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An agreeable truth: facts and faith in nineteenth century photography

David Wooters

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AN AGREEABLE TRUTH

Facts and Faith

in

Nineteenth Century Photography

Submitted in Partial Fulfillment of the
Requirements for the Degree

MASTER OF FINE ARTS

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MFA PHOTOGRAPHY PROGRAM

SCHOOL OF PHOTOGRAPHIC ARTS AND SCIENCES

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Date   August 26, 1986
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Preface

In the nineteenth century it was widely believed that the photograph was a truthful representation of the world. Photographs were accepted as scientific evidence and eyewitness accounts. This faith in the photograph, however, far exceeded its capabilities.

Looking at nineteenth century photographs today, while reading descriptions of them, one is struck with the discrepancy between what is seen and what is read. The photograph is often described as though it conveys information that, to twentieth century eyes, it simply does not contain. I have chosen to study this discrepancy between what the nineteenth century viewer believed a photograph showed and what a twentieth century viewer sees.

This is not an attempt to put photography on trial, to accuse it of making false or misleading statements. The photographic process is neither innocent nor guilty. It is neutral. What this study examines is the overwhelming belief in the photograph as a truthful picture, in the face of contrary evidence.

For this study I have examined nineteenth century photographically illustrated books of art, science, and travel. These books provide one of the few means of comparing nineteenth century descriptions of photographs with the actual photographs described.

All the photographically illustrated books used for this study were published before 1890, and most of them before 1870.
To avoid confusing different cultural responses to photography, I have limited my study to photographically illustrated books published in Great Britain, the country that produced the greatest number of these books. All other primary source material for this study was also published, translated, or reprinted in Great Britain during the nineteenth century.
Acknowledgments

The members of my thesis board have provided helpful suggestions and good advice. It was Bob Bretz who first interested me in photographically illustrated books, though I imagine he is a bit surprised at the turn that interest took. Grant Romer offered many insights and saved the reader from many confused pages. Jim Reilly provided the assistance and prodding that falls to the board chairman.

Barbara Puorro Galasso is largely responsible for seeing that this study, which is based on photographically illustrated books, is photographically illustrated.

My parents provided the opportunity for me to begin this study and my wife, Paula, provided the encouragement needed to complete it. To them I am especially grateful.

David A. Wooters

Rochester, New York
Introduction

The nineteenth century began by believing that what was reasonable was true and it wound up by believing that what it saw a photograph of was true...William Ivins

Photography achieved this status of truth largely because of its scientific pedigree. Founded on the control of certain scientific principles and facts, photography was the triumph of modern science. This was not simply the clever invention of a new method of making pictures. It was the discovery of a natural law by which objects could, in effect, record their own images. No longer was the artist required to create pictures of the world. With photography the world could now do that itself, with "perfect accuracy and truth." This is what caused all the excitement.

The fact that the photograph was a record of a photochemical reaction was quickly lost in the enthusiasm for the new photographic images. Though scientists had analyzed the photographic process as they would other scientific investigations, they unscientifically described photographs as "miraculous" and as objects which "infinitely surpassed,...the most perfect specimens of human art."

In *The Pencil of Nature*, W.H.F. Talbot presents the fundamental understanding that the photograph is a chemical record of
light. He writes,

The picture, divested of the ideas which accompany it, and considered only in its ultimate nature, is but a succession or variety of stronger lights thrown upon one part of the paper, and of deeper shadows on another.\(^5\)

Yet shortly after this, Talbot describes a particular photograph very differently. Describing his *View of the Boulevards at Paris* (plate 1), he writes, "The time is the afternoon...The weather is hot and dusty, and they have been watering the road..."\(^6\)

This is a dramatic shift. The photographic object has disappeared. Darks and lights have given way to time and weather.

Because the photograph was a product of natural law, its image of the world was believed to be as truthful as natural law. Faith in science and nature led to a faith in photography and photographs. The photograph's "faithful images of [the world's] grandest, her loveliest, and her minutest features, are transferred to her more distant worshippers, and become the objects of a new and pleasing idolatry."\(^7\)

Quickly accepted as truthful pictures of the world, photographs were compared to the world and seldom found lacking. In most cases, of course, this comparison was made without the original object or scene at hand. The comparison was then between the photograph and what one thought the world looked like. With such comparisons it is easy to see how what one thought the world looked like came more and more to be what was seen in a photograph. And so, as Ivins suggests, the nineteenth
century "wound up by believing that what it saw a photograph of was true."

This belief was based more on faith than fact. Hopes and expectations far outdistanced photography's limited capabilities. Indeed, much of the excitement over photography was focused on its potential, not its early results. This faith in photography's potential often blinded its enthusiasts to the facts. Photography did not record objects and colors in the same way as the human eye. Many objects could not be recorded at all. But time and again, the actual photograph was overlooked, and faith, and often an accompanying text, turned a simple chemical record of light into a truthful picture of the world.
CHAPTER 1  Picturing Pictures: Photographic Distortions of Works of Art.

Though the debate over whether photography was an art consumed much energy and filled many pages, it was photographic reproductions of paintings, drawings, and sculpture that, without opposition, changed the way we look at and think about works of art. These reproductions had a greater effect on art than any acceptance or rejection of photography as an art itself.

Belief in the mechanical accuracy of photography played a central role in both the fiercely fought battle and the uncontested victory. Photographs could not be works of art, it was argued, because they were created independent of the artist's hand. By the same reasoning, photography was the perfect means of reproducing artist's work. With photography, art work no longer needed to be subjected to the engraver's translation. Photography would, in effect, present the original work of art to the viewer. At least so it was hoped. In practice, photography merely replaced the translation of the engraver's hand with the translation of photographic optics and chemistry.

Our study of photographic art reproduction begins with Talbot's reproduction of Hagar in the Desert (plate 2), in The Pencil of Nature.

This Plate is intended to show another important application of the photographic art. Facsimiles can be
made from original sketches of the old masters, and thus they may be preserved from loss, and multiplied to any extent.¹

For multiplying images and preserving originals from loss, photography performed a role similar to that already carried on by engraving. If these had been its only advantages, photography would have been but one more means of performing the same task. But photography's acclaimed truthfulness, heralded time after time, set it apart. Photography would bring the viewer "original sketches of the old masters." The engraver or lithographer would not interfere. This was Talbot's promise for photography; a promise photography was unable to keep.

The problems of photographic art reproduction are already evident with Hagar in the Desert. Talbot's photograph is not taken from the original object, but "from a facsimile executed at Munich."² The original drawing was not even photographed for this "important application of the photographic art." The photographic facsimile itself is from a facsimile. Talbot's photograph might be of another photograph, an engraving, or a drawing from the original. It is unclear. All that is certain is that Talbot's reproduction is of another reproduction, something other than the original. Photography has been used for the reproduction of art, but it has not been used wisely.

The first book of art illustrated with photographs, William Maxwell Stirling's Talbotype Illustrations to the Annals of the
Artists of Spain, suffers from the same problem as Hagar in the Desert. Few of the photographs in this book are from original works of art. Instead, photographs are made of drawings of paintings, engravings of paintings, and even paintings of paintings. Sometimes we are fortunate in the copyist, as with the photographs of Goya's etchings of Velazquez' portraits. This is, however, small consolation for Talbot's promise of "facsimiles... from original sketches of the old masters."

To illustrate El Greco's portrait of his daughter (plate 3), a drawing of the painting is photographed. The drawing is by William Barclay. The photograph is by Nicolaas Henneman. Only the painting by El Greco is not shown.

Murillo's Senorita Rufina and Senorita Justa (plate 4) also suffers from this approach. The original painting, housed in the museum at Seville, remained untouched for Stirling's book. The photograph included here is not of Murillo's painting, but of a copy of Murillo's work painted by Don Jose Roldan.

Some allowance for such substitutions must be made. Original paintings are sometimes lost or destroyed. But that is not the case here. The painting by El Greco was in the Louvre, the Murillo in Seville, and a Velazquez painting represented by a photograph of an engraving was even closer to home, in London in the Duke of Wellington's collection.

Stirling's book does contain a few photographs of the originals he wishes to illustrate. Spared the hand of the engraver,
draftsman, or painter, Murillo's original drawing, *Savior on the Cross* (plate 5), is photographed. Finally, the camera is used to reproduce the original work of art. But even here Murillo cannot escape. New problems arise. To improve on the faulty photographic reproduction, an unnamed retoucher has drawn over most of the photograph. It is his drawing which now remains, the photograph of Murillo's drawing having badly faded.

The final irony of this roundabout approach to art reproduction is the photograph of Richard Ford's drawing of Murillo's house. This photograph, one of the very few unretouched photographs of an original drawing in this book, does not depict the work of a Spanish artist. It is included not to illustrate Ford's work, but to illustrate Murillo's house in Seville. The purpose of this drawing is informational, not artistic. Yet photography is not used to record the house, but a drawing of the house. Nowhere, it seems, does the camera face the object it is to reproduce.

Stirling's book fails in another of Talbot's hopes; that, by photography, works of art might be "multiplied to any extent." Many of the photographs here reproduce engravings and lithographs, both of which would have already been "multiplied to any extent." It is unlikely that these photographs serve any more democratic purpose than the original copies, considering Stirling's book was limited to an edition of twenty-five.⁴

This book is not a very promising start for photographic art
reproduction. It is difficult to understand what has been gained by the use of photography. It is evident, though, that Talbot's hope of "facsimiles...made from original sketches of the old masters" will not be easily fulfilled.

There were many problems in the photographic reproduction of drawings and paintings. The chemical and optical peculiarities of the photographic process could dramatically change the way the original looked in reproduction. Photography was not, as hoped, the transparent window through which the original work of art could be clearly seen.

Some of these problems are addressed by Ogden Rood in his article, "On the Truthful Reproduction of Original Drawings by Photography." Rood begins his defense of photography pointing out the shortcomings of traditional engraved or lithographed art reproductions. He argues that deviations from the original drawing are created by both the copyist's handwork and the characteristics of the reproduction process; so much so that it often "requires an effort to call up, by the imagination, the exact look of the original drawing from the inspection of its engraved copy." It is left for photography to supply, as Rood promises, the "truthful reproduction."

Rood's faith, however, cannot overcome photography's limited capabilities. The photographic reproduction Rood describes bears little resemblance to the original drawing.
The outlines will be correctly enough placed, but the relative depth of the shades is, in most cases, not satisfactory, or, at all events, not in correspondence with the original, so that, in a print of a dark sepia drawing, large masses of unrelieved blackness are likely to occur, and many minor gradations in the middle tints and lights are either lost or altered.⁶

This is a far cry from "truthful reproduction." Here only the schematic is correct. The photographic reproduction has altered all the shading. It bears no relation to the original drawing.

Faced with these problems, Rood's solution for obtaining a truthful reproduction is simple, though unexpected. He suggests that the negative be retouched! The copyist is put back to work, but now correcting photography by hand. The copyist's translation of the original has not been eliminated by photography. Instead, photography has compounded the problem.

Even Rood's belief in photography's truthfulness wanes at times. Unsatisfied with the photographic reproductions of Turner's Lieber Studiorum, Rood draws his own copies from the photographs.

Being anxious to get a distinct idea of the look of the original drawings, I was obliged, in order to effect this, to make careful sepia copies with the brush, slightly altering, in some places, the depth of the shade, to counterbalance the known deviations in depth usually produced by simple unaided photography.

Little, if anything, has been gained with photographic reproduction; certainly not "truthful reproduction." Photography has destroyed the shading of the original drawing. The reproduction must be corrected either on the negative by hand, or by redrawing the original. It is amazing that, after all these problems, Rood chooses to draw from the inadequate photographic
reproduction at all. Here, in the field of art reproduction, the "pencil of nature" is not even able to copy the pencil of man.

While the problems of reproducing drawings by photography were great, those encountered in the reproduction of paintings were overwhelming. The very laws governing the photographic process guaranteed inaccurate reproduction. Color sensitivity of the photographic chemistry to colors in the original painting often produced a result completely opposite of the one desired.

It often happens that yellows that have been used to give a light and aerial effect in the original came out dark in the copy, while blues which have been employed for shades came out light, thus destroying the tout ensemble of the picture.8

To partially correct photography's gross misrepresentation, filters and various chemical formulas were used.9 These did not, however, entirely solve the problem. To obtain a more accurate photographic reproduction, it was suggested that the original painting be treated so that it would be easier to photograph. Oil, albumen, or glycerine might be brushed on the painting, changing its surface and color and so improving the photographic reproduction.10 This suggestion must have been met with very little enthusiasm by the owners and caretakers of valuable paintings, and may account for some of the substitution of engravings for originals noted earlier.

