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J. B. READE, F.R.S., AND THE EARLY HISTORY OF PHOTOGRAPHY

PART I. A RE–ASSESSMENT ON THE DISCOVERY OF CONTEMPORARY EVIDENCE

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[PLATES XI–XII]

Introduction

THE Rev J. B. Reade has appeared frequently in histories of photography as a pioneer who began photographic experiments, using gallic acid and fixation with sodium tbiosulphite ('hypo') in 1836 or 1837. This was two years before the announcements by Daguerre and Talbot of their inventions in January 1839.

W. H. F. Talbot's part in the invention of the photographic process, with his first experiments being made in 1834, is well documented from contemporary evidence; and a large number of his early photographs have survived. In contrast, no example of Reade's work exists; and his reputation relies entirely on letters and reminiscences published several years after the event.

The uncertainty surrounding Reade's discoveries, due to this lack of contemporary evidence, has led to a very unsatisfactory situation in recent publications: historians of photography are obliged to bring Reade into their accounts of the invention of photography, albeit in a somewhat indefinite manner. This obligation is especially obvious in publications subsequent to 1955, when Helmut and Alison Gernsheim, in their comprehensive *History of Photography*[1], enthusiastically championed Reade's early photographic work by integrating the story of his pre–1839 role in the history of photography from the available secondary source

* *Present address:* [ ]

[1] H and A Gernsheim, *History of Photography,* Oxford University Press, 1955, pp. 66, 69–73.

material. The really exact documentation required to establish the claims made for Reade had, however, never been tackled; although some valuable work was done in the 1920s by C. H. Oakden[2], who, from the evidence available to him, was an influential advocate of J. B. Reade as an inventor of photography before Talbot.

In 1960 a letter, written by Reade, was sent to the Royal Photographic Society. This manuscript letter, the only *direct* evidence of Reade's work, was, 'from J. B Reade to his brother George, written on 1 April 1839, only two months after Fox Talbot's announcement of Photogenic drawing'[3]. It was published together with a re–examination by Mr A. T. Gill of the claims put forward for Reade's early discovery of photography. Unfortunately, the letter was still not able to supply unequivocal evidence, although it was able to raise doubts that Reade's discoveries could have been made in 1837. Reade spoke in the letter of making a discovery of 'a certain chemical process' on 26 March 1839; the most likely interpretation of this statement is that it refers to his method for increasing the sensitivity of silver nitrate paper negatives with nut gall infusion. Mr Gill's most recent (1968) assessment of the evidence provided by this letter of April 1839 is that J. B. Reade should still be given the credit for being the first to use sodium thiosulphite as a fixing agent, and (I quote), 'undoubtedly he did discover photography independently, though probably after Fox Talbot'.[4]

Clearly, Reade's position has not been resolved by this letter, and modern studies on the history of photography are still having to resort to rather vague statements regarding him.[5]

1970 is the centenary of Reade's death, and it is of some importance that his position in regard to the discovery of the photographic process be fully clarified. Fortunately this is now possible, as I have recently uncovered two manuscript letters which were written in 1839 and 1840. These letters, together with the information available from a documentation of his life and scientific publications that I have undertaken,[6] enable J. B. Reade's relevance to the early history of photography to be seen in better perspective.

[2] C. H. Oakden, *J. Roy. Micr. Soc.,* Series 3, 1926, **46**, 181–192; *Brit. J. Phot.,* 1928, **75**, 453–5 and 466–I; *Watson's Microscope Record,* 1930, No 21, 10–13.

[3] A. T. Gill, *Phot. J.,* 1961, **101**, 10–13.

[4] A. T. *Gill, Phot. J.,* 1968, **108**, 215.

[5] See for example; A. H. Booth, *W. H. F. Talbot, Father of Photography,* London, 1964; D. B. Thomas, *The first Negatives,* Science Museum Monograph, London, 1964; H and A Gernsheim, *A Concise History of Photography,* 1965, pp. 26–27; J. N. Watson, *Pictures in Silver,* London, 1969, p. 5.

[6] R. Derek Wood, 'Bibliography of Joseph Bancroft Reade (1801–1870)', to be published. [Remained unpublished but a copy of part 1 of this bibliography was deposited many years later at the library of the Royal Society: Catalogue No. R.63128, shelf-mark Tracts X499/3. A PDF file of Part 1 of the Bibliography is available on the author's 'Midley History of Early Photography' website at www.midleykent.fsnet.co.uk/.]

Life

Joseph Bancroft Reade (1801–1870),[7] the eldest of eight children, was born in Leeds on 5 April 1801. After being educated at Leeds Grammar School, and one year at Hull under the tutorship of the Rev. Mr Scott, be went up to Cambridge in 1819. Here, at Caius College, he graduated B.A. as thirty–sixth senior optime in 1825, and later M.A. He was ordained in 1826. From 1829 to 1832 he was curate at the parish church at Halifax, where be became a close life–long friend of John Waterhouse (1806–1879), who is now remembered by photographers as the inventor of' Waterhouse Stops'. After a short stay as part–time curate at Harrow–Weald, he became proprietor, in 1834, of a preparatory school in Peckham, south London. It was in Peckham that he carried out his early experiments in photography described in this article. In December 1839, by invitation of Dr John Lee[8] of Hartwell and the Royal Astronomical Society, he moved to Stone, near Hartwell and Aylesbury in Buckinghamshire. Here a small observatory was built, and he stayed for twenty years carrying out a wide variety of scientific experiments; the highlight of these years was undoubtedly 1854, when he appeared as chief witness for the defence in the Talbot *v.* Laroche photographic patent trial. While at Stone under the patronage of Dr. Lee he was part of the intellectual and scientific life of Hartwell, which has been described as a 'British Association in miniature'. This continued to some extent when he moved in 1859 to the rectory of Ellesborough at the invitation of Lady Franklin Russell, who lived at nearby Chequers and whose intellectual parties were well known at the time. He lived at Ellesborough for four years before going to Bishopsboume Rectory, near Canterbury in Kent, where he lived until his death in 1870 at the age of 69.

