

Gold in Photography
The History and Art of Chrysotype

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Preface

That if gold rust, what then will iron do?

Geoffrey Chaucer (c.1345–1400)
Prologue to the Canterbury Tales

Since prehistory, humankind has embellished many of its greatest works of art with that most alluring of metals, gold. But it was not until the 17th century that early chemistry discovered a form of this element with the power to stain glass and ceramics to a fine ruby-red. In the late 20th century this superb gold pigment was added to the select group of noble metals – silver, platinum and palladium – which lend themselves as image substances for making permanent photographic prints. Here is the history of this innovation, illustrated by examples of what the gold medium can offer to the photographic artist. Instructions for the making of gold prints are fully set out in my comprehensive workshop handbook: *The Chrysotype Manual: The Science and Practice of Photographic Printing in Gold*, which is published separately as a companion to this volume.

This is my third monograph on the historical processes of photography; the first concerned the earliest silver images made on paper by Henry Talbot, and the second explored cyanotype, the process of printing in Prussian blue invented by Sir John Herschel. Both these media are still known to us today, as conventional black and white photography and blueprinting, respectively. The present account describes a forgotten method of photographic printing invented by Herschel in 1842, but one that yields pictures in pure gold. Named “chrysotype” by its originator, this process proved to be practically non-viable at the time of its invention, due to expense and difficulty, so it lay dormant for 150 years, until recently revived and perfected by means of modern chemistry.

The literature on photographic imaging in silver is voluminous; in contrast, this is the first monograph on photography in gold. In order to set this new medium in its cultural, aesthetic, and technical contexts, these pages offer

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an outline account of the history of gold in art. My purpose here is also to put forward a justification for this seemingly profligate use of precious metal for making photographs: chrysotype can offer advantages over every other photographic printing method, especially in the beauty and permanence of its images – advantages that in future may qualify it as a unique medium of artistic photographic practice.

Gold, as a pigment, has higher covering power than the other noble metals, a benefit which makes its use significantly less expensive than platinum or palladium. Chrysotype shares with its sister-processes, platinotype and palladiotype, the same characteristics of a totally matte print surface and a very delicate tonal gradation. It does, however, offer an important bonus: besides the usual neutral grey tones, chrysotypes can also display a wide range of subtly-muted colours, including pink, magenta, brown, purple, violet, blue or green. The creative monochrome photographer should find here an extra dimension to explore, in which the colour of an image can be matched to the expressive intent of its maker. The hue of the print is determined by the chemistry of the sensitiser and the conditions of processing, so the photographic artist has full control of this new palette of non-literal colour.

The traditional disciplines of art and science are so disparate that their respective practitioners seldom enjoy much mutual dialogue. Although direct interchanges between the artists and scientists of our divided culture seem sadly infrequent, one of the most accommodating meeting-grounds is provided by the practice of photography, where the science of photochemistry empowers the art of expressive imaging of the real world. Encounters between artists and scientists in this arena can be most fruitful. The work to be described in these pages constitutes one small example of the way that chemical science may be harnessed in the service of graphic art. Practitioners and connoisseurs of photography naturally acquire an appreciation of the cultural history of their materials; so this book is intended to present them with the

essence of the gold-printing medium, through its history and aesthetics. Details of the practice will be found in the companion workshop manual, described above.

The two elemental protagonists in our story, iron and gold, are introduced in the first chapter, which paints an impressionistic picture of their occurrence, history, and properties, including the central role that gold has played in alchemy, with particular regard to the manifestations and significances of colour within that tradition, and the extent to which alchemy can be considered a precursor to modern chemistry. The use of gold as a pigment in the graphic and decorative arts is outlined in the second chapter, which also sketches its contemporary applications in the modern world.

In 1842, one of the foremost men of science in Britain, Sir John Herschel, invented a method of photographic printing in gold, for which he coined the name ‘chrysotype’ from the Greek χρῦσότυπος meaning ‘wrought of gold’. But by then the recently-announced process of silver photography on paper was rapidly improving at the hands of his gifted colleague, Henry Talbot, so Herschel’s embryonic gold process never came to fruition, due to its high cost and very problematic chemistry. To borrow some alchemical symbolism: just as the sun is eclipsed by the moon, so gold printing was eclipsed by silver, but the eclipse was total and proved almost permanent. From the day of its invention, the elusive chrysotype process resisted the few attempts that were made to tame it. These endeavours are traced in Chapter 3, drawing on my researches into Herschel’s original experimental records, which explain why gold-printing failed to be accepted into the canon of photographic practice. Over the last 160 years a number of photographic innovators besides Herschel have attempted to employ gold as an imaging substance in its own right; so a diverse cast of photo-historical personalities is introduced in Chapter 4, some of them highly idiosyncratic, but all with one characteristic in common: despite their best endeavours, they met with little real success.

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In contrast to these persistent failures, gold was used with great success as a toning agent to improve the stability and appearance of silver photographs, and Chapter 5 describes their several varieties: daguerreotypes, salted paper prints, albumen and collodion prints, and gelatin printing-out papers. The high speed of modern silver halide emulsions, which we take so much for granted in our camera films today, depends critically on their sensitisation by incorporating trace amounts of gold compounds.