Changing the appearance of the original painting so the photographic reproduction looks more like the original (which no
longer appears as it did) defies logic. That such changes to the original painting could even be suggested illustrates the power of photography's position. The painting is asked to compensate for photography's shortcomings. The servant has become the master. This acknowledged instrument of truth required that objects be changed to meet its needs. This is faith, not reason. It is a faith in photography grown to evangelical proportions.

In addition to having the original painting altered, photography could also demand that an additional "original" be painted to meet its own requirements.

On the continent it is generally the artist's first thought to prepare a copy of his picture in monochrome on purpose for the camera, so that accurate copies are obtainable almost simultaneously with the completion of the original.11

Monochrome copies of paintings were also prepared for the camera in Great Britain,12 though a slightly different practice was more popular.

The method is either for the artist to make an Indian-ink drawing of his picture for reproduction by this process, or if the details are too elaborate, the picture is photographed, and the proof is sent to the painter, who corrects any faults as to arrangement of light caused by the photographic transfer, either with his chalk or brush, and from this corrected copy the prints are reproduced. The negatives when thrown out of balance from the reason before mentioned are retouched, and a large number of artists are employed in this kind of work...and the vast number of photos from popular pictures are reproduced by what may be termed this appreciative and intelligent method of translation, which can only be effected by a certain artistic skill.13

All of this for photographic accuracy! Painted copies are
photographed or inaccurate photographic copies are painted. The original painting is no longer even part of the process. Extensive hand work, decried as inaccurate on engravings or lithographs, was viewed as an "appreciative and intelligent method of translation" when used for correcting photographs.

Unable to adequately copy the artist's work, photographers required that the art work be recreated. Only then would photography perform its magic. The process which was to bring us face to face with original works of art instead did away with the original, so that the reproduction might be accurate.

Problems which are not easily solved are often simply avoided. With the problems paintings caused photography so great, it is easy to understand the tendency to completely avoid the original art work, if at all possible. Painters, anxious for their work to be favorably reproduced, were willing to paint special copies for the camera. Photographers, anxious to avoid the problems of photographing original paintings, welcomed such substitutes.

In addition to substitutes specially made for the camera, already existing reproduction engravings provided another way to avoid original paintings. Joseph Cundall's *The Great Works of Raphael Sanzio* confines itself to photographs of engravings of Raphael's paintings, even though two of the paintings were housed at the National Gallery, only a few blocks away from Cundall's
Likewise, Sampson Low's Picture Gallery includes only six photographs of original paintings while almost four times as many photographs are of engravings of paintings.

Just as it had been before the invention of photography, reproduction engraving continued to be the standard means of reproducing works of art. Now, however, the hand engraved translation of the original painting underwent the additional photographic translation. Photography separated the viewer from the original by one more step.

This was often simply overlooked. The Musee Francais uses photographic reproductions of engravings of paintings, though the text completely ignores the engraving and only discusses the original painting. Though the subject matter of the painting and engraving is the same, the text and illustration deal with two entirely different objects.

The text accompanying Rubens' The Descent from the Cross (plate 6) describes a 13 ft. painting in Antwerp Cathedral with colors "distinguished by brilliancy, vigour, and harmony..." The accompanying illustration shows none of this. The text describes the painting. The photograph illustrates the engraving. The discrepancy is not mentioned. Though the text attempts to bring the painting to the viewer, the photographic illustration settles for reproducing the subject matter.

This discrepancy between text and illustration is even greater with David Tenier's The Knife-Grinder (plate 7). The illustra-
tion is a monochromatic photographic reproduction of a monochromatic engraved reproduction, though the text describes a rainbow of colors.

The knife-grinder appears clothed in a red jacket, with...breeches of a greenish dye; his drab and green hat is ornamented with a white feather, stuck in a gold-coloured riband.¹⁷

Illustrations such as these were accepted, in large part, because of the poor quality of photographic reproduction from original paintings. The Times reasoned,

...a photograph from an old master is at best a melancholy production, and though these have been taken with all care and pains, they have not, of course, succeeded in overcoming the shortcomings of their art. . . . It is another matter when we come to photographs from the engravings of famous pictures. Here photography finds its legitimate sphere, and can give us perfect fac-similes of the finest specimens of the art and of the engraver, and a far juster representation of the original picture than when applied at first hand. We do not deny that even a blurred photograph of the actual picture possesses a charm and a reality in the eyes of the lover of art, who will scan it with an enthusiasm which he cannot feel for the copy of a copy. But for ordinary purposes, and as separate works with an intrinsic beauty of their own, these fine photographs of rare engravings are to be preferred to attempts to reproduce the original picture.¹⁸

Again the basic problems of photographic reproduction are sidestepped. Photographs of engravings are accepted as substitutes for the paintings photography cannot adequately record. This is due more to photography's shortcomings than any special interest in rare engravings. Indeed, the rarity of the engravings photographed is often doubtful. Ironically, the importance of engraving seems to be discussed only when photography is being
excused for not performing up to expectations.

This enthusiasm for photographs of rare engravings rather than photographs of paintings seems a bit forced. Richard Smith, in his *Expositions of Great Pictures*, claims the engravings photographed for his book are closer to the original paintings than the original paintings.

The pictures themselves are now so changed, by re-painting, from what they were, that their original condition is, in most cases, only to be traced in those rare plates which were executed before the ravages of time, and the labors of the restorer, had marred the masters' work. These engravings may thus be regarded as the best copies we possess of these great Pictures, and Photography, undisturbed by colour, has reproduced them with the utmost fidelity.¹⁹

Smith's appreciation for engravings is a bit too convenient, based more on the fact that photography is "undisturbed by colour" here than on any true appreciation of engraving.

One reviewer gave a more accurate account of Smith's use of engraved reproductions.

The photographic illustrations are taken from early engravings, not from the pictures themselves, some of which, from their age and consequent loss of colour, would come out most inefficiently from the camera... These copies, therefore, reflect the originals of a more favorable time than our own.²⁰

Yes, photographs of original paintings did "come out most inefficiently from the camera." Though heralded as a major breakthrough in the spread of accurate reproductions of original paintings and drawings, photography was, for many years, little more than a new technique for reproducing old engravings.
Very few saw the folly of this limited use of photography. Faith in the utility and truthfulness of photography, often overshadowed common sense. One thoughtful reviewer, however, recognized the waste of simply reproducing reproductions.

...these [photographic reproductions of lithographic and engraved reproductions] cannot be considered an advisable proceeding in photography. Copies of rare or valuable engravings...are very legitimate exercises for the art; but not such works as are existing on stones or plates, and capable of being produced in a direct way as perfectly by another process. The substitution should be for the labour or skill in copying on to the stone or plate, not for the impression of that stone or plate, where the labour of placing it there has been undergone. The object of the Photograph from the original drawing...is to avert the risk of error in copying, by the lithographic draughtsman or the engravers. If they have been successful, the Photographic copy of their work will not be superior to the original; if they have made any error, or failed in any part, the Photographic copy will not remedy or remove them.

Unfortunately, this advice was not often heeded. Photographic copies of reproduction engravings and lithographs fill too many photographically illustrated books of art. Substitutes, rather than solutions, characterize what was to be an "important application of the photographic art."
Plate 2. Hagar in the Desert.
Plate 4. Senorita Rufina and Senorita Justa.
Plate 5. Savior on the Cross.
Plate 6. The Descent from the Cross.
Plate 7. The Knife-Grinder.
CHAPTER 2  Photographic Observation:  The Photography of Science.

Photographic successes were as difficult to achieve in the world of science as they were in art. Though photography had been greeted with enthusiasm by scientists, transforming this scientific discovery into a tool of science proved to be much more difficult than anticipated.

Since the scientific revolution of the sixteenth and seventeenth centuries, when the teachings of ancient and medieval scholars had been called into question, new emphasis had been placed on experimentation and observation. With this change in attitude, instruments that provided the means for better observation became very important. The telescope and microscope were foremost in this, though other optical instruments such as the magic lantern and camera obscura were also called into service.

With such dependence on optical instruments, it is not surprising that the world of nineteenth century British science so enthusiastically adopted photography. After all, the optics of photography had been used by scientists for years. To this was added chemistry, another familiar field of study. What resulted was the new science of photography.

Unfortunately, problems arose when the science of photography was used for the photography of science. As a tool for scientific observation and documentation, it faltered. Photography clung too tenaciously to its own natural laws, which prevented it from accurately recording the scientist's observations.
I now come to a branch of the subject which appears to me very important and likely to prove extensively useful, the application of my method of delineating objects to the solar microscope. W.H.F. Talbot

The idea of using nature's "own inimitable pencil" to record microscopic objects occurred to Talbot as early as 1835. The difficulties of photomicrography, however, kept him and other experimenters from major successes for several years. The camera obscura had successfully been used as a microscope, but photographically recording its image presented new problems.

Talbot hoped photomicrography would be a successful substitute for "the imperfect, tedious, and almost hopeless attempt of copying a subject so intricate," but his own successes were limited. None of the twenty-four plates in The Pencil of Nature illustrate photomicrography, nor did a book on photomicrography Talbot proposed in 1848 ever materialize.

The first photomicrographic illustrations in Britain appeared in 1852, in the Fall issue of The Quarterly Journal of Microscopical Science. Though The Art Journal considered the illustrations by Joseph Delve "eminently successful," the critic for Notes and Queries found little merit in the photographs.

Photography applied to this instrument [the microscope] will be of no further use than as an assistant to the draughtsman...the plates alluded to will show how incompetent it is to produce pictures of microscopic objects: any one who had seen these objects under a good instrument will acknowledge that these specimens give but very faint idea of what the microscope actually exhibits.
George Shadbolt thought Delve's photomicrographs showed "excellent promise," but knew from his own experience that any real success was still a long way off.

I do not advocate photography in microscopic science as a rival that will supersede the draughtsman, except in certain cases; and although it may in very many instances do so, it will most assuredly make much more work than it takes away from those who follow the occupation of a microscopic artist.

Such a response from a founding member of the Royal Photographic Society and editor of the British Journal of Photography points out the magnitude of the problems of photomicrography.

Photomicrography was not to be the handmaiden of science, but once again the handmaiden to a more familiar handmaiden of science. This is not the role Talbot envisioned for photomicrography. Nature's "own inimitable pencil" is not able to supersede the imperfect and tedious copying, but only assist in such hopeless attempts!

Thirteen years after these first illustrations, the same problems still plagued photomicrography. Though photomicrographs are used as frontispiece illustrations in Lionel Beale's 1865 edition of How to Work with the Microscope (plate 8), limited color sensitivity and depth of field still hampered the use of photography with the microscope. Beale credited photography with some success and hoped for more, but realized there was no immediate help in sight.

To be able to copy accurately by hand the beautiful and delicate lines and tints in many microscopic objects ... is so important...that I cannot too strongly
urge on all those who wish to work at the microscope, earnestly to practise drawing as much as possible. ¹⁰

The chapter on photomicrography in Beale's book is provided by Dr. Richard L. Maddox, best remembered for his work with gelatin bromide emulsions. Maddox's enthusiasm for photomicrography is also tepid. Maddox explains that the limited color sensitivity of the photographic chemistry, which caused so many problems in art reproduction, also makes it impossible to obtain accurate photomicrographs of many biological specimens.¹¹

This same problem had confronted Dr. Hugh Diamond fifteen years earlier. Diamond experimented with photomicrography in 1850, on the very day Frederick Scott Archer told him of the collodion process. He had some small success with specimens such as wood, but

in animal tissues where a great deal of yellow or yellowish brown prevails, the productions appear to be very inferior from drawings made by the camera lucida.¹²

Color sensitivity, chemical focus, and limited depth of field were not the only problems facing the photomicroscopist. Far from being the inevitable natural law "by which objects delineate themselves," the photographic process required a great deal of human intervention if objects were to "delineate themselves" correctly.

The negative can be handed to a professional photographic printer, but if so, he should be acquainted with the character of the object, or have its chief points named to him, otherwise a print may be returned bearing anything but a semblence to the real appearance of the object, as seen in the microscope; the tendency generally being to over-print and render a delicate

20
object heavy and out of all character, just as a light haired child is sometimes transformed in a photograph, into one with raven locks.\textsuperscript{13}

With all these problems, it is not surprising that virtually the only use of photography Maddox suggests without reservation is the photographic reproduction of drawings of microscopic objects, his method of illustration in \textit{The Anatomy of the Liver}.\textsuperscript{14}

The problems which plagued Talbot's first attempts at photomicrography did not disappear. Poor light sensitivity, limited color sensitivity, and the discrepancy between chemical and visual focus severely hindered the production of successful photomicrographs.