[7] To date the most informative published *Life* is to be found on pp. 90–99 of *The Reades of Btackwood Hill in the parish of Horton, Staffordshire; a record of their descendants,* by Aleyn Lyell Reade, (Privately Published, for subscribers only) 1906. This genealogical work is primarily devoted to the author's own branch of the Reade family of the Staffordshire/Cheshire/Lancashire area. Much of the chapter concerning the Reades of Leeds ('Pedigree xxv, Reade of Leeds etc.', pp. 85–102) was written with the collaboration of W. Paley Baildon, who was J. B. Reade's great nephew. Baildon also supplied the information for the article on J. B. Reade in the *Dictionary of National Biography* (1896). The most informative obituary, which contains a useful summary of his scientific work, was written by his close friend John Millar *(MonthJy Micros. J.*, 1871, **5**, 92–96.).

[8] Dr John Lee (1783–1866) scientific dilettante and wealthy patron of astronomy, meteorological and antiquarian studies. *D.N.B.* (1892); *Proc. Roy. Soc. London,* 1868, **16**, xxx. For an interesting glimpse of the scientific/dilettante gatherings at Hartwell House see *Thomas Sopwith Diary.* ed. B. W. Richardson, London, 1891.

In 1825, the year that be graduated, be married Charlotte Farish, the niece of William Farish, Jacksonian Professor at Cambridge. Three children were born in the 1830s, but they all died young.

When be was only fifteen his father gave him a microscope (this was not the only occasion on which be received such a gift, for many years later, when be was 58, his parishioners at Stone presented him with a valuable microscope as a farewell present) and throughout his whole life be was especially interested in microscopy; but be was occupied also in the other optical sciences of astronomy and photography. However, an abiding theme of his work was chemical, especially the chemistry of metallic salts and botanical/agriculture chemistry.

He became a 'Life member' of the British Association for the Advancement of Science on its formation in 1831, and a dominant factor throughout his life was his enthusiastic attendance at its meetings, at which he occasionally read papers. In 1839 be was one of the founder members (indeed the 'godfather') of the (Royal) Microscopical Society and was its President at the time of his death in 1870. He was not a founder member of the Photographic Society as be came into photographic prominence only at the time of the Talbot *v.* Laroche trial in December 1854; but after that, especially in the late 1860s, be took a prominent part in the affairs of that Society. Indeed, his activities in the affairs of both the Royal Photographic Society and the Royal Microscopical Society (he was often chairman of their meetings) are probably among the chief reasons that his work received so much attention from historians of photography.

At the time with which we are particularly concerned, the late l830s, his interest in microscopy was dominant. His first scientific paper had been read at the Royal Society in December 1836, and be was elected F,R.S. early in 1838; during the next four or five years he frequently attended the Society's meetings. I have been able to compile a list of 86 scientific papers and contributions that he made at meetings of learned societies between the years 1837 and 1870. None contains any especially revolutionary contribution to scientific knowledge. He exhibited a telescope 'solid eyepiece' at the London International Exhibition of 1851, for which he won a medal; while to the London Exhibition of 1862 he submitted a 'Hemispherical Condenser' for the microscope. Reade had always paid considerable attention to the problems involving the illumination of microscopical specimens. The Hemispherical Condensers (which he often called his 'Kettledrums'***),*** and other of his contrivances for illuminating specimens, such as his Diatom Prism, seem to have become quite well known among microscope workers at the time. They do, perhaps, show that he had some manipulative skill with the microscope. His 'Double Hemispherical Condenser' (the adjustable apertures of which were designed with the collaboration of John Waterhouse) has been

considered, on such authority as that of E.M. Nelson,[9] to be 'the parent of all our present devices for dark–ground illumination'. This, however, may be considered an extravagant claim; for Nelson had also noted that 'in 1836 the Rev. J. B. Reade introduced dark–ground illumination'. But Reade had, in fact, then simply described the illumination of objects from the back with oblique refracted light.[10] It was only by this loose, and careless, linking of the Condenser of the 1860s with the earlier publication, that the Double Hemispherical Condenser could have been rated so highly by Nelson. All that can be said is that J. B. Reade's Double Hemispherical Condenser, which was a ' method for regulating the position of transmitted pencils of oblique light', was a cousin of dark–ground illuminators.

Few of his papers have retained any interest today, although one, 'On some new organic remains in the Flint of Chalk' which was published in November 1838 [11] and which contains the first illustrations to be published in England of 'Xanthidia' (now shown to be fossil dino–flagellate chorate cysts) is still of interest to geologists today.[12]

Although Reade illustrates the apex of Victorian enthusiasm for science, he lacked that quality which amateurs can often contribute to scientific research, that of thoroughness and accuracy; and his writing especially lacked clarity and careful attention to detail.

All of the several obituaries of him pay most exceptional tribute to his kindly and genial disposition. As this present paper is concerned with his photographic work it is apposite to quote from the obituary published in the *British Journal of Photography* [13] 'Every member of the Photographic Society entertained a warm feeling of affection and esteem for Mr Reade, whose venerable appearance and gentle manner were extremely prepossessing. In the great world of science he has not left a single enemy.'

[9] 'Nelson on Illuminators' (ed. A. D. Booth) *J. Roy. Micr.* Soc., 1962, **80**, 263.

[10] J. B. Reade, 'A New method of illuminating microscopic objects' in C. R. Goring and A. Pritchard's *Micrographia,* London, 1837, appendix 2, reprinted in *Annl. Electricity,* 1839–40, **4**, 407; and described in John Quekett's *Practical Treatise on the Microscope,* London, lst–3rd edns., 1848–1855. A specific Dark–ground method, using a 'spotted lens' with central rays obscured, had, anyway, been mentioned by J. J. Lister in *Phil. Trans.,* 1830**,** p. 187.

[11] *Ann. Nat. Hist.,* 1838, **2**, 191–198.

