thus exposing more people to the technology. Due to its increasing public

use, many people make the assumption that it is new technology. In this way the myth of the "revolution" continues.

In chapter one the question was raised, Is our understanding of photographic reality on the verge of a fundamental and irreversible change? The answer to this question is yes, our understanding of photographic reality is changing. When we learn about new capabilities and view manipulated images, we realize that photographs are not always what we expect, nor can we ever assume that they might be. How will the viewer ever actually know what they are seeing in a photograph unless they were at the scene themselves? If the definition of photographic reality is that the photograph represents what something actually looks like without manipulation, then there are no more assurances other than the claim of the originator. We then turn to the integrity of the photographer, publication editor, and/or computer operator for communicating their intentions, either by context, caption, or a symbol. The viewers' trust must go further than before, because there are more opportunities for alteration of images involving more people. The affordable systems which can manipulate images are widespread today. The concerns and attitudes of the future will depend upon the use and misuse of these capabilities.

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