Ironically, to overcome these photographic problems, a microscope was required which was not of higher quality than one used for visual observation, but of lower quality. Improvements made in microscopes for visual observation created problems for photography. "The more perfect the instrument, the less adapted it is for producing photographic pictures."\textsuperscript{15}

Apparatus could be made for photography or visual observation, but the same apparatus could not be used successfully for both. Consequently, photography was not capable of recording visual observations. Photography could only be an alternative to observation, and not a very successful alternative either.

Very few books illustrated with photomicrographs ever did appear in Great Britain. What had once been thought of as a
natural union of photography with the microscope turned out to be an impossible mix.

Photo-micrography, or the art of producing enlarged positive or negative pictures direct from microscopic objects by the combined use of the microscope with photography, although partaking of the value of each, has, unfortunately, a much less application than either. The giant strides of progress made by the parents have left their offspring, in the race towards perfection and usefulness, far in the rear. Laden with its childish toys and treasures, it climbs a narrow path; con-
strained to walk when they run - to stop when they advance. No precocity marks its growth. Slow its steps, it clings to friendly hands, and hastes for shelter, in the threatenings of opposition or adversity, where 'proud science' finds a home. Thus, indebted to their union for its existence, it claims indulgence for its infant weakness and en-
couragement in its childhood from those who so largely enjoy the amusement and instruction afforded by both.
EXPLANATION OF THE PLATE.

1. Part of Stem of Hydrangea, transverse section ... 1 inch object ve.
2. Sarcoptes scabiei, female ... ... ... ... 1 th
3. Human Blood Corpuscles, rapidly dried ... ... ... ... 1 th
4. Tuba from Field Mouse ... ... ... ... 1 th
5. Bone, Manxman, transverse section ... ... ... ... 1 th
6. Parasite, House of Martin ... ... ... ... 1/16 inch
7. Diatom, Hemicphora flabellata ... ... ... ... 1/16 th
8. Flea, from rossil earth, Barbados ... ... ... ... 1/16 th
9. Pleurosigma formosum ... ... ... ... 1/16 th
10. Aculeus, Latissimus ... ... ... ... 1/32 th
11. Male Flea of Pigeon ... ... ... ... 1/16 inch
12. Diatom, part of the case of Pleurosigma formosum ... ... ... ... 1/8 th
13. Female Flea of the Horse ... ... ... ... 1 inch

Plate 8. Frontispiece from How to Work with the Microscope.
This public recognition of the success of chemical delineation of celestial objects may be an important date in the history of Astronomy. No discovery of our day affords a more hopeful field of anticipation than that of photography, which seems destined to take that part in the astronomy of visual phenomena which graduated instruments have taken in the astronomy of motions and positions. Athenaæum

From its early days, photography was associated with astronomy. In France, it was the astronomer, Francois Arago, who urged the French government to purchase Daguerre's process. In Great Britain, it was the astronomer Sir John Herschel who proposed the word "photography." "[One] astronomer presided over its birth and another over its christening."18

But these two fields, mutually dependent on light, were not easily united. Hopeful writers, of course, believed that astro-photography was simply a matter of replacing the astronomer's eye with a camera. Having seen the problems encountered in photomicroscopy, it will come as no surprise to learn that converting the telescope into a camera was a much more difficult task.

Until photographic problems were overcome, astro-photography would fall far short of the stars, and it would be several years before Talbot's sun-pictures actually pictured the sun.

The early history of photography applied to astronomy seems appropriately summarized in Sir John Herschel's earliest in-camera photographs. The great astronomer's photographs are not of the sun, moon, or stars; but of his father's giant telescope.19
The first photographically illustrated book that deals with an astronomical subject contains no photographic illustrations of astronomical objects. The photographs in Charles Piazzi Smyth's *Teneriffe, an Astronomer's Experiment: or, Specialities of a Residence Above the Clouds* do not get any farther off the ground than Herschel's photographs.

Smyth's book is a record of his astronomical expedition to the island of Teneriffe "to ascertain how far astronomical observation can be improved, by eliminating the lower third part of the atmosphere." His expedition was not limited to astronomical observations, but also encompassed biology, geology, and meteorology. Consequently, the resulting book is not only a record of astronomical observations, but a personal account of the trip. It is, however, the "Astronomer's Experiment," as the title notes, that is the purpose of the expedition.

None of the twenty photographic illustrations, however, depict astronomical phenomena; though five illustrations show the astronomical apparatus, recalling Herschel's photograph of fifteen years earlier. That astronomical photographs were meant to be obtained cannot be doubted. It was the astronomer/photographer Sir John Herschel who suggested that Smyth, the Astronomer Royal of Scotland, be supplied with equipment "for obtaining photographic impressions of everything worthy of record." The problems of astro-photography were often overwhelming to Smyth. In some instances, just pointing the camera lens towards
the sun created problems which prevented photographs from being made.

The solar radiation was strong...and in spite of care, some part or other of our photographic apparatus, for picturing the sun's image, would every now and then begin to smoke and burn. Yet with the less incendiary moon, the camera is not even mentioned. Smyth complains that the evening is not long enough for him to record the lunar details revealed in his telescope, but apparently makes no photographic attempts at such records.

Though astro-photographs are not included in this book, it is not because Smyth lacked faith in photography. He uses photography often and, to his mind, convincingly. The accuracy of a telescope or barometer would be questioned before the truthfulness of photography, especially when rigid precautions are taken.

By its necessary faithfulness, a photograph of any sort must keep a salutary check on the pencil or long-bow of the traveller; but it is not perfect; it may be tampered with, and may suffer from accidental faults of the material. These, which might sometimes produce a great alteration of meaning in important parts of a view, may, however, be eliminated, when, as here, we have two distinct portraits of each object. Correctness is thus secured...

To insure truthfulness, stereo photography is chosen as a method of double checking, of eliminating any tampering or "accidental faults." Scientific accuracy seems assured. Even today, one writer discussing Smyth's work seems to accept "the fact that cameras did not have cultural prejudices or faulty memories" as implying the same for photographs. This is not the case.

The text and photographs of Teneriffe are filled with
Smyth's cultural prejudices. Trained in both painting and science, Smyth's perceptions are an interesting mix. Describing a mountain cast shadow at high elevations, he notes:

> a full idea can only be formed, by combining what the telescope reveals of the powerful lights and shadows in the moon, with the paintings of Turner and Rembrandt.27

With Smyth, the painter's eye is often used for the scientist's observations. This is the same eye that directs Smyth's camera. Though stereo photography may prevent some tampering with the photographic print, photography is full of tampering, whether it be framing, editing, or directing the activity in front of the cultureless camera.

The artist can create the scene the scientist's camera records. During his study of an unusual plant, Smyth attracts a group of curious boys. Rather than only photograph the plant or record the boy's actions, Smyth poses them in a manner more agreeable to his Victorian tastes (plate 9).

> Persuading them at last to be somewhat more orderly, Photo-stereograph No. 14, was obtained...[One boy's] dress consisting of nothing but a coarse shirt, we thought he would look more appropriate in a slumbering attitude.28

Though the stereograph was chosen for its accuracy, Smyth's concern for what is appropriate overrides his interest in accuracy.

Smyth's photographs seem strangely unrelated to their intended purpose. Employed for the purpose of scientific illustration, explanation, or proof, the photographs do not illustrate, explain, or prove much of anything. Instead, a great deal of text is
required to illustrate and explain the photographs. Like objects under the scientist's microscope, Smyth dissects these photographs piece by piece. Like photographs in a family album, however, much that is described lies in memory and not in the photograph. One writer suggests that "in a characteristically determined and creative fashion, Piazzi squeezed a large amount of information and insight out of the pictures."\(^2^9\) Looking at the photographs, though, will show that much of that information and insight is squeezed into the photographs in a "creative fashion," and not squeezed out.

It is instructive to look at the illustration, Sheepshanks Telescope First Erected on Mount Guajara... (plate 10), and then read what it is that the photograph is supposed to show. Even the most careful study of this photograph does not provide the information and insight supplied by Smyth's text.

A photograph taken in the late afternoon, shows the Equatorial mounted, and approximately in position. Its stand, in the shape of a hollow pier of wood, filled with stones to make it heavy, gives promise of resisting the wind. The two Sailors are seated about amongst the packing boxes, looking very tired. One of the guy ropes of the tent crosses the foreground, and in the distance is the magnificent Peak of Teyde, raising its sugar-loaf cone high into the sky. At the foot of the cone, or at an elevation of 11,700 feet, there is still a patch of last winter's snow; and below that begin on every side the streams of lava and pumice, various in colour, but subdued by distance into good keeping for the background of a picture.\(^3^0\)

Even the most careful examination of the photograph does not reveal these things. "Late afternoon,...filled with stones,
...looking very tired,...Peak of Teyde,...last winter's snow,... streams of lava and pumice, various in colour" are either not visible or not identifiable in the photograph. Smyth describes all of this as though it is clearly visible. But Smyth's description is not of the photograph. It is a description of the place.

Smyth continues his close observations (or memories) and actually analyzes one photograph under a magnifying glass. His microscopic scrutiny provides not only minute details, but a narrative as well. The stereograph, Second Mate of Yacht Observing Radiation Thermometers on Mount Guajara (plate 11), is included to illustrate term day work, where scientific observations are made and recorded at regular intervals throughout an entire twenty-four hour period. Again, it is instructive to look at the illustration before reading the descriptive text.

To chronicle the exact circumstances under which these high results appeared, the photographic camera was employed with effect. Accordingly, in Photo-stereograph, No.7, may be seen towards one corner of the telescope enclosure, our stout seaman-observer, notebook in one hand, and chronometer in the other, counting seconds up to the moment that he is to take the reading of the exposed thermometer, sharp: after that, he will remove part of the tin-foil covered lid from the sheltered instrument, in order to get the temperature of shade. Both thermometers have their bulbs encased in glass bells, from which the air had been extracted by syringes, that project through the boxes below; and show their turned rings neatly under a magnifying glass. Our honest second mate wants no such refinement of method to make him visible; and though he had requested that his portrait might be taken, - in the act of holding up a large sextant, which he was ambitioning to learn the use of; and with a smart cap on his head, and in his best jacket, as if he were already a merchant skipper.
of some degree, - I preferred catching him at an instant when he was thinking of nothing but his duty; with his oldest Guernsey on his broad, manly breast; and his trousers turned up and dusty, from his recent labours at the wall.\[15.5pt\]

Smyth narrates all that is about to occur in the scene photographed. Again, it is the scene and not the photograph he describes. The photograph does not show a man counting seconds. It depicts a man looking at something he holds in his hand. The photograph does not explain the procedure Smyth describes, yet he states that the "camera was employed with effect."

The photograph does not provide nearly as much information about the scene as the accompanying text. The ineffectual use of photographs in _Teneriffe_ reinforces the old truism that after looking at a photograph, one reads what is written on the back to "see" what the photograph shows. Smyth, who in another context reminded himself "to throw old associations on one side, and attend only to absolute facts, before us at the instant,"\[32pt\] is unable to do so with photographs.

Most photographs, of course, are kept alive because of these associations. Asking Smyth to limit his comments to "facts before us at the instant" may be too much. But in his introduction to _Teneriffe_ Smyth explains that the photograph keeps a "salutary check on the pencil or long-bow of the traveller." He believes the photograph will curb traveller's tales. But it clearly has not kept the pencil in check. Instead, the pencil creates the meaning of the photograph. The photograph is not the
incontrovertible witness, but a meaningless picture which illustrates the narrative it is provided.

Smyth's faith in photography remains unshaken. Describing his photograph, *Dragon Tree Walk at a Palazzo Near Orotava* (plate 12), Smyth praises photography for its accurate record. Comparing three drawings of the Dragon Tree, one of which is a sycamore-like looking tree drawn from another drawing, Smyth is profoundly struck by the vast differences between the drawings of the tree and his photographs of it. He concludes:

...with the language of drawing...errors are always copied, and magnified as they go; seldom are excellences reproduced. After a few removes, the alleged portrait of nature, is only a caricature of the idiosyncrasies of the artist.

Never was the debt that mankind owe to the inventors and organizers of photography, Talbot, Daguerre, Herschel, and Archer, more apparent than in the case of the dragon-tree...Nature...awed by nothing she has made, takes on the collodion plate, the whole scene, with all its foreshortenings, all its groupings, as instantly as a flat wall.33

This passage has been quoted repeatedly, reinforcing the notion that photography was, indeed, the means by which the world was accurately recorded. Yet, the comparison Smyth makes is not between the tree and the photograph, but between his photograph and bad drawings. The accuracy of the photograph is thus assured.