[12] W. A. S. Sarjeant, *Microscopy; J. Quekett Club***,** 1967, **80**, 241–250, and 1970, **31**, 221–253. However, a letter which Reade wrote to G. A. Mantell in December 1837, and which was published in Mantell's *Wonders of Geology,* Relfe and Fletcher, London, 1838, **2**, 684–9, also contains an illustration of a 'Xanthidia'. This letter is especially important as it shows that Reade's microscopical work on Xanthidia was not independent research of his own, but was inspired by the just published studies of C. G. Ehrenberg and P. J. F. Turpin (*C. R. Acad. Sci. Paris.,* 1837, **4**, 304–314).

[13] *Brit. J. Phot,,* December 16, 1870, **17**, 588–589.

Contemporary published statements regarding Reade's early photographic experiments.

In January 1843 Sir David Brewster published an article in the Edinburgh Review entitled 'On Photogenic Drawing'[14] This article, which was one of the earliest historical reviews of photography, did not mention the name of J. B. Reade. But when Brewster wrote another review four years later, the claim that Reade had invented a process involving development with gallic acid and fixation with sodium hypo–sulphite was for the first time brought to the attention of the public. Brewster quoted Reade's process in full, and stated that it had originally been 'communicated by Mr Reade, on the 9th of March 1839, to E. W. Brayley,[15] Esq., who explained the process, and exhibited the drawings referred to, at one of the soirees of the London Institution[16] on the 10th April 1839'. This article of Brewster's in the August 1847 edition of the North British Review[17] had most important consequences, when some years later, in 1854, there was agitation regarding Talbot's Calotype patent:

"The first public use of the infusion of nutgalls, which" said Brewster in his *Review*, "is an essential element of Mr. Talbot's patented process, appears to be due to Mr. Reade, and his process of fixing his pictures by hyposulphite of soda, which has since been universally used as the best, and was afterwards suggested in 1840 by Sir John Herschel, must be regarded as an invaluable addition to the photographic art."[18] Brewster

[14] *Edinb. Rev.,* Jan. 1843, **76**, 309–344.

[15] Edward William Brayley, (1802–1870), *D.N.B.* (1886), vol. **vi**, p. 246. Brayley was also an editor of the *Philosophical Magazine* during the 1830s, and almost certainly must have had contacts with Reade after 1837, when Reade had submitted the first of several publications to that journal. As Brewster was the leading 'Conductor' of the *Philosophical Magazine,* it is also very likely that this association between him and Brayley was the means by which he obtained the Reade's letter to Brayley.

[16] The London Institution, Finsbury Circus, was a City of London scientific institution of the nineteenth century with an important Library. This Institution must not be confused with the Royal Institution. They were entirely separate establishments; although some facilities of the Laboratory of the London institution did occasionally attract visits from Faraday. Gideon Mantell *(The Journal of Gideon Mantell,* ed. E. C. Curwin, Oxford University Press, 1940), says in the entry for 28 November 1844, that between 700 and 800 persons attended a lecture on Geology which he gave there in 1844. Unaccountably there do not seem to be any modern studies on this Institution, which greatly deserves attention for its role in Victorian scientific adult education. The most important source for this is the Collection on London Institution, Ref. L50.2 in the Guildhall Library, London; see also the British Museum Catalogue of Printed Books vol. cxlii (London iii), cols. 1257–1259.

[17] *North Brit. Rev.,* 1847, **7**, 465–504; J. B. Reade's letter of 1839 to Brayley, with Brewster's comments, is on pp. 470–471 of the *Review.*

[18] It was from this somewhat misleading comment of Brewster's that much of the confusion about Reade's work arose; this will be discussed more in Part II of this paper, which deals with the Talbot v. Laroche trial and Reade's use of gallic acid. Some correspondence between Reade and Brewster in 1862, concerning the notice in the *North British Review*, will also be reported there.

considered that "This process cannot fail to be considered as highly honourable to the ingenuity of Mr. Reade." This comment drew the attention of Robert Hunt, and other persons involved in the events that led up to the Talbot v. Laroche photographic patent trial in 1854. At this time Reade stated, both in published letters and at the trial, that he had first used nut gall treatment of paper prepared with silver nitrate, followed by fixation with hypo, *in 1836-7,* two years before Daguerre's and Talbot's public announcements of the invention of photography. This 1837 claim was repeated, in more detail, by Reade in published letters in the 1860s. Reade was then very well known in Photographic Society circles. Twenty years after Mr Reade's death a professional photographer, John Werge, who had known Reade well in the 1860s wrote an influential book, *The Evolution of Photography,* in which he reprinted a long letter of Reade's describing his part in the early history of photography. Werge was a vigorous advocate of Reade as the 'Inventor of Photography' in 1837 ('I place the Rev J. B. Reade first and highest')[19] and this, along with his publication of Reade's letter (especially as Werge did not give its original published source[20]) had great influence on modern historians of photography.

A very important element in all accounts (whether enthusiastic or dismissive) of J. B. Reade's part in the discovery of photography has been that not only is the evidence intrinsically poor, but it has also become exceptionally muddled. The whole story has been plagued with reliance on later publications rather than the earlier ones; and the earlier ones themselves are full of ambiguities! What follows therefore is the *basic story,* which I have compiled from Reade's published statements. As much irrelevant matter as is possible has been excluded, and the reference given for each item is that of the earliest source only.

J. B. Reade's own published statements regarding his early photographic experiments

Reade's letter to E. W. Brayley, communicated by Brayley at the London Institution soiree on 10 April 1839, published 1847,[17] was as follows:

> 'The more important process, and one probably different from any hitherto employed, consists in washing good writing paper with a strong solution of nitrate of silver, containing not less than 8 grs. to every drachm of distilled water. The paper thus prepared is placed in the dark and allowed to dry gradually. When perfectly dry, and just before it is used, I wash it with an infusion of galls prepared according to the

[19] J. Werge, *The Evolution of Photography,* London, 1890, pp. 15, 22, 26–27 and 90; The letter, which in fact was Reade's letter to Lyndon Smith, was given on pp. 15-22.

[20] Letter from Rev J. B. Reade to Lyndon Smith, dated 1859 *; Brit J. Phot.,* 1862, **9**, 79-80.