Chrysotype resembles closely the highly-esteemed platinotype process of William Willis, which was widely-practised and, by the end of the 19th century, had achieved great commercial success. There are, however, clear chemical reasons why it is intrinsically more difficult to use salts of gold, rather than platinum, in an iron-based photographic sensitiser. Indeed, all the leading authorities on photographic theory at that time acknowledged these difficulties, which persuaded them totally to discount the feasibility of gold printing. So, although this notion has been in the air since the dawn of photography, it has not previously been carried into successful practice. A controllable, economic chrysotype process only becomes possible with the aid of some modern chemistry, whereby the vigorously oxidising nature of the gold salts can be moderated. As the culmination of sixteen years' research, I have perfected formulae for iron-based gold-printing sensitisers. My "new chrysotype" process, retains the name to honour the original invention by Herschel, and is probably the only chemically novel method of precious metal printing to be devised in the last 100 years.

The chrysotype process finds its contemporary context among the recently-revived minority practices that have come to be called "alternative" photographic printing. The background history to this low-key, non-commercial technology is provided in Chapter 6, with a survey of the various processes and imaging substances that can be employed to make photographic prints by hand – that is, without recourse to manufactured photographic papers, which are factory-coated with silver halide emulsions.

To illustrate the results obtained from the new chrysotype process, in a variety of hands, some examples of work by contemporary artists are reproduced in Chapter 6. Although the chemical principles of new chrysotype were published in 1994, instruction in the practical techniques has been confined, so far, to one workshop in California in 2000. Practitioners of this process are consequently yet few in number – about a dozen worldwide. By showing this gallery of work, I hope to prove that there is no mystery or secret surrounding the process, and that its use is now accessible to all, with high expectations of success, for the creation of new and beautiful works.

Finally, there are the curatorial issues of the identification of the processes used for photographic images and their relative stability. The analysis and conservation of precious metal prints is considered in Chapter 7, where I suggest that chrysotypes may well prove to be the most permanent of all photographs. The gold image should enjoy great longevity: chrysotypes are extremely light-fast and resistant to chemical attack; they can claim an archival permanence excelling even that of platinotypes because, unlike platinum, gold is a relatively poor catalyst, meaning that it does not tend to promote reactions leading to the acidic destruction of the paper upon which the image is printed. For the same reason, gold is not in demand commercially as a catalyst, in contrast to platinum and palladium, so its use for image-making does not compete for a vital resource.

This time of writing is a time of revolutionary change in the prevailing technology of the lens-based media. The majority of photographers, amateur and professional alike, are presently forsaking the darkroom in favour of the desktop, enticed by the ease and convenience with which the personal computer can handle images as digital files. There can be no doubt that, during these opening years of the new millennium, the practice of electronic imaging – processed, stored, and transmitted in digital, rather than analogue forms – will exert a profound influence upon the flow of pictorial information within our societies.

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As a direct consequence, the very authenticity of the photographic medium is being called into question. This transformation in the nature of the dominant technology, from chemistry to physics, brings a danger that the practices of ‘analogue photography’, which is already deemed obsolete from a commercial viewpoint, may be totally lost – to the detriment of the minority practice of photography as a vehicle for artistic expression. A review of the methods of hand-making photographs, which is a major theme underlying this book, would therefore seem timely.

Some echo of the personal feelings that accompanied my first success in gold printing nearly 20 years ago may be found in these words of Charles Dickens from *Great Expectations*:

“That was a memorable day to me, for it made great changes in me. But, it is the same with any life. Imagine one selected day struck out of it, and think how different its course would have been. Pause you who read this, and think for a moment of the long chain of iron or gold, of thorns or flowers, that would never have bound you, but for the formation of the first link on one memorable day.”

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I am indebted to the custodians of the world’s historic chrysotypes and manuscripts by Sir John Herschel: Tony Simcock, the Archivist of the Museum of the History of Science, Oxford; the Librarians of the Royal Society, and of the Science Museum, London; and the curatorial staff of the National Museum of Photography, Film & Television, at Bradford. I record my gratitude to the trustees of the Harry Ransom Humanities Research Center

of the University of Texas at Austin, for the award of a Mellon Research Fellowship in 1999, which enabled me to examine at first hand that most significant part of Sir John Herschel's legacy which is in their keeping. My warmest thanks go to the staff of the HRHRC, in the manuscript archive and the photography collection, especially to Barbara Brown, Linda Briscoe, David Coleman, Roy Flukinger, and Mary Alice Harper, for their assistance in making this material accessible.

Some of the leading figures in contemporary photohistorical scholarship have with kindness – and at times great patience – assisted my faltering steps down the pathways of photographic history. For this guidance I thank Michael Gray, Anne Hammond, Larry Schaaf, Sara Stevenson, Roger Taylor, and Mike Weaver; but I would add that any obvious waywardness on this journey must be ascribed solely to the vagaries of this writer, and not to his mentors.

Two distinguished professors of photographic art in the USA, Pradip Malde and Roger Vail, undertook to “prove” the new chrysotype process by using it for their own image-making. I am beholden to these two good friends for their enthusiastic and critical responses from their distant proving grounds, which have both energised and refined the research described in these pages, and I am grateful for their permission to reproduce some of their work in these pages. If I am ever called upon to justify this self-indulgent excursion into obsolete 19th century photographic process, then I shall need only to point to their work as evidence of a valued artistic outcome.

This work would not have reached print without the enthusiasm and commitment of my editor-publisher, Paul Daskarolis.

Mike Ware
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