Another often quoted passage from *Teneriffe* is Smyth's confident assertion, "Where doctors differ, there is nothing like the testimony of a photograph."34 This comes after he compares the rocky landscape of the Malpays on Teneriffe with Baron Von Humboldt's written description of the area. The point in ques-
tion is the size of the gaps between the rocks which form the jumbled pile. Humboldt, a renowned scientist, had written, "The road...was extremely fatiguing...the lava, broken into sharp pieces, leaves hollows, in which we risked falling up to our waists."\textsuperscript{35}

Smyth disagrees.

But the breadth of the gaps, though quite enough now and then to take in and break a horse's leg, is never, or by proper care need never be, anything inconvenient for even a lady to step across.\textsuperscript{36}

Describing these gaps as "never, or by proper care need never be" dangerous, tells little about the size of the gaps. It is more of a suggestion to use caution than a description of the rocks. Photography is called upon to settle the matter.

We planted our camera, at a fair average part of the Malpays; and straightaway obtained Photo-stereograph No. 10; the handle of a geological hammer, on a stone in the foreground, presenting something of a scale for measure.\textsuperscript{37}

For Smyth, photography again proves its usefulness to scientific investigation. However, the widest gap here is not between the rocks, but between the text and photograph.

Smyth's concern is the size of gaps between the top surfaces of the rocks. The photograph (plate 13), however, shows the rock pile from the side, revealing little of the gaps in question. The hammer handle included as "something of a scale for measure" is foreshortened, providing no scale; nor does its elongated shadow help. Looking at the photograph with a more cautious eye
than Smyth, one sees that very little information is provided by the photograph which would help settle the question.

Where accurate measurements would provide the required infor-

mation, a photograph is made instead. The photograph shows a rocky terrain, but no more. There may be "nothing like the testimony of a photograph," but here there is nothing to that testimony. As with the other illustrations, what the photograph depicts and what the text explains are quite different. Smyth's faith in photography's abilities outdistances what the photograph here accomplishes, preventing Humboldt's assertion from being photographically disproved.

Smyth has another encounter with Humboldt's observations which is not mentioned in articles on Teneriffe. The passage is probably overlooked because no photographs are associated with it. That alone may make it worth mention. The subject is neither rocks nor trees. It is astronomy, the focus of the expedition if not the photographs from the expedition.

During his astronomical observations on Teneriffe, Humboldt witnessed "lateral fluctuations of stars;"38 stars which appeared to rise straight up, descend sideways, and return to their original point.39 Smyth had been instructed to investigate this phenomenon and did so. He found no such movement, though he did note that heat vapor from the surrounding volcanic rock was sufficient to cause the appearance of such movements. Here is the careful scientist. He observes and then draws conclusions only from what he has seen. Without photographic testimony or praise to the
inventors of photography, Smyth suggests further observations need to be made. In this situation, where doctors differ what is needed is more observation, not more photographs.

The use of photography in Teneriffe reinforces Thomas Huxley's observation that "when good authority has pronounced what is to be believed, and faith has accepted it, reason has no further duty." Eminent scientists had pronounced their faith in photography as a valuable aid to science, Smyth accepted it, and any reasoned questioning of its utility or accuracy was beyond further duty.

Blind to its own mistakes, Teneriffe is an illustrated catalog of what photography is not. It is not an unbiased record. It is not a tamper proof document. It is not a story teller. It does not explain or reveal meaning. And, in Smyth's book, it is not a tool for the illustration of astronomical phenomena.

The final irony of Smyth's faith in photography comes in his second book on Teneriffe, Report on the Teneriffe Astronomical Experiment of 1856. Though he had submitted 74 stereo photographs as illustrations, only two photographs were used. Frustrated in his attempt to promote photographic illustration, he complains.

Duly bearing in mind the burst of enthusiasm with which the birth of photography was hailed by all scientific men, and the prophetic descriptions that were indulged in by venerable Arago...as to the infinite improvement which would...occur to all scientific illustrations...some disappointment must be felt on looking round
now; and finding how little has been brought to pass of those magnificent dicta, uttered years ago by great men, to whom the world gave implicit credence. In spite of such predictions, photography has not taken that special and useful line...it is not reforming and supplanting all other methods of illustrating scientific memoirs. Where is the fault or the difficulty? It is not in photography itself.41

To vindicate photography, Smyth's report includes the two photographs printed by his wife in an edition of 350 in "a very short space of time."42 His case is clear. Photography has not been adequately used in scientific illustration. To show that the reason behind this is not a fault of photography, Smyth demonstrates how easy it is to produce a large number of photographs. Where then is the problem? Why hasn't photography removed scientific illustration from the "caprice of the artist?"43

Though Smyth did not believe it, the problem did, in fact, lie with photography. Like Teneriffe, the two photographic illustrations included in Smyth's Report to support his assertions provide no astronomical information. One photograph shows the rock walled observing station. Again, the telescope is photographed, but not the stars. The other illustration (plate 14) does not even escape the "caprice of the artist." It is a stereo photograph of a hand-made model of the Great Crater of Teneriffe. Photography provides no illustrations of the moon, stars, or planets; only pictures of equipment and plaster models. To illustrate the astronomical subjects viewed from Teneriffe, such as Jupiter and lunar craters, Smyth's Report uses hand drawn lithographs. This is not a very convincing demonstration of the
usefulness of photographic illustration.

Smyth's attempts at photography for scientific illustration are not very successful nor illustrative. In the field of photomicrography, the overwhelming problem was chemical. Though the problems of photochemistry also plagued astro-photography, the main problem here is faulty reasoning and unquestioning belief. Photography may delineate the forms in front of the camera, but it cannot explain these forms; nor can it reveal their function. Smyth's books point out the limited usefulness of photographs for illustration, and the extreme dependence of the photograph on "the ideas which accompany it."
Plate 10. Sheepshanks Telescope First Erected on Mount Guajara.
Plate 11. Second Mate of Yacht Observing Radiation Thermometers on Mount Guajara.
Plate 12. Dragon Tree Walk at a Palazzo Near Orotava.
Plate 13. Specimen of the Malpays of Black Lava near Alta Vista.
REPORT
ON THE
TENERiffe
ASTRONOMICAL EXPERIMENT
OF 1856,

ADRESSED TO THE LORDS COMMISSIONERS OF THE ADMIRALTY,

BY
Prof. C. PIAZZI SMYTH, F.R.S. L. & E., F.R.A.S. AND
H.M. ASTRONOMER FOR SCOTLAND.

LONDON AND EDINBURGH:
PRINTED BY RICHARD TAYLOR AND WILLIAM FRANCIS, RED LION COURT, FLEET STREET, LONDON,
AND NEILL AND COMPANY, HIGH STREET, EDINBURGH.
1868.

IMP/GEH

Unlike Charles Piazzi Smyth's photographically illustrated books, Warren De La Rue's Bakerian Lecture. On the Total Solar Eclipse of July 18, 1860 is illustrated with photographs which depict astronomical phenomena. At last, photography gets off the ground and the astronomical event is photographed instead of the equipment.

De La Rue uses photography as an observational tool to record the solar eclipse. His faith in photography as an accurate eyewitness is so strong that at first he makes no plans for complementary eye observations, trusting the record solely to photography. He is later persuaded to carry out these observations. This is fortunate as he ends up relying on them so that he "might be in a position to interpret from [his] own sketches and recollections the results of the photographs."

These "sketches and recollections" are of great importance. They provide the bridge of understanding the viewer needs to cross over from De La Rue's photographs to the subject photographed. Without them the photographs are indiscernible.

Though De La Rue's photographs do record the eclipse, these records are not the same as the scientist's observations. The photographic process creates an observation all its own.

First, the lack of photographic quality affects the illustrations. The two photographs illustrating this book (plate 15) are made from copy negatives, and so "do not present all the details visible in prints taken direct from the original
negatives.\textsuperscript{46} The resulting loss of detail and increased contrast rob the photographic illustrations of much of their usefulness.

The corona, for example, which is depicted in the original negatives, is to a great extent lost in the copies, because in bringing clearly out the details of the prominences, the corona in most cases becomes overprinted.\textsuperscript{47}

This loss of detail is only one problem in deciphering these photographs. De La Rue's photographs of the eclipse are so different from the scientist's own observations that he is obliged to explain "certain appearances in them, which might otherwise occasion some difficulty."\textsuperscript{48}

The difficulty of understanding these photographs is that they are time exposures. What they depict is not visible to the human eye. These records are unique to photography, entirely different from human observation.

To further confuse the matter, in these exposures motion is not tracked across the negative. De La Rue's telescope compensated for the earth's rotation so that the sun appears stationary. Not only do we lose our visual cues, but we cannot call on photographic cues to help explain this. There is no blur across the sky. There is the sharp edge of instant exposure, within which lies the accumulated traces of an entire minute of solar activity.\textsuperscript{49}

These photographs reveal a sight that never was. To "see" the eclipse one must decipher the photographs, not simply look at them. They must be dissected and then reconstructed to create a
picture resembling what would have been seen by a human observer.

Unless an instantaneous picture...could be procured...no photograph would show the precise state of matters at any one moment; consequently, if it be desired to know what was the condition of things at any one instant...for example, at the commencement of the totality, and a minute afterwards, recourse must be had to the expedient of completing the circle of the lunar disk for the position she occupied at these two epochs.50

De La Rue provides instructions for the complicated deciphering the photographs require, and uses this method for his illustration, Copy of a Touched Photograph (plate 16). This mezzotint illustration is a dissection and partial reassembly of the photograph, a hand worked montage to recreate what the eye could see but the photograph could not record.

De La Rue's last suggestion for using the two photographic illustrations is to view them together in stereo. Remembering Smyth's use of stereo photography as a double check on reality, De La Rue's suggestion is surprising. He uses the two photographs to create a view of the total eclipse "which could not be enjoyed by mortal eyes in looking at the real eclipse."51 Stereo photography is used here to create a scene that never was, not to keep the "long-bow of the traveller" in check.

Though De La Rue believed that photographs were capable of "a precision as to contour and position impossible of attainment by eye-observation,"52 fortunately he did not completely rely on them as substitutes for observation. Drawings done during the eclipse were later superimposed on the photographs for comparison.
Combining the photographic information with the drawings, illustrations depicting the visual appearance of the solar eclipse were made. Though these illustrations are not purely photographic, it should be clear by now that "more photographic" does not mean more truthful or more like reality. It simply means more like a photograph, which may not always be what is desired.

Photographic illustration of astronomical subjects comes full circle in this book. Originally employed because of its accuracy, photography ends up creating a fiction. Photography does not capture our view of the world, but creates its own. Time exposures, photomontage, and the creation of a realistic three dimensional sight from two inaccurate photographs are all "photographic," but not an accurate visual record.

These photographic fictions are not unique to De La Rue's work. In "Applications of Photography to Astronomy," another creative method for producing stereos of the moon is described. Two photographs are made of the same phase of the moon but with one or more month's interval between the exposures. The result is a stereo "representing the moon exactly as it would appear if our eyes could be separated thirty thousand miles apart and each view the moon through a telescope at the same time." In addition, this painful sight would also show "actual elevations...as they would be in a bird's-eye view to a lunar inhabitant."

Viewing the moon with eyeballs separated by 30,000 miles or as a lunar inhabitant may be interesting, but it is not relevant
to scientific observation. Yet, this author advocates the use of photography because of its "entire immunity from personal errors, errors of judgment, or from want of skill." In short, because of its truthfulness.

Here again, photography's convincing pictures have been mistaken for truthful pictures. "The possibility...of dispensing with the observer...has been fully demonstrated. The method consists in substituting for the eye a photographic plate."56

Photography's convincing pictures lead this author to suggest using photography to rid science of the "personal equation," the human errors and inconsistencies which vary "not only with years, but from one moment to another, with the troubles of digestion, circulation or nervous fatigue."57 Photography, free from such human maladies, will, in the author's view, greatly improve scientific observation.

Though at first glance De La Rue's photography does seem to free scientific observation from the "personal equation," this is clearly not the case. Photography is not the ideal impartial observer. It is not a substitute for the scientist's own observations, but depends on these observations for its own usefulness. Not only can photography not replace human observation, it cannot survive without it.

Photography is an alternative to observation, and not one without its sacrifices. During the eclipse De La Rue becomes
aware of the sacrifice he has made, forfeiting the experience of the eclipse for the scientific and photographic records of it.

Only a few brief seconds unfortunately, could be spared from the telescope after the totality had actually commenced; but when I had once turned my eyes on the moon encircled by the glorious corona, then on the novel and grand spectacle presented by the surrounding landscape, and had taken a hurried look at the wonderful appearance of the heavens, so unlike anything I had ever before witnessed, I was so completely enthralled that I had to exercise the utmost self-control to tear myself away from a scene at once so impressive and magnificent, and it was with a feeling of regret that I turned aside to resume my self-imposed duties. I well remember that I wished I had not encumbered myself with apparatus, and I mentally registered a vow, that, if a future opportunity ever presented itself for my observing a total eclipse, I would give up all idea of making astronomical observations, and devote myself to that full enjoyment of the spectacle which can only be obtained by the mere gazer.58

Another astronomer/photographer, during the earlier 1851 solar eclipse, chose a course different from De La Rue's. Though urged by the Astronomer Royal of England to photograph the eclipse, William Henry Fox Talbot decided to forego any attempts at astro-photography. Talbot understood that photographing the eclipse would mean not seeing it.