Pharmacopeia, and immediately, *even while it is yet wet,* throw upon it the image of microscopic objects by means of the solar microscope. It will be unnecessary for me to describe the effect, as I am able to illustrate it by drawings thus produced. I will only add, with respect to the *time,* that the drawing of the *flea* was perfected in less than five minutes, and the section of cane, and the spiral vessels of the stalk of common rhubarb, in about eight or ten minutes. These drawings were fixed by hyposulphite of soda. They may also be fixed by immersing them for a few minutes in weak salt and water, and then, for the same time, in a weak solution of hydroiodate of potash. The drawing of the *Trientalis Europea* was fixed by the latter method : it was procured in half a minute, and the difference in the colour of the ground is due to this rapid and more powerful action of the solar rays. This paper may be successfully used in the camera-obscura. Further experiments must determine the nature of this very sensitive argentine preparation. 1 presume that it is a gallate or tannate of silver..

Reade's letter to Robert Hunt, 1854 [21]:

'In giving you the information you require respecting my early researches in photography in 1836 and following years, I may assume that you are already aware, from my letter to Mr Brayley of March 9, 1839, and published in the British Review for August, 1847, that the principal agents I employed, before Mr Talbot's processes were known,[22] were infusion of galls as an accelerator, and hyposulphite of soda as a fixer. I have no doubt, though I have not a distinct recollection of the fact, that I was led to use the infusion of galls from my knowledge of the early experiments by Wedgwood. I was aware that he found *leather* more sensitive than *paper*; and it is highly probable that the tanning process, which might cause the silver solution to be more readily acted upon when applied to the leather, suggested my application of the tanning solution to paper ... I employed hyposulphite of soda as a fixer. Mr. Hodgson, an able practical chemist at Apothecaries' Hall, assisted me in the preparation of this salt, which at that time was probably not to be found, as an article of sale, in any chemist's shop in London. Sir John Herschel had previously announced the peculiar action of this preparation of soda on salts of silver, but I believe that I was the first to use it in the processes of photography...

Reade's letter to Talbot, 1854 [23]:

' ... The beautiful *Solar Mezzotints,*as I termed them, varying in size from 50 to 150 diameters, which were exhibited in 1839 at the

[21] J. B. Reade, 'On some early experiments in Photography', letter to Robert Hunt dated February 13th 1854, *Phil. Mag., (4th* Series), May 1854, **7**, 326-311 ; also in *Notes and Queries,* June 1854, **9**, 524, and R. Hunt, *Researches on Light,* 2nd edn. 1854, appendix 2.

[22] This obviously could be a source of confusion, not only to historians, but to Reade himself, as to whether this refers to Talbot's Photogenic Drawing process of 1839 or to Talbot's Calotype process of 1841, which used gallic acid.

[23] 'Letter from the Rev. J. B. Reade to H. Fox Talbot', dated June 24th 1854, *Notes* and Queries, July 1854, **10**, 34 ; also reprinted in *Phot. J.,* July 1854, **2**, 9-10, and *Art J.,* August 1854, **6**, 237.

Marquis of Northampton's and at the London and Walthamstow Institutions[23a]; and some in the spring of that year were even sold at a Bazaar in Leeds in support of a charitable fund. The process was explained to my friends in Yorkshire, and I find from a Leeds manuscript that I proposed the nitro-gallate paper for "immediate use and diffused daylight". The ammonio-nitrate process also.... though I believe included in your second patent of June 1843, was among the first which 1 employed, ... I may give you as a matter of history the following extract from a letter to my brother in Leeds, dated April 26, 1839 - "Dissolve 6 grains of [silver] nitrate in 1 dram of water and add liguor ammoniae, which will throw down the brown oxide of silver, but on the addition of a little more will take it up and form a clear solution, wash the paper and dry it. Then put 1 scruple of common salt in half a pint of distilled water. Wash the paper with this mixture, &c". I also proposed to dissolve 2 grains of gelatine in 1 ounce of distilled water as an accelerator for the nitrate '

Report of Reade's evidence given at the Talbot *v.* Laroche patent trial, 1854[24]:

[Reade stated in his evidence that,] '…He had made some experiments on white leather, and the use of leather led him to apply infusion of galls to paper to induce sensitiveness in the paper ; ... The first picture he obtained by infusion of galls was in 1837 ... He washed the paper with a solution of common salt, then with nitrate of silver, and then he placed it before the solar microscope to receive the picture, and he washed it with an infusion of galls and proceeded to take the picture. He found it necessary to keep the paper wet ; and in order to see how the picture was being developed, though he had no idea of an absolutely invisible image, but in order to strengthen the image which had been produced, he put his head in the microscope and watched how the picture was being developed, and when it had come to a certain tone of blackness, which he termed solar-mezzotinto, he suspended the operation and fixed by hyposulphite of soda.

Mr. HANNEN [the defendant's lawyer],-I understand you to say you spread the infusion of galls over the prepared surface before it was placed to take representations of objects ?

[23a] Stated by James Henderson in 1854 (obviously from information given him by Reade) to be 'at a meeting of the Society for Promoting Literary and Philosophical knowledge held at Walthamstow ... on the 2nd May 1839'. (Talbot v. Henderson, Court of Chancery, Henderson's *Answer* dated 1 August 1854, filed in Pleading C15,157/1854, T39; Public Record Office, London).

[24] 'Court of Common Pleas, Talbot v. Laroche', Phot. J., December 1854, 2, 84-95. This report of the trial can be confusing due to the reporter's use of the third person in quoting the witnesses' remarks. However, only the witnesses' statements wore so transcribed; the lawyer' and Judge's remarks remained in the first person. Due to the difficulties in quoting the evidence given at the trial historians have always paraphrased the report - thus sometimes distorting the facts. This extract of Reade's evidence is therefore given in its original wording.

Witness [Reade] - Sometimes before and sometimes after. He continued to wash it and to watch the process of development ... In summer time and in broad sun the picture was developed in about two or three minutes ... He fixed them with hyposulphite of soda. He learnt the power of salt and nitrate of silver from a paper of Sir John Herschel's in Brande's Chemistry.[25] The paper was written in 1821 ...

He took positives on dry paper which had been washed with an aqueous solution of salt and nitrate of silver, or with ammonia, nitrate of silver, and also iodide of silver. He had also used another process in connexion with glazed cards. He took a card which had been glazed with carbonate of lead, and in order to produce a soluble salt of lead on the surface, he discharged a portion of the carbonic acid from the lead by means of acetic or muriatic acid. He then floated the card in a solution of iodide of potassium, ... and then washed the surface, which had become a surface of iodide of lead, with nitrate of silver.... and being nearly dry, it was washed with infusion of galls, ... The sensitive surface was in his opinion infusion of galls with nitrate of silver and iodide of silver. He took impressions on cards, but they were not capable of being used to get positives. He had also used chloride of silver with infusion of galls. He had taken in the camera representations of hyacinths in flower, and a bust of Pitt he had taken two of three times; and he had taken a representation of his greenhouse and the gardener leaning on the end of it. This was previous to 1839. In 1839 he had attended a soiree at the Marquis of Northampton's by invitation from the Marquis, received at a meeting of the Royal Society on the 23rd April 1839, and the soiree was on the 27th. The Marquis saw the photographic drawings which witness produced, and requested him to exhibit the pictures at the soiree; ... He also explained the process to the gentlemen who were there. The specimens produced [for examination at the trial] were those he had exhibited. He had found it absolutely necessary to have the paper washed in order to get good specimens. He also took [shadow] profile representations of himself and friends as large as life in this way ... Soon after he had exhibited his specimens, he received a letter from Mr. Brayley on the subject. He thought it (Mr. Brayley's letter) was before the meeting of the Royal Society, for he sent to the Marquis of Northampton the pictures which Mr. Brayley had exhibited in his lecture. (The answer of witness to Mr. Brayley's letter, detailing his process of taking pictures, was then put in and read.) He remembered Mr. Talbot having been pointed out to him, and witness [Reade] introduced himself, and he made some inquiries to ascertain in certain pictures exhibited, how much of the process was due to the artist. Witness told him [Talbot], that two years before he had used hyposulphite of soda, and infusion of galls. Witness also made similar communication to Mr. Reeve [26] in 1839... '

[25] W. T. Brande's *Manual of Chemistry* ; Herschel's original papers on the chemistry of hyposulphites [thiosulphites] appeared the *Edinb. Phil. J.,* 1819, vol. **1**, pp.8 and 396; 1820, vol. **2**, p.154.

[26] No definite evidence has been traced concerning Mr Reeve, or Mr Hodgson ; However, L. A. Reeve *(1814-65) (D.N.B.*, vol. 47, p. 412) is almost certainly the person concerned.

Reade's letter to Lyndon Smith, published 1862 [20]*:*

> ' ... Talbot did not patent any valuable fixer. Here I had the advantage of having published my use of hyposulphite of soda which Mr. Hodgson [26] made for me in 1837, when London did not contain an ounce of it for sale. 1 tried ammonia, but it acted too energetically on the picture itself to be available for the purpose. It led me, however, to the ammonio-nitrate process of printing positives, a description of which process ... I sent to a photographic brother in 1839 ... On examining Brande's Chemistry, under the hope of still finding the desired solvent which should have a greater affinity for the simple silver compound on the uncoloured part of the picture than for the portion blackened by light, I happened to see it stated on Sir John Herschel's authority, that hyposulphite of soda dissolves chloride of silver. I need not now say that I used this fixer with success. The world, however, would not have been long without it ; for, when Sir John himself became a photographer in the following year, he first of all used hyposulphite of ammonia, and then permanently fell back upon the properties of his other compound. Two of my solar microscope negatives taken in 1837, and exhibited with several others by Mr. Brayley in 1839, are now in the possession of the London Photographic Society. They are, no doubt, the earliest examples of the agency of two chemical compounds which will be co-existent with photography itself, viz., gallate of silver and hyposulphite of soda; and my use of them, as above described, will sanction my claim to be the first to take paper pictures rapidly and to fix them permanently ... Of course, I tried the effect of my accelerator [nut galls] on many salts of silver, but especially upon the iodide, in consequence of my knowledge of Davy's papers on iodine in the *Philosophical Transactions.*[27] These I had previously studied, in conjunction with my chemical friend, Mr Hodgson, then of Apothecaries' Hall. I did not, however, use iodised paper, which is well described by Talbot in the *Philosophical Magazine* for March, 1838,[28] as a *substitute* for other sensitive papers, but only as one among many experiments alluded to in my letter to Mr Brayley. My pictures were exhibited at the Royal Society, and also at Lord Northampton's, at his Lordship's request, in April, 1839, when Mr Talbot also exhibited his ... My use of gallate of silver was the result of an inference from Wedgwood's experiments with leather. Mrs Reade was so good as to give me a pair of light coloured leather gloves that I might

[27] This must refer to Davy's paper of 1814 on Iodine *(Phil. Trans.,* 1814, **104**, 74.) ; although the only mention of silver iodide etc consists merely of Davy's first experiment to see of the new substance (iodine) would form silver salts when mixed with silver nitrate, and that 'the precipitate was much more rapidly altered by exposure to light, than the muriate of silver'. Reade's concern with stating that he had used silver iodide is due to the fact that the use of iodised paper was part of Talbot's patent.

[28] This pre-1839 description by Talbot of his use of paper treated with silver iodide *(Phil. Mag.,* 1838, **12,** 258-259.) was not concerning its photographic use but about the effect of *heat* on it. It is perhaps interesting also to note here that Talbot had described the use of a photosensitive paper before 1839 ; for as early as August 1835 Talbot described experiments carried out with paper treated with silver nitrate in an article ' On the nature of light', *Phil. Mag.,* 1835, **7**, 113-118.

repeat Wedgwood's experiments; and as my friend Mr Akerman [29] reminds me, her little objection to let me have a second pair led me to say - 'Then 1 will tan paper'. Accordingly, I used infusion of galls, in the first instance, in the early part of the year 1837, when I was engaged in taking photographs of microscopic objects. By a new arrangement of lenses in the solar microscope I produced a convergence of the rays of light, while the rays of heat, owing to their different refractions, were parallel or divergent. This ... enabled me to use objects mounted in balsam, as well as cemented achromatic object glasses ; ... and indeed, such was the coolness of the illumination that even infusoria in single drops of water were perfectly happy ... The continued expense of an artist - though I at first employed my friend, Lens Aldous[30] to copy the pictures on the screen - was out of the question. I therefore fell back ... upon the photographic process adopted by Wedgwood, with which 1 happened to be well acquainted. I was a weary while, however, before any satisfactory impression was made either on chloride or nitrate paper. I succeeded better with white leather ; but my fortunate inability to replenish the little stock of this latter article induced me to apply the tannin solution to paper ...