The idea of making a photogenic representation of the next total eclipse had occurred to me, not without some misgivings as to its practicability - The image would be obtained I think in a few seconds, but the excitement of the observer as the critical moment approaches would be such that I think if he attempted to make many observations of different kinds he would probably fail in all of them. To succeed he must devote his attention to the point alone, thereby losing the rare opportunity of studying the rose coloured eminences with all his attention during the brief period of their visibility...60

Talbot realized what De La Rue discovered too late; that
photography proves least effective when it is asked to be a substitute for experience. It does not show what was and its operations prevent the photographer from experiencing what is.
Plate 15. First Totality Photograph.
Second Totality Photograph.
Plate 16. Copy of a Touched Photograph.
James Nasmyth's *The Moon: Considered as a Planet, a World, and a Satellite* is another photographically illustrated book on astronomy which, with one exception, contains no photographs of the moon, the sun, or the stars. Unlike *Teneriffe*, however, these illustrations do not merely depict the activity surrounding astronomical observation. Astronomical subjects are illustrated, but not the actual astronomical objects. The photographic illustrations are of models of the moon, not the moon itself.

In reference to the Illustrations accompanying this work, which represent certain portions of the lunar surface, we should say a few words here on the means by which they have been produced. During upwards of thirty years of assiduous observation, every opportunity has been seized to educate the eye not only in respect to comprehending the general character of the moon's surface, but also to examining minutely its marvellous details under every variety of phase in the hope of rightly understanding their true nature as well as the causes which had produced them. This object was aided by making careful drawings of each portion of the object when it was most favourably presented in the telescope. These drawings were again and again repeated, revised, and compared with the actual objects, the eye thus advancing in correctness and power of appreciating minute details, while the hand was acquiring, by assiduous practice the art of rendering correct representations of the objects in view. In order to present these Illustrations with as near an approach as possible to the absolute integrity of the original objects, the idea occurred to us that by translating the drawings into models which when placed in the sun's rays, would faithfully reproduce the lunar effects of light and shadow, and then photographing the models so treated, we should produce most faithful representations of the original. The result was in every way very highly satisfactory.

Such an approach to scientific illustration is, in part,
explained by Nasmyth's reliance on analogy. "Analogy," Nasmyth writes, "is a guide in enabling us to infer the appearance of the invisible from that which we know to be of kindred nature and which we have seen."^62

Nasmyth's illustration, Back of Hand & Wrinkled Apple (plate 17), is a photographic analogy used to explain his ideas on how lunar mountain ranges were formed. The objects depicted are not the subject. Nasmyth does not depend on direct observation or photographic accuracy here to make his point, but instead relies on analogy. This releases photography from its traditional role. It is not relied on for the truthful representation of objects. Indeed, Nasmyth believes the only photograph in his book which actually depicts the moon gives only an "imperfect idea"^63 of the moon's surface.

Why, then, is photography used? None of Nasmyth's illustrations rely on photographic accuracy to depict the actual objects he discusses. Photographing models of the moon seems rather far removed from any legitimate use of photography in scientific illustration. But this is not simply one more misguided use of photography. Rather, Nasmyth shows an exceptionally keen understanding of pictorial and graphic representation for scientific illustration. His decision to illustrate his book with photographs of models is made because of the shortcomings of the other alternatives.

Hand drawn illustrations of the moon do not satisfy Nasmyth's
needs. Having studied many drawings of the moon in his work, Nasmyth was well aware of how little use these drawings often were in forming any conclusions about the objects depicted.

No two draughtsmen will produce each a drawing of the most simple object from the same point of view, in which every detail in the one will coincide exactly with every detail in the other. There is abundant evidence of this in the existing representations of the great nebula in Orion; a comparison of the drawings that have been lately made of this object reveals varieties of detail and even of general appearance such as could hardly be imagined to occur in similar delineations of one and the same subject... The fact is that the drawing of a man, like his penmanship, is a personal characteristic, peculiar to himself, and the drawings of two persons cannot be expected to coincide any more than their handwritings.

Maps came no closer to providing the accurate pictures of the moon Nasmyth required.

[The map] does not pretend to be a picture. The asperities and depressions are symbolized by a conventional system of shading and no attempt is made to exhibit objects as they actually appear in the telescope. A casual observer comparing details on the map with the same details on the moon itself would fail to identify or recognize them except where the features are very conspicuous.

Nasmyth's solution to this is a "picture-map," an illustration in which the general outlines are taken from a map, but the shading done so that each feature "is shown somewhat, if imperfectly, as it actually appears at some period of a lunation." But this too has its problems. The shading which gives the features their form is standardized.

We depicted the general aspect of each object: and we so adjusted the shading that all objects should be shown under about the same angle of illumination - a condition which is never fulfilled upon the moon itself.
Pictures, maps, and picture-maps all fall short of providing the information Nasmyth required. To most, photography would be the obvious solution. But photography too provided only an "imperfect idea" of the object depicted. Nasmyth does not even mention photography as an alternative here. What is it then that Nasmyth's photographs of models accomplish that drawings, maps, and photographs do not?

In Nasmyth's method of illustration, sculpture and photography are each used to their best advantage. Sculpture is used to record form and photography to record light. Photography is not used to record the moon's surface, because Nasmyth believes his models do that better. Photography is chosen instead to perform its most basic function; to record light and shadow.

In order to present these Illustrations with as near an approach as possible to the absolute integrity of the original objects, the idea occurred to us that by translating the drawings into models which, when placed in the sun's rays, would faithfully reproduce the lunar effects of light and shadow, and then photographing the models so treated, we should produce most faithful representations of the original. The result was in every way very highly satisfactory (plate 18).

Light and shadow are fundamental to Nasmyth's concerns. It is "shadows by which the lunar objects reveal themselves...[and] mostly by their shadows...that their forms are revealed to a terrestrial observer."69

The importance of accurately reproducing light and shade precluded the possibility of simply photographing the moon.
In photographic pictures produced by the moon of itself there is always an apparent exaggeration in the relation of light to dark portions of the disc. The dusky parts look, upon the photograph, much darker than to the eye directed to the moon itself, whether assisted or not by optical appliances.70

Faced with the original, photography does not perform to Nasmyth's standards. When employed to reproduce light and shadow on his models, however, "the result was in every way very highly satisfactory." The unexaggerated reproduction of light and shade from a plaster model is more important to Nasmyth than the exaggerated reproduction of light and shade, even though the photograph is of the moon itself.

Light, not the object it illuminates, is the focus of Nasmyth's photography.
PLATE IX

THE LUNAR APENNINES, ARCHIMEDES &c. &c.

SCALE.

plate 18. The Lunar Apennines, Archimedes &c.
CHAPTER 3 The Universal Traveller: Accurate Or Beautiful Views.

Of all the photographically illustrated books published in Great Britain in the nineteenth century, books of travel outnumber all other subjects. Travel and tales of travel were popular in Great Britain long before the invention of photography. The foreign and exotic or the local and picturesque each attracted the British tourist. While the Grand Tour of Europe had long been a staple of the wealthy Englishman's education, travel in Britain also became popular in the closing years of the eighteenth century.

This increase in travel created a need for accurate travel information in both words and pictures. To provide the eighteenth and nineteenth century traveller with accurate pictures, and to assist him in making his own, optical devices such as the camera lucida and camera obscura were often used. This topographic concern is evident in Captain Basil Hall's Forty Etchings, From Sketches Made With the Camera Lucida, in North America, in 1827 and 1828.

It should be recollected that in most cases, it is not striking or beautiful views that we require, but merely correct representations, as far as form is concerned, of those familiar objects which strike the eye of the traveller every where in his path as characteristic of the country he is visiting.

If his sketches be further relieved by lights and shades, another step is made towards the attainment of this purpose; for even a very few such touches, if strictly true to nature, often serve to place new scenes more distinctly before us than the most elaborate, or the most graphic verbal description can ever hope to accomplish.
With this emphasis on accurate representation, Hall is satisfied with the "character of truth" imparted by the camera lucida. It is important for him to note that the illustrations in his book have not been embellished in any way.

The very lines traced on the spot, have been transferred to the Plates, in order to preserve, as far as possible, the character of truth which the mechanical accuracy of the Camera Lucida communicates to its work, even in hands but little familiar with the management of the pencil.

This valuable instrument ought, perhaps, to be more generally used by travellers than it now is; for it enables a person of ordinary diligence to make correct outlines of many foreign scenes to which he might not have leisure, or adequate skill, to do justice in the common way...With his Sketch Book in one pocket, the Camera Lucida in the other...the amateur may rove where he pleases, possessed of a magical secret for recording the features of Nature with ease and fidelity, however complex they may be, while he is happily exempted from the triple misery of Perspective, Proportion, and Form, - all responsibility respecting those being thus taken off his hands.

In short, if Dr. Wollaston, by this invention, have [sic] not actually discovered a Royal Road to Drawing, he has at least succeeded in Macadamising the way already known.²

Most of Hall's views are, unfortunately, rather uninteresting as pictures. Unrelieved by those "lights and shadows...to place new scenes more distinctly before us," the sparse hesitant lines of his camera lucida drawings provide only outlines (plate 19).

The most interesting of Hall's drawings are his sketches of frontier people, which depict characters, not mere stick figures. In these, however, the "character of truth" has suffered. Like later photomontages, accurate but unrelated figures have been
combined into groupings which never existed. Backwoodsmen and Steam-Boat Pilot (plate 19) shows three men in what is drawn as one continuous space, though such a group never gathered.

Other travellers were more interested in the pictorial qualities of the landscape. Here aesthetic concerns took precedence over topographic detail. This concern with the aesthetic qualities of a landscape extended beyond landscape drawing to landscape viewing. To enhance their view of the world as a picture, travellers often looked at the landscape using a Claude Glass, a piece of darkened glass named for the French landscape painter Claude Lorrain. After travelling to a chosen spot, the traveller turned his back on the vista before him and looked at the scene as it was reflected in the Claude Glass.

One traveller, interested in the pictorial qualities of the landscape, was William Henry Fox Talbot. On seeing a beautiful scene during one of his travels he writes, "I wish Claude were here to take a view for me..."³ Later, on the shores of Lake Como, Talbot tries to make his own pictures of the scene before him. But with the camera lucida "the faithless pencil had only left traces on the paper melancholy to behold."⁴ Talbot is unable to draw even the "merely correct representations" Hall thought possible "even in hands but little familiar with the management of the pencil." Frustrated at his inability to record "the inimitable beauty of the pictures of nature's painting" Talbot, as he tells the story, is led to the invention of
photography.

Talbot's experience at Lake Como is an interesting contrast to Hall's use of the camera lucida. Hall's emphasis on "correct representations" rather than "striking or beautiful views" is that of the topographer. His sole purpose is the accurate recording of the world he sees.

Talbot's purpose is very different. Nowhere in the account of his Lake Como experience does he mention "mechanical accuracy" or the "character of truth." "Merely correct representations" did not satisfy him. Talbot wanted to capture "the inimitable beauty of the pictures of nature's painting." While Hall believed that "it is not striking or beautiful views that we require," that is exactly what Talbot wanted.

Talbot's invention often satisfied both the topographer and the artist, though it was the perceived accuracy of the photograph more than its beauty which attracted so much attention and praise. Just as Basil Hall praised the truthfulness of the camera lucida, photographically illustrated books of travel praised the "unimpeachable fidelity" of the "unerring pencil of light." 5 One writer bluntly stated, "Whoever doubts the truth of these views, doubts the truth of heaven's own blessed light itself!" 6

Once again, this praise of photography is based more on faith than on fact. When photography was actually used to record the monuments of distant lands the results were less successful.
In John L. Stephens' *Incidents of Travel in Yucatan*, photography is only capable of a subsidiary role. The daguerreotype is used merely as a check on the camera lucida drawings.

[Catherwood] made all his drawings with the camera lucida, for the purpose of obtaining the utmost accuracy of proportion and detail. Besides which, we had with us a Daguerreotype apparatus, ... with which, immediately on our arrival at Uxmal, Mr. Catherwood began taking views; but the results were not sufficiently perfect to suit his ideas. At times the projecting cornices and ornaments threw parts of the subject in shade, while others were in broad sunshine; so that, while parts were brought out well, other parts required pencil drawings to supply their defects. They gave a general idea of the character of the buildings, but would not do to put into the hands of the engraver without copying the views on paper, and introducing the defective parts, which would require more labor than that of making at once complete drawings. He therefore completed everything with his pencil and camera lucida while Doctor Cabot and myself took up the Daguerreotype; and, in order to ensure the utmost accuracy, the Daguerreotype views were placed with the drawings in the hands of the engravers for their guidance7 (plate 20).

Stephens does not question the accuracy of the photograph, he just cannot decipher the photograph to figure out what it is that is being depicted so accurately. What these confused, though accurate, photographs did reveal was that the "unerring pencil of light," the pencil of nature, wrote in a language all its own.

When photography was applied to reproducing works of art or recording scientific information, it was expected to be accurate. As we have seen, accurate reproduction was often more than it could provide. But that was all that was asked. When the camera was pointed at the world, however, topographic accuracy was
enough only for a few. Those whose interests were pictorial as well as topographic, demanded that photographs of the world be beautiful as well as accurate.

With photography attempting to meet the different demands of accuracy and beauty, attention shifts back and forth between considerations of how correct the world looked in a photograph and whether a photograph met the criteria of a work of art.
Plate 19. The Balize at the Mouth of the Mississippi.

Backwoodsmen and Steam-Boat Pilot.
In the work of Francis Frith, these two concerns come together. For Frith, photography was a combination of art and science whose proportions changed from one photograph to the next.

Frith was a firm believer in the truthfulness of photography. For him the action of light on silver and the properties of the lens which combined to produce the photograph were "a sort of providential arrangement so remarkable that it looks exceedingly like a special one...not so much a contrivance of man as a design of nature..."³

The cornerstone of this providential process was its accuracy, "its essential truthfulness of outline, and, to a considerable extent of perspective, and light and shade."⁴ It is this which set photography apart from the other arts and, for Frith, made photographs not only more interesting than drawings, but even more interesting than the world itself.

Every stone, every little perfection, or dilapidation, the most minute detail, which, in an ordinary drawing would merit no special attention, becomes, on a photograph, worthy of careful study. Very commonly, indeed, we have observed that these faithful pictures have conveyed to ourselves more copious and correct ideas of detail than the inspection of the subjects themselves had supplied; for there appears to be a greater aptitude in the mind for careful and minute study from paper, and at intervals of leisure, than when the mind is occupied with the general impressions suggested by a view of the objects themselves, accompanied, as these inspections usually are, by some degree of unsettlement, or of excitement, if the object be one of great or unwonted interest.⁵

This fascination with photographic detail elevated photography to a commanding position. Objects became "worthy of
careful study" only in photographs. The reproduction became the reality. Looking at photographs became the substitute for experience.

With such unbridled confidence in photography, Frith finds it well adapted to the same topographic function Hall pursued. In Sinai and Palestine Frith pauses before Jerusalem to reaffirm his photographic faith, echoing Hall's concern for an accurate picture rather than a beautiful one.

Nowhere in this series do we so fully recognise the peculiar excellence of photography as in the view before us. In it we have the very reflection of Jerusalem. Artists have represented the Holy City; but while we have admired their works, we have lamented an inevitable want of perfect exactness. The first feeling in looking at them with those who had seen what they purport to portray has been disappointment; with those who had not, distrust. Here the first feeling is the satisfaction produced by confidence; and as with a muchloved face, such a truthful record is of more value than the most elaborately beautiful picture.

Here is the photographer's declaration of faith. From the disappointment and distrust of the artist's work the photographer's soul is raised to "the satisfaction produced by confidence."

The photograph accompanying Frith's declaration of faith is further illustration of the strength of his belief (plate 21). In fact, it is a better illustration of Frith's faith than it is of Jerusalem. Jerusalem is only a narrow band of indistinct shapes between the sky and foreground in the photograph. Exactness or inexactness cannot be an issue here. The entire city is barely discernible. "The satisfaction produced by confidence" has satisfied Frith too easily.
Frith is less sanguine over photography's possibilities with his photograph, *Distant view of Damascus* (plate 22).

...in presenting this attempt at the celebrated view of the city and plain from the slope of Lebanon, we must qualify the disappointment of our friends who have read the glowing descriptions of this scene given by a score of travellers, by acknowledging that the camera does very scanty justice - we might almost say does an injustice - to subjects so distant and so minute and indistinct in their details as this is;...To the eye it is undoubtedly a magnificent view; the white buildings of the city, covering a vast area, glitter charmingly through the interminable plain of rich foliage.  

This photograph has tempered Frith's enthusiasm. It does not provide a magnificent view of Damascus. Like his photograph of Jerusalem, it too barely provides any view of Damascus at all. The city is only a thin white line on the horizon, barely discernible. Unlike his Jerusalem creed, however, here Frith is more realistic concerning the limitations of photography.

If photographic accuracy was Frith's only concern and he was no better illustrating his subjects than in these photographs, his name would not be known today. But Frith was not blind to the art of photography. He might claim "a truthful record is of more value than the most elaborately beautiful picture," but he knew what beautiful pictures were and how to use photography to make them.

For Frith, photography was an art as well as a divine instrument of truth. Having moved beyond the early chemical and optical experiments, Frith believed photography could now "take
rank amongst the great pictorial arts of the day." He did not, however, claim that photography was "either 'high Art', or in any way a substitute for it." It was, for him, an art still "in its infancy."¹³

But whether in infancy or adolescence, photography had one major limitation as an art. That limitation was also its chief virtue - its truthfulness.

We now come to the disadvantages of this attribute: for it happens, by a singular fatality that upon it hangs the chief reproach to photographic productions as works of Art. The fact is, that it is too truthful. It insists upon giving us 'the truth, the whole truth, and nothing but the truth.' Now, we want, in Art, the first and last of these conditions, but we can dispense very well with the middle term.¹⁴

After all the praise Frith heaps on photography because of its truthfulness, including its beneficial effect on one's morals,¹⁵ it comes as a surprise when he declares that the major problem photography faces as an art is that it is "too truthful." But Frith, along with many others, viewed this mechanical accuracy as a severe limitation to artistic work. Art improved on nature. Photography copied it.

Although [the photographer's] chemical knowledge be perfectly adequate, and his manipulation is faultless, it is a marvel, an accident, a chance of a thousand, when a picture 'turns out' as artistic, in every respect, as his cultivated taste could wish.¹⁶

Yet within these limitations and against these rather steep odds, photographers did produce artistic work. With his photograph, Pharoh's Bed (plate 23), Frith arranged the subject on the ground glass in an artistic manner and used the open shadows and
delicate tonal variations of the photograph effectively.

I flatter myself...somewhat upon the quality of my Photograph – light transparent shadows, sweet half-tones, oh discriminating Public! It is true that the Temple outdoes the Tower of Babel, not only 'reaching onto the heavens,' but robbing the picture of well-nigh all its sky – that feature so essential to the picturesque in landscape. But what could I do? I must have that scrap of water, and the Nile boat...and I could not falsify the height of the bank, as I see most artists have done, to suit the proportions of my picture.¹⁷

Frith has elevated photography to an art without falsifying the scene "to suit the proportions of [his] picture." Here he satisfies both the topographer and the artist. The photograph is beautiful and accurate. Photography has achieved its rank as an independent art.

This exaltation of photography, however, is short lived. In the text which accompanies The Approach to Philae (plate 24), the photograph preceding Pharaoh's Bed, photography bows low to art. Frith credits the landscape with any success the photograph might achieve.

This is one of the few views which a photograph can render without, perhaps, greatly detracting from its artistic fame. Everybody has sketched it - many clever artists have painted it - Murray has engraved it for his "Guide", and now, in these later days, the Sun himself condescends to pigmify it, and pop it bodily into the box which your artist provided. And it is a view which can bear all this treatment – this freedom of travellers - this robbery - above all, this unflattering mechanical picture-making, without loss of beauty or interest.¹⁸

Photography is no longer an independent art, but a mechanical hack destroying views. The only saving grace we are told, is
that this place is so beautiful even photography cannot make a bad picture. There is no explanation how, in one page, photography went from mechanical hack to an independent art. Frith's reflections on photography as an art change from scene to scene and photograph to photograph, as dependent on the problems encountered while photographing as on any philosophical attitude. Sitting comfortably at home writing "The Art of Photography" he is more generous than when recalling the difficulties of photography in the Middle East.

Frith's denunciation is all the more interesting because of the photograph which it accompanies. The Approach to Philae is one of the most beautiful of Frith's Middle East photographs. It is an excellent example of the options open to the photographer in choosing the viewpoint from which to frame his picture and advance his art. Yet, Frith's artistic claims are abandoned just when artistic results are achieved.

Arguing the artistic claims of photography sometimes involved rather twisted reasoning. Art was criticized for its lack of photographic accuracy, while photography was criticized for its lack of artistic imagination. The unfortunate result of this was that a criticism of art was substituted for an analysis of photography.

Frith takes this approach comparing his photograph, Osiridae Pillars and Fallen Colossus (plate 25), with David Roberts'
lithograph of the same subject. Not surprisingly, photography, being more photographic, wins the contest.

David Roberts, in his splendid work, has bestowed upon it [the fallen colossus] a very respectable and recognisable profile; but my picture shows that the face is so mutilated as scarcely to leave a feature traceable.¹⁹

Comparison of Frith's photographs with Roberts' lithographs of Middle East subjects continued in later criticism. With other critics, however, prejudices were stronger and criticism was more pointed. In Egypt, Nubia, and Ethiopia, a book illustrated with Frith's stereographs, Samuel Sharpe has nothing favorable to say about artist's drawings of the Middle East. As one might expect from a book illustrated with one hundred photographs, Sharpe is full of praise for Frith's photographs and their obvious advantages over drawings.

The valley of the Nile has been visited by a variety of travellers, who have brought home drawings...made under various difficulties. Denon, following the French army, published a volume of views; but too often sketched hastily, perhaps while his comrades were engaged in battle. The scientific expedition sent out by Napoleon was accompanied by several artists; but their costly volumes too clearly show that the drawings receive many of their last touches in Paris. Some of our English artists have also published beautiful volumes of the picturesque ruins in this land, most interesting for the draftsman; but we cannot but sometimes fancy that they have sacrificed somewhat of the scientific accuracy to artistic effect. But when we look at Photographic views, we are troubled by no such misgivings. Here we have all the truthfulness of nature, all the reality of the objects themselves, and, at the same time, artistic effects which leave us nothing to wish for.²⁰

Sharpe boosts photography by criticizing art for not doing what photography does better. Artistic views are faulted because of their
sacrifice of "scientific accuracy to artistic effect." Such a criticism is clearly irrelevant. Art is not expected to do otherwise. But Sharpe twists the argument. Ignoring the purpose of art, he looks only at the informational content of the drawings. With this as the sole point of comparison, art falls short, lacking photography's "scientific accuracy."

In Sharpe's argument art does not match up to photography. But these photographs, which possess "all the truthfulness of nature," qualify as works of art with "artistic effects which leave us nothing to wish for." Photography, it seems, provides truth as well as beauty.

Though Sharpe's criticism of art and praise of photography occupies only one paragraph in *Egypt, Nubia, and Ethiopia*, it is the focus of the *Art Journal*'s review of the entire book. After a few favorable comments concerning the value of these views "made by the unerring sun," the *Art Journal* turns its attention and wrath towards Sharpe's comments. Sharpe's criticism of painting in terms of photography is answered with criticism of photography in terms of painting.

If we were to speak in the same 'extreme' style, we should say that this is not only unjust but untrue. Certainly no artist can hope to rival the photographer in the production of such elaborate transcripts of sculpture and hieroglyphics as many of these views present; but when 'artistic effects' are spoken of, we shall often look in vain at these views to find them. Indeed, there is a general blackness in some that is not at all characteristic of the brilliant climate of Egypt, and is simply the result of the effect of the hot air and bright sun upon the negatives...
never was, nor could be, such a dark mass of confusion seen in the colonnade at Philae, or the Temple of Luxor as is thus by chemical accident produced. Shadows can scarcely be said to exist in this land of sunshine and sand, and the works of Roberts and Lewis are consequently far more truthful than any photograph in this volume; inasmuch as they delineate the pure sky and arid air, the transparent shadows, and clear beauty of Egyptian scenery. Let us give honestly to every branch of Art and science its due praise, but let us not overrate one by underrating another.

It is not surprising that the Art Journal finds photographs less artistic than art. This response is as predictable as Sharpe's criticism of art as less photographic than photographs. But this criticism goes farther and challenges the truthfulness of the photograph. The Art Journal criticizes photography for its inaccurate recording of shadow in a land where "shadows can scarcely be said to exist." The work of David Roberts is again compared to Frith's. This time, however, Roberts' work, with its open shadows, is cited as more truthful than the photograph's "dark mass of confusion...as is thus by chemical accident produced."