'Naturally enough, the solution which I used at first was too strong but, if you have ever been in what 1 may call the agony of a find, you can conceive my sensations on witnessing the unwilling paper become in a few seconds almost as black as my hat ... It was evident, however, that the dilution of so powerful an accelerator would probably give successful results. The large amount of dilution greatly surprised me ... In reference to this point, Sir John Herschel, writing from Slough, in April, 1840, says to Mr. Redman, then of Peckham (where I had resided), and now a photographic artist in Cornhill :- “I am surprised at the weak solutions employed, and how, with such, you have been able to get a depth of shadow sufficient for so very sharp a re-transfer is to me marvellous.” I may speak of Mr. Redman as a photographic pupil of mine, and at my request he communicated the process to Sir John,[31] which, “On account of the extreme clearness and sharpness of the results” to use Sir John's words, much interested him. Dr Diamond also, whose labours are universally appreciated, first saw my early attempts at Peckham in 1837, and heard of my use of gallate of silver,

[29] J. Y. Akerman (1806-1873), *D.N.B.*, 1886, vol. i, p. 211; Numismatist and Antiquarian ; he was certainly friendly with Reade after 1839 when Reade was at Stone, but their acquaintance when Reade was at Peckham is not so fully substantiated, although this is likely, for Akerman also lived in south London and was secretary of the Numismatic Society to which Reade communicated three papers in 1837 and 1838. See also *The Builder,* 25 July 1846, **4**, 355.

[30] W. Lens Aldous, who lived at the time south of London fairly near to Reade, was also an original member of the Royal Microscopical Society, and well known to early Victorian microscope workers as an artist specialising in the preparation of micrograph illustrations.

[31] I have been able to unearth this letter from Redman to Sir John Herschel, and evaluation of it’s evidence for Reade's early photographic work will be made in Part II of this article.

and was thus led to adopt [32] what Admiral Smyth[33] then called "a quick mode of taking bad pictures but - as I told the Admiral in reply – *he* was born a *baby...'* 'But of all the persons who heard of my new accelerator, it is most important to state that my old and valued friend, the late Andrew Ross, told Mr. Talbot how first of all by means of the solar microscope I threw the image of the object on prepared paper, and then, while the paper was yet wet, washed it over with the infusion of galls, when a sufficiently dense negative was quickly obtained. In the celebrated trial, "Talbot versus Laroche", Mr. Talbot, in his cross-examination and in an almost breathless court, acknowledged that he had received this information from Ross, and from that moment it became the unavoidable impression that he was scarcely justified in taking out a patent for applying my accelerator to any *known* photogenic paper...'

Reade's letter to George Shadbolt, 1862. [34]

'...The first camera picture which Ross saw was one of my greenhouse at Peckham, with the gardener standing outside ; and at my request he made me a short-focus achromatic object-glass instead of the combination I was then using. In fact, the first achromatic camera was made for me, I have therefore done some little in the "pioneering line", as Lyndon Smith calls it ; but I hope I shall not be accused of pushing myself unduly forward when I merely answer the questions of friends'.

Report in *Photographic News,* 1865. [35]

'... Mr Reade told us that one of his early photographs, produced in the solar microscope on the paper prepared with chloride of silver and washed with an infusion of nut-galls, was an enlarged copy of a flea, which he gave at the time to Mr. Akerman. Mentioning this circumstance to Dr. Diamond, he stated that the same photograph was given by Mr. Akerman to him the Sunday on which King William IV died the circumstance being impressed on his mind by hearing, shortly after receiving the picture, the bell of St. Paul's toll, and the exclamation being made that some member of the royal family must be dead. This, it will be remembered, was in June 1837. The photograph in question, Dr. Diamond states, had all the peculiarity of the early developed prints.'

[32] This sentence can be the source of some misunderstanding. It perhaps could be better re-phrased to 'Dr Diamond was thus led to adopt photography', and Smyth once told Reade that 'photography was a quick mode of taking bad pictures.' [Compare with another account in *Photo. J*., 17 December 1867, vol. **12**, p. 152]

[33] W. H. Smyth, F.R.S. (1788-1865),Astronomer and active member of many learned Societies, *D.N.B*., (1898), vol.. **53**, p. 192. Dr Lee had Smyth's telescope moved from Bedford to the Observatory at Hartwell and Smyth retired there at the same time as Reade was instituted, by Lee, as Rector of Stone Parish Church nearby. Smyth was also taking a very active part in the affairs of the Antiquarian Society, as were J.Y. Akerman and Dr Diamond, at the time when proposals to establish an amateur Antiquarian photographic group played a part (through the journal *Notes and Queries)* in the agitation leading up to the Talbot v. Laroche patent trial.

[34] Letter, 'From the Rev. J. B. Reade to George Shadbolt ', dated Feb. *24, 1862, Brit. J. Phot.,* March 1st, 1862, **9**, 80.

[35] 'Origin of Photography ', *Phot, News,* October 13, 1865, **9**, 492.

Reade on the ‘ Separation of the Rays of Heat from the Rays of Light in Solar ... Microscopes ', 1868 and 1870 [36]:

> ‘... A large drawing of the head of a flea by Lens Aldous, with the beautiful apparatus of the mouth, which 1 had mounted in Canada balsam, was an appropriate illustration of my communication [in 18361 to the Royal Society, and of the practical value of this new arrangement of lenses in the solar microscope ; and it may interest photographers to know that before Lens Aldous prepared from this drawing the first coloured lithograph of the head only, I took several enlarged negatives of the flea as I stood, as it were, inside the solar camera, and unconsciously developed the latent image by washing the moist-excited paper with a weak solution of Aleppo galls. These negatives, and other solar microscope enlargements, were fixed by hyposulphite of soda. Dr. Diamond saw one of these negatives of the flea in June, 1837. It was the first negative he ever saw, and, more than this, it was the first link in the chain which has bound him so firmly to our art.’