Though the criticism is justified it is unjustly amplified. Photography's rendering of outline is considered a matter of accuracy but its inaccurate rendering of light and shade is addressed as a matter of truth. The argument suffers from the underrating of what photography does well and overrating of what it fails at. What results is another example of "the same 'extreme' style" for which Sharpe is criticized.

The distinction between accuracy and truthfulness needs to
be drawn more carefully than it is by the *Art Journal*. Accuracy deals with how closely the photograph's outlines, shadows, and color match those of the object or scene depicted. The dark shadows criticized in the *Art Journal* review are inaccurate. The depiction of the Great Fallen Colossus in Frith's photograph is accurate. It is the success or failure of the process, the optics and photochemistry of photography, which accuracy addresses.

Truthfulness does not stop with the two dimensional depiction of the world. It requires much more. A truthful photograph must convey the presence or experience of the world, not merely its image. Such truthfulness is not easily achieved. Though he complained photography was "too truthful," Frith was aware of the difficulty of providing "the whole truth" in a photograph. As a result, Frith provided a great deal of text to explain his photographs, to provide a sense of the place to the image of the place.

Alone, Frith's photographs do not often convey a sense of the actual place. Though his photographs accurately depict monuments of the past, the life which goes on amid these buildings and landscapes is absent. It is only in his text that Frith's photographs come to life. A silent landscape is accompanied by a text alive with snakes, panthers, and wolves. An unpopulated view of Jerusalem accompanies Frith's revulsion at the sight and smell of lepar beggars. His picturesque photograph of Tiberias (plate 27) is foreign to his description of the place.
The town itself is a most wretchedly forlorn and dirty-looking assemblage of houses, or hovels...There is an adage, 'that the king of fleas holds his court in Tiberias.' This we had vividly in mind on our arrival at the spot, and so were steeled against the strong inclination of our Bedouins to pitch our tents within the walls.22

There is a wide gap between the world in Frith's photographs and the world described in his text. Into this gap falls "the whole truth." This discrepancy between photograph and text is, in part, explained by Frith's attitude towards the Middle East. Like many others, he is a modern day traveller interested only in the past. He has not travelled to see the Middle East as it is in his own time, but to find, in what remains, the world that once was.

Frith finds life in Jerusalem loathsome, made tolerable only by the city's association with events nearly 2,000 years past.

I do not envy the man who can enter unmoved the land [Jerusalem]'Where the holiest of memories, phantom-like, throng.' If he has no organ of veneration, he had better stop at home...I cannot write lightly of Holy Palestine. It is true that the natural features of the country are, for the most part, monotonous and comparatively uninteresting—that the towns are paltry and dirty in the extreme—that the Turkish Mohammedan population is ignorant and bigoted—that the Arabs who infest its solitudes are the laziest, the most cowardly, and worthless set of fellows—in a word, and in every sense of it, the greatest vagabonds in existence; yet in spite of all this, and overwhelming it triumphantly, comes the thrilling recollection—that this was the country of Abraham and the Prophets!23

This concentration on the past and exclusion of the present is well served by Frith's photography. Here photography does not show "the whole truth." Instead, it isolates the monument or
landscape from contemporary life, inventorying the past without recording the present. The photographs are accurate but not truthful.

Frith's attempts to provide the whole truth went further than most photographers. Realizing that photography would only record the "bare sunlight truth," Frith provided texts to enhance and inform the photographs. He supplied his scenes with activity and histories. What still escaped his photographs, however, was "the witchcraft of the place."

I am all too enamoured of the gorgeous, sunny East, to feign that my insipid, colourless pictures are by any means just to her spiritual charms.

Though considered "too truthful," here photography does not often achieve a whole truth. Most of Frith's photographs are empty of the experience surrounding the place. They are records of shapes but not souls.
Plate 22. Distant View of Damascus.
Plate 24. The Approach to Philae.
Plate 25. Osiridae Pillars and Fallen Colossus.
Plate 26. The Temple of Luxor - Thebes.
Plate 27. Tiberias, From the South.
P.H. Emerson focuses his photography more closely on "the whole truth;" a truth which, for him, encompasses not only facts, but also poetry. He is not satisfied with "merely correct representations." Emerson's truth must include the beautiful.27

Emerson's philosophy of art and photography is difficult to discuss because his views changed dramatically in a very short time. He first established and then rejected photography's claims as an art. His opinion of photography's influence on painting, for example, changed from "marvelous" to "nothing short of disastrous,"28 while photographer's "works of art" became merely "pictorial decorative works."29

Emerson's belief in the artistic possibilities of photography vanished when he became familiar with photography's inflexible scientific basis. Though his own work exhibits an artistic use of photography, Emerson lost sight of the art he had created when he reasoned that because of its scientific nature photography could not be art.

Before his dramatic change of heart, Emerson believed photography could produce both a truthful and artistic statement. Indeed, the artistic element was an integral part of his photographic truth.

Accuracy was now only one element of the truth. Photography's ability to produce "inimitable drawings of skulls, savages, weapons, waterfalls, geological strata, fossils, animals, birds, trees, landscapes, and men"30 was still important, but for Emerson it
was not enough.

Emerson's photographic truth was more than "merely a register of bald facts." The physiological and psychological aspects of photography, which Emerson felt had been overlooked too long, were also parts of his photographic truth. If photography was to be artistic and truthful, it must present the world in a manner which mirrored the viewer's physiological and aesthetic vision.

The physiological truth Emerson advocated included his well-known dictum of differential focussing. "Do not mistake sharpness for truth," he cautioned. A sharply focussed photographic lens records more detail than the human eye sees, consequently such photographs, for Emerson, were false. Emerson recommended focussing "just as sharp as the eye sees...and no sharper." In addition, because the eye sees only part of a scene in focus at any one time, Emerson believed the photographer should focus only on the principal subject of the scene, rather than strive for edge to edge sharpness in the photograph.

In addition to the facts before the lens and the perceptions of the eye, Emerson felt the photograph must also convey man's aesthetic experience of nature if it was to be considered wholly true. The factual photograph of the guide-book might "do well for a botany but not for a picture." The photograph must capture the "sentiment of nature" as well as its facts; the poetry of nature as well as its prose.
Before being overwhelmed by Hurter and Driffield's discoveries in photographic science, Emerson believed photography was fully capable of interpreting nature and expressing emotions. He believed the photographer's aesthetic response to the world could be conveyed in the photograph. To this end, he suggested that the photographer develop his negatives on the same day they were made while "the mental impression of what you are trying for is fresh." This, along with the proper materials, such as color corrected glass plates for negatives and platinum paper for prints, would enable the photographer to effectively capture the correct tones and atmosphere of a scene, two important elements for Emerson in translating the impressions of nature into photographs. With this approach, the photographer would no longer merely record nature but create "poems of the winds whispering amongst the reed-beds...the spirit of the wild colts on the flowery marsh...silvery flowers of nature."

This is Emerson's Naturalistic Photography, "the true and natural expression of the impression of nature by an art;" the factual, physiologically correct record of the photographer's aesthetic response to the world. It is Emerson's well-balanced photographic truth.

To achieve this, Emerson's photographs are more than unedited transcripts of life. Rather, they are recreations of life. Emerson required only that his photographs have the same sentiment as nature and what he later called "the illusion of
truth."\textsuperscript{41} The truth in these photographs is the truth found in good fiction. It is not an attempt to capture life, but to create it.

It is this approach to nature that separates Emerson's photographs from those we have seen. His photographs are worlds onto themselves. They are not attempts to match the world fact for fact, but are self-contained images with intrinsic artistic value and truth.

\textbf{Life and Landscape on the Norfolk Broads} is Emerson's attempt at creating a photographic art which includes "representation of the facts, the beauties, and the sentiment of nature."\textsuperscript{42} No claim is made that either text or photograph reproduces life. That is not the purpose of this "book of art for lovers of art."\textsuperscript{43} Instead, what is sought is a reconstruction of life, the creation of pictures which are "suggestive of life."\textsuperscript{44}

To accomplish this Emerson does not rely solely on photography. Though he professes a belief in photography's ability to interpret nature and express emotions, as well as convey facts, Emerson often falls back on words to do just that. Like the work of Smyth and Frith, his text provides a script for the photograph, explaining to the reader what to see and feel.

In \textbf{Life and Landscape on the Norfolk Broads} the relation between text and photograph varies a great deal, dependent, in part, on how successful Emerson is in creating artistic photo-
graphs. This is evident in Water-Lilies (plate 28) and Gathering Water-Lilies (plate 28), two photographs supplemented with the same text. These two photographs can be compared before the text is read to see how successfully the photographs stand on their own, conveying the "sentiment of nature" necessary to Emerson's photographic truth.

Emerson's text, like both these photographs, is poetic. He does not present "bald facts," but like the facts in his photographs, wraps them in artistic expression.

The beautiful perennial aquatic herbs of the poetically named order Nymphaeaceae are common throughout the Broads. They were so called, perhaps because, like the nymphs, they delighted in sequestered pools and shady streams...Towards evening the flowers shut up, but remain floating on the tranquil bosom of the water, and in the early morning the petals expand to woo the sweet pure air and warm sunlight...The Nymphaea nelumbo was the water-lily...sacred to India... The duck, says an Indian writer, went one night in search of water-lilies, and looking into the pond saw the stars reflected there: at dawn of day, seeing the great white flowers open, he feared to touch them, thinking they were the stars...

After reading even this short excerpt of Emerson's text, the photographs look different to us. For Water-Lilies, the text is depended on to create a large part of the total impression. Though the photograph conveys the tone and atmosphere of the scene, alone it does not express the sentiment of nature as effectively as when combined with the poetic text.

Gathering Water-lilies, on the other hand, gains little from the text. The impression Emerson seeks is contained in the photograph. Though there are no more facts in one photograph
than the other, one succeeds much better in the "expression of the impression of nature by art."

This is the truth Emerson wants to capture. It is in our aesthetic response to his pictures. If the viewer can feel the "sentiment of nature" in the photograph, Emerson's truth has been achieved.

Gathering Water-lilies, Twixt Land and Water (plate 29), and Poling the Marsh Hay (plate 30) all convey this aesthetic expression of the world, independent of the text.

Emerson has produced pictures which, for him, are true to nature. Nature is still the measure by which the photograph is judged. But it is no longer only the facts of nature the early enthusiasts of "the pencil of nature" recorded. It is the pictures in nature as well. Concerned that his photographs be aesthetic impressions, not inventories of facts, Emerson views the world as being "full of pictures." 46

We first came upon this picture, and the lighting was beautifully soft and subdued...In the foreground were some withered stalks, reminding one of poor Bonvin's fine feeling and delicate drawing... on the right grew two trees - the wispy trees beloved of Corot. There is...tranquil repose in atmosphere and water, teaching that simplicity and sentiment are at the foundation of all true art.

Emerson's concern with creating aesthetic truth in his photographs often led to a preoccupation with the pictorial qualities of the world. As a result, the "illusion of truth" he sought was often achieved at the expense of factual information.
This is not crucial in this "book of art for lover's of art," where facts are secondary. Emerson's photographic truth is still achieved.

Facts become more important in Pictures of East Anglian Life, where the factual and aesthetic parts of Emerson's truth do not fit together well. Pictures of East Anglian Life appears to mark an important shift in Emerson's attitude. Unlike his "book of art for lovers of art," Pictures of East Anglian Life sets out to be a "contribution to a Natural History of the English Peasantry and Fisherfolk." 48

My aim has been to produce truthful pictures of East Anglian Peasant and Fisherfolk Life, and of the landscape in which such life is lived. With this end in view, I made ample notes whilst living in East Anglia, so that all the information...was gained by actual observation, and afterwards amplified and corrected by information gathered from the lips of specialists in the various subjects...These plates are, with one or two exceptions, untouched, so that they may be relied upon as true to Nature. 49

The "truthful pictures" Emerson describes here are different from those in Life and Landscape on the Norfolk Broads. Greater emphasis is to be placed on fact rather than impression. This attitude carries over into the text as well. The lives of the people are dealt with more fully here than in Life and Landscape on the Norfolk Broads and, in general, written about from a less picturesque point of view. To further this factual approach, references are cited and appendices of meteorological observations,
agriculture, and species lists of birds and fish of the area are included.

*Pictures of East Anglian Life* is not, however, simply a "register of bald fact." Emerson still wants to "express sympathetically various phases of peasant and fisherfolk life and landscape which have appealed to me in Nature by their sentiment or poetry." Consequently, there is no dramatic shift in Emerson's photographic approach.

Though Emerson claims that *Pictures of East Anglian Life* is a "contribution to a Natural History," he uses the book to fulfill other goals as well. Emerson presented copies of his book to English photographic societies as an example of artistic photography. This has nothing to do with natural history.

In giving a copy of this work to every English Photographic Society, my purpose has been to lay before them the results of my views on the practice of artistic photography as laid down in my recent work *Naturalistic Photography*...some of the plates in this work...will form a sort of atlas to that text-book.

Emerson's attempt to produce a record which was both accurate and artistic put greater demands on his photographs than were made in *Life and Landscape on the Norfolk Broads*. He is successful in accomplishing these dual tasks in *A March Pastoral* (plate 31), the photograph he felt possessed "every naturalistic quality I seek." In this photograph "the sombre tone well expresses the bleak, raw day of early March," satisfying Emerson's requirement that naturalistic photography be an "expression of the impression of nature by art."
Added to this is the natural history of the scene, factual information provided in detail.

Here is depicted, in very early spring, the hedgerow of a Suffolk field...These sheep are not of pure breed, with the exception, perhaps, of the sheep in the hedge-row, which are of the black-faced Suffolk breed...
The sheep in the picture are nibbling at grass and turnips, which the sheperd has pulled, and cast along the hedgerow to leeward, so that the sheep can feed and the lambs be protected from the biting north-easterly winds so prevalent in March. The lambs' tails have been cut, which points to their age being over a fortnight, for it is the practice to cut their tails and geld them at a fortnight old.  

In addition, Emerson also provides information on sheep washing and shearing as well as quoting Darwin on the domestication of sheep and their adaptation to various environments.

Both the factual and aesthetic approach to nature are provided by this photograph and its accompanying text. This scene from nature is recorded accurately, even though the manner in which the scene is photographed is governed by aesthetic, and not factual, concerns. This is the natural history with sentiment and poetry that Emerson wished to achieve.

This delicate balance is difficult to maintain. Fact and art make different demands. In such a struggle it was Emerson's aesthetic concerns that took over. His text accompanying Where Winds the Dike (plate 32) provides little factual information that is not already evident in the photograph. The dike, bridge, and cattle shed are simply inventoried with no additional information concerning their natural history. Emerson is focussed
on the artistic sentiment of the scene.

To us the picture speaks eloquently of flowers of the salt marsh and cries of circling fen-fowl; of nibbling sheep, and the frolics of new-born foals...of the gentle murmurings of spring, of the hot breathings of summer, of the dying moanings of autumn and of the wild cryings of winter...55

Though an unrelated discussion of fishing follows, the balance between naturalistic photography and natural history achieved in March Pastoral is lost to the murmurings, breathings, moanings, and wild cryings of the seasons. The natural history of the subject is abandoned for the aesthetics of the photograph.

In his chapter, "Norfolk Cottages", Emerson does not merely abandon the natural history of the subject, but carefully avoids it. Rather than examine the actual conditions of rural life, Emerson reverts to aesthetic concerns.

Though the country cottage appeared quaint and picturesque in the landscape, it was often a squalid place in which to live. Emerson knew this from his days as a medical student, but ignores the peasant's plight and concentrates instead on the pictorial qualities of the scene.

The simple houses of the poor have always interested us, so much of the poetry, so much of tragedy throws its glamour around these lonely dwellings...Once, when a student of hygiene, we viewed cottages from the cubic-space, water supply, village-slop point of view; but now we are able to forget these points when outside these lowly homes.56

Emerson easily forgets the problems of the residents of these filthy hovels and, for "artistic purposes," photographs the cottage but not the life within it.
In Norfolk there are still to be found many beautiful cottages, with their quaintly-painted gable-ends and picturesque chimneys...for artistic purposes we prefer the quaint isolated cottages of Norfolk to the lily-fronted vine-embowered cottages of Surrey. The latter are pretty, and are loved by lady watercolourists, but we do not think Corot or Bastien Lepage would have spent much time on them...57

Emerson chooses the picturesque over the real. *A Toad in the Path* (plate 33) shows a cottage in the distance, a prop in a genre scene. *Norfolk Cottages* (plate 33) illustrates a picturesque facade, "the white walls beautifully subdued by the grey day-lighting."58 The natural history of the peasant is not illustrated. Emerson is not unaware of their difficulties, but his camera and mind are focussed on beauty, not documentation or reform.

Such a lack of concern with the life of the peasant is a real stumbling block in a book which purports to be a natural history of the peasant. An additional problem, however, arises when Emerson does choose to photograph peasant life. Not satisfied with documenting the peasant's actions, Emerson instead composes genre scenes. Peasants are enlisted as models. "Suitable types for artistic purposes" are sought.59 Children "bribed with pence" model for Emerson against his "chosen background."60 Peasant workers at the clay-mill, reluctant to be photographed, become willing models when "promised there should be plenty of beer for all."61 And so Emerson creates his fictions (plate 34).

Though he still achieves naturalistic photographs with the
"illusion of truth," this approach is fatal to a natural history. The photograph's special claim to historical accuracy, which Emerson acknowledged, is destroyed. The straightforward record is abandoned in favor of an approach which provides "the illusion of truth," but not the facts. Emerson does not follow the flow of life; he directs it. The people and scenes of East Anglia are arranged into little fictions. The photographs are good fiction and fine pictures, but dismal failures as natural history.

Though the photographs in Pictures of East Anglian Life are as beautiful as those in Life and Landscape on the Norfolk Broads, the book is not a success. Emerson has fallen far short of his goal of producing a "Natural History of the English Peasantry and Fisherfolk." While the question of accuracy could rightly be ignored in a "book of art for lovers of art," it must be addressed in a book whose stated purpose is natural history. This book's purpose is different from his earlier "book of art," but his method is not.

Two different demands are placed on photography in this book. Natural history requires photographs which depict, as close as is photographically possible, life as it occurs. Naturalistic photography requires an aesthetic response to nature. Though at times Emerson achieves both goals, too often the accuracy of the photograph is compromised for the picture's aesthetic truth. Such photographs may be more pleasing and emotionally
stronger, but they do not meet the social scientist's demands. The functions of art and science are not the same, nor are their methods, and so Emerson ultimately fails at his very difficult task.

Emerson's attempts at producing truthful photographs are far in advance of the other work studied. His awareness that a true picture must contain more than "bald facts" led him to create photographs that revealed the spirit lacking in much of the other work we have examined. This is done, however, at a cost. Though Emerson's photographs are, in his terms, truthful they are not factual.

Gathering Water-Lilies.
Plate 29. Twixt Land and Water.
Plate 30. Poling the Marsh Hay.
Plate 31. A March Pastoral.
Plate 32. Where Winds the Dike.
Plate 33. Norfolk Cottages.

A Toad in the Path.
Plate 34. The Clay Mill.
CONCLUSION

When good authority has pronounced what is to be believed, and faith has accepted it, reason has no further duty. T. Huxley

The nineteenth century began by believing that what was reasonable was true and it wound up by believing that what it saw a photograph of was true...W. Ivins

Huxley's statement helps to explain Ivins' conclusion. The good authority of science endorsed photography; an accepting public believed in it; no further questions were asked, and the "nineteenth century wound up by believing that what it saw a photograph of was true."

Faith and a willingness to believe are evident in all of these books, from The Pencil of Nature to Pictures of East Anglian Life. The photograph is relied on as a truthful record. We have seen that such a truth is elusive and such a faith is sorely misplaced.

Reason was a weak defense against such a faith. Awareness of photography's limitations did not diminish the nineteenth century's belief in photography. Paintings were reproduced incorrectly and scientific records distorted, but still photography was believed to be true. Faith obscured the facts.

As the nineteenth century progressed, photographic accuracy improved. Developments in chemistry and optics eliminated many of the early problems that plagued photography. But photographic
truth did not develop along with photographic accuracy.

Truthful representation is not the product of new chemicals or lens design. It is a matter that lies outside the realm of scientific discovery. Indeed, truth is not often simply discovered. More often it is chosen.

The nineteenth century wanted pictures they could believe were true. Photographs were the most accurate and scientific means of representation available, and so they were chosen to fill this need. It was not that photography revealed the truth. We have seen that is not the case. Photography was chosen to be a truth. That choice and the faith that accompanied it guaranteed that photographs, no matter what their limitations, would be accepted as truthful pictures of the world.

Once photography was accepted as true, its shortcomings were easily overlooked. Faith made the photograph much more than it ever could be alone. Faith provided meaning to otherwise meaningless photographs. The photograph was not asked to explain what it pictured; faith provided all necessary explanations. What was known about the world was read into the photograph. Faith stretched the edges of the photograph and filled it with stories, facts, and explanations.
NOTES

INTRODUCTION


2. *The Hand-Book of Heliography; or, the Art of Writing or Drawing by the Effect of Sun-Light. With the Art of Dioramic Painting, as Practised by M. Daguerre* (London: Robert Tyas, 1840), p. 45.


6. Ibid., Plate 2, "View of the Boulevards at Paris."

CHAPTER 1


2. Ibid.


4. Ibid., p. xiii.


7. Ibid., p. 126.


15. The illustrations in this book are Woodburytypes.

16. The Musee Francais: Fifty of the Finest Examples of the Old Masters from this Famous Collection (London: Bickers, 1876), "Descent from the Cross."

17. Ibid., "The Knife-Grinder."


CHAPTER 2


2. Ibid., p. 27.

3. Ibid.


9. Ibid., p. 368.


11. Ibid., p. 151.


22. Ibid., p. 297.


24. Ibid., p. x.


31. Ibid., pp. 172-3.

32. Ibid., p. 146.

33. Ibid., p. 426.

34. Ibid., p. 297.

35. Ibid., p. 296.

36. Ibid., p. 297.

37. Ibid.
38. Ibid., p. 335.

39. Ibid., p. 341.


42. Ibid.

43. Ibid.

44. This is an extra-illustrated book; only a few copies contain albumen photographs. The well-known fading of albumen photographs stopped De La Rue from using them to illustrate the entire edition. In place of the photographs, the more permanent mezzotint engravings were used "to give a general idea of the photographs."

Though photography was used to record the solar eclipse, it was not suited to the illustration of a book on the eclipse.

De La Rue, p. 67


46. Ibid., p. 67.

47. Ibid.

48. Ibid., p. 68.

49. Ibid.

50. Ibid., p. 69.

51. Ibid., p. 83.

52. Ibid., p. 7.

53. Ibid., p. 30.

54. Professor Merriman, "Applications of Photography to Astronomy," The Illustrated Photographer 2 (October 29, 1869):492.
55. Ibid., p. 493.

56. Ibid.

57. Ibid.


60. Letter from W.H.F. Talbot to G.B. Airy, May 2, 1851 (Royal Greenwich Observatory 6/119:f500r).


62. Ibid., p. 144.

63. Ibid., p. 145.

64. Ibid., pp. 4–5.

65. Ibid., p. 68.

66. Ibid., p. 69.

67. Ibid.

68. Ibid., p. ix.

69. Ibid., pp. 68–9.

70. Ibid., p. 146.

2. Ibid.


6. [George Bridges], *Selections from Seventeen-Hundred Genuine Photographs: (Views-Portraits-Statuary-Antiquities.) Taken Around the Shores of the Mediterranean Between the Years 1846-52* (Cheltenham: Mary Hadley, Printer, Journal Office, n.d.) unpaged.


10. Ibid., p. 117.


12. Ibid., "Distant View of Damascus."


14. Ibid., p. 117.

15. Ibid.
16. Ibid.


18. Ibid., "The Approach to Philae."


22. Frith, *Sinai and Palestine*, "Tiberius, From the South."

23. Ibid., "Jerusalem, The Pool of Hezekiah."


29. Ibid., p. 10; Ibid., 1899, p. 18.

30. Ibid., p. 3.


33. Ibid., p. 119.
34. Ibid., p. 25.
35. Ibid.
36. Ibid., pp. 278-79.
39. Ibid., p. 5.
40. Ibid., p. 22.
42. Peter Henry Emerson and T.F. Goodall, Life and Landscape on the Norfolk Broads (London: Sampson Low, Marston, Searle, and Rivington, [1886]), p. 81.
43. Ibid., preface.
44. Ibid., p. 72.
45. Ibid., pp. 27-9.
46. Emerson, Naturalistic Photography, 1889, p. 247.
47. Emerson, Life and Landscapes on the Norfolk Broads, p. 67.
49. Ibid., pp. iii-iv.
50. Ibid., p. iii.
51. Ibid., "To the Student."
52. Ibid.
53. Ibid., p. 87.
54. Ibid.
55. Ibid., p. 111.
56. Ibid., p. 130.
57. Ibid., p. 131.

58. Ibid.

59. Ibid., p. 142.

60. Ibid., p. 132.

61. Ibid., p. 116.

CONCLUSION


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