Appraisal of the published accounts of Reade's early photography

Can the veracity of Reade's claim that he carried out his experiments before 1839 be checked? His story that his earliest experiments were carried out in the years 1836-7 became more elaborate as years passed. 1 have already added foot-notes to confirm some of the small items of the basic story, and it is now necessary to discuss in more detail the major aspects of Reade’s claim to have carried out experiments in photography in 1836 or 1837.

There is some evidence concerning Dr. Hugh Diamond’s [37] part in the story. In a report by him of the Paris Exhibition of 1867 he states:

> The Rev. J. B. Reade very early produced an enormous representation of a flea by the aid of the solar microscope and his sensitive paper.[38]

The jurors’ report of the London International Exhibition of 1862 was prefaced by a brief history of photography. John Werge attributed this history to Dr. Diamond (who had been secretary of the jury), and Werge thought that it was “not perfectly correct regarding the Rev. J. B. Reade's labours, but otherwise good”.[39] On referring to the report [40] we find

> “The Rev. J. B. Reade in *April 1839* [my italics] took pictures of Natural History by means of the solar microscope, Nitrate of Silver was employed ... and a solution of nut gall washed over just previous to use.”

[36]. *Brit. J. Phot. Almanac for 1868*, pp. 85-86 ; reprinted in *Brit. J. Phot.,* December 16, 1870,17,590.

[37] 'Hugh Diamond, 1809-1886', *D.N.B.,* (1888), vol. 15, p. 1.

[38] *Phot. J*., 1867, **12**, 118.

[39] J. Werge, *The Evolution of Photography,* London, 1890.

[40] *Report of Jurors, Class* 14 (Photography), London International Exhibition 1862, reprinted in *Phot. J.,* 1862, **8***,* 191.

Dr. Diamond was, of course, much more likely to have been correct concerning ‘ Reade's labours ’ than was John Werge.

John Werge, tried, presumably in the early 1880s, to trace the “1837 paper” negatives which Reade had once told him “were given to Dr Diamond when secretary of the Photographic Society to be lodged with that body for safety”; Dr Diamond's reply (shocking to Werge) was “to the effect that he had no recollection of them, and that Mr Reade was given to hallucinations.” [39]

In 1868 the *Photographic Journal* reprinted a letter by Reade written in reply to a query about his part in the discovery of the latent-image. Reade stated [41] that, although it was as a consequence of his own experiments that Talbot had used gallic acid, it was nevertheless true that the merit for the realisation that gallic acid was developing a latent image belonged to Talbot. The note by the editors of the *Photographic Journal* [42] to this letter is of interest, as Dr Diamond was one of the journal's two editors:

> “Dr Diamond would have confirmed Mr Reade's statement as to his use of gallic acid had his summons to be witness in the cause of Talbot v. Laroche been followed by his being called into the witness-box.”

However, no mention of the date at which the nutgall experiments were carried out was made in this particular letter of Reade's, and therefore Dr Diamond's editorial note gives support for how Reade used the nutgall solution, but not for when he used it.

There is evidence that Diamond began his photography in April 1839, for there was in the Science Museum, London, “a photogenic drawing of a piece of lace .... on the back in Diamond's handwriting are extracts from his diary showing that the paper was purchased and used the following day in April 1839.” [43, 44]

[41] Letter on the discovery of the latent-image, *Brit. J. Phot*., 1868, **15**, 60-61 ; reprinted in *Phot. J.,* 1868, **13**, 15-17.

[42] Editors’ note [by Dr Diamond] regarding the reprinting of letter by J. B. Reade, *Phot. J.,* 1868, **13**, 15.

[43] C. H. Oakden, ‘Early Photomicrographers’, *Watsons Microscope Record,* January 1931, No. 22, p. 13. Dr. D. B. Thomas, Science Museum, tells me (personal communication, July *1969)* that there is now no record of this photogenic drawing at the Science Museum.

[44] Dr. Hugh Diamond of Wandsworth (who was professionally the superintendent of a Mental Hospital) was later, in the 1840s, a prominent member of the Calotype Club and closely associated with F. Scott Archer. Reade in 1854 took some collodion negatives of the Moon and Sun through the telescope of an associate at Wandsworth. The prints of these, which were exhibited at a meeting of the British Association the same year *(Adv. Sci. Brit. Assoc*. *Rep. for 1864,* part 2, pp. 10-12) and for which Reade received ‘honourable mention’ at the Paris Exhibition of 1855 were printed by Dr. Diamond.

There does not therefore seem to be any support from Dr. Diamond regarding the 1837 story; on the contrary, 1839 is the date which seems most likely for Reade's earliest photographic work.

The Problem of the solar microscope and photogenic drawing of the Flea

Reade was very precise about the time of the photograph of the flea (William IV died 20 June 1837), but there is probably an explanation for this: he submitted a paper in December 1836 [45] to the Royal Society concerning a solar microscope illumination system that he had invented. This lens system was designed to enable intense sunlight to be focussed on the microscopic object in such a way that the injurious burning-glass effect would be dispersed. Living micro-organisms or objects mounted in canada balsam, which would otherwise have been affected by intense heat, could then be examined by Reade (who also used the recently invented achromatic compound objective lenses which were cemented with balsam) at optimum brightness. Most objects when mounted in canada balsam have improved clarity; so Reade would therefore have obtained clearer images of such objects and also brighter projected images which could be more easily traced. This 1836 illumination system then could have enabled him to obtain photomicrographs of specimens when others would have failed;[46] but this does not provide evidence that his photomicrography of the flea was done in 1836 rather than in 1839. The communication to the Royal Society regarding the system of illumination of 1836 was published only as a short Abstract [45] but Reade's original MS letter still exists in the Royal Society archives.[47] The last paragraph of this reads:

> 'I will only add ... that the accompanying drawing of the apparatus of the head and mouth of a flea mounted in canada balsam prove ... the practical value of this new (illumination) principle'.

Unfortunately the drawing of the flea is no longer with the letter. But in the Royal Microscopical Society's collection there exists a large (52 cm x 67 cm) framed copy of a lithograph entitled 'Head of the Flea as represented by the solar microscope in canada balsam' which was presented to the Society by Reade.[48] (See Plate XII)

[45] J. B. Reade, 'Observations and Experiments on the Solar Rays that occasion Heat; with the application ... to the construction of the Solar ... Microscope'. *Proc. Roy. Soc. London,* 1830-1837, **3**, 457. See also *Phil. Mag.,* (3rd Series) 1837, **10**, 184, 219.

[46] See comments by J. J. Woodward 'On an improved method of photographing histological preparations by sunlight', *Monthly Microscopical Journal,* 1871, **6**, 173-174.

[47] Letter dated 9 December 1836 from J. B. Reade to the Royal Society: *Archive Papers, AP 20.* 14 (1836).

[48] J. Millar in his obituary of Reade states *(Monthly Micros. J.,* 1871, **5**, 93) : 'at this time ("1837") he made the first micro-photographs [sic] ; ... which were subsequently lithographed a copy of that of the flea he has left to the Society'. [Lens Aldous presented his lithograph of the "highly magnified figure of the head of a flea" to a meeting of the Entomological Society of London on 7 May 1838]

We also find that before 1839 Reade was *tracing* microscope images; for in a paper dated 5 October 1838,[49] concerning micro-fossils, he says,

> Of the beauty of these drawings it is unnecessary to speak, and their accuracy is secured by the image of the objects having been thrown on paper by means of a Camera eyepiece,[50] and then carefully drawn, ... 1 traced [fish scales] under the microscope ... and they were reduced and lithographed by Mr Aldous.

The plates accompanying this paper are certainly of 'beauty' and high quality for the period, but it is hardly conceivable that he would not have mentioned any revolutionary mode of recording those images with silver salts and hypo, if indeed he had used them at that time. It would appear then that Reade was correct, many years later, about having a drawing of a flea on the day that William IV died, but not correct about its being a *photogenic* drawing, although no doubt he did have this also two of three years later.[51]

Analysis of the events described for 1839

Reade stated in 1854 that he had received from the Marquis of Northampton, the President, at a meeting of the Royal Society on 23 April 1839, an invitation to a soiree to be held on the 27 April 1839 [a Saturday]. There was no meeting of the Royal Society on the 23rd, but Northampton was the chairman at the meeting on 25 April 1839. 1 have been unable to find any report of the soiree on 27 April, though *The Athenaeum* reported the previous month[52] that,

> On Saturday evening last [9 March 1839] the Marquis of Northampton, gave his first soiree... Mr Bauer's specimens of Niepce's Heliographic and photogenic drawings by Mr Fox Talbot and Sir John Herschel were exhibited.

Also the artist William Havell (who used Talbot's photogenic paper to reproduce his own paintings and engravings on glass) exhibited his prints 'at the Conversazione of the Royal Society, held at the mansion of the

[49] J. B. Reade, 'On some new organic remains in the Flint' , A*nn. Nat. Hist., 1838, **2**, 191-198.*

[50] 'Camera eyepiece' means camera lucida, not camera obscura. He also projected images onto a wall, for in his *1836* paper to the Royal Society (foot-note *47)* he stated that his lens system of illumination enabled him to obtain 'on the wall a large and well illuminated disk of light.'

[61] It would have been difficult to have obtained a good photomicrograph of a flea's head and its mouth apparatus due to insufficient depth of focus to cover the field required. Tracing the image while readjusting the focus would give better results.

[52] *The Athenaeum,* 16th March 1839, No. 594, p. 204.

Marquis of Northampton, on Saturday the 23rd [March]'.[53] There is, however, no reason to doubt that there was another soiree held on 27 April, at which Reade showed his specimens; for, the previous November, Northampton had announced his intention of giving four soirees during the session; though it is, of course, possible that it was the soiree of either the 9th or 23rd of March to which Reade went, for this could explain the confusion in his evidence at the Talbot v. Laroche trial concerning when he first contacted Mr Brayley. Certainly the Rev. J. B. Reade and his exhibits made no great impression at the time; for the Marquis of Northampton did not mention Reade's work when he spoke not long after about the persons who had been involved in the discovery of photography.[54] Of course, as Reade was not within the most intimate Royal Society circles he might be at some disadvantage in this respect, and his work (compared with Talbot's and Herschel's) be more easily overlooked.

Reade unexpectedly visited Leeds from 29 March 1839 (Good Friday) to Wednesday 3 April, and on Monday 1 April he wrote a letter to his brother George mentioning that he had discovered a process by which he could 'fix' the images of microscopic objects. His father added a P.S. along the margin of his own letter [55] to George (this was on the back of Joseph's letter) which suggests that some sort of auction or sale of art objects was soon to take place. J. B. Reade's recollection of having sold some of his 'solar mezzotints' at a Bazaar in Leeds in the spring of 1839 does therefore receive some confirmation. One of the Leeds newspapers reported a Bazaar, held, in aid of church funds, at the Music Hall, Albion Street, Leeds, from May 21st to May 23rd 1839. There is no mention of Reade's photogenic drawings in this report however. [56]
The claims of the published story can also be checked in detail in regard to Talbot's learning through Andrew Ross that Mr Reade had used nutgalls; for Ross, at the 1854 Talbot v. Laroche trial, stated that "about the middle of 1839 Mr Reade had told him that *he had made a discovery* [my italics] as to the use of galls." [57]

Close analysis of the published story alone can go some way towards providing a re-assessment of J. B. Reade's part in the early history of photography; but it cannot provide the complete answer - this can be obtained only from any surviving contemporary material.

[53] Literary Gazette, March 30th 1839, p. 203.
[54] *Proc. Boy. Soc. London,* 1840, 4, 254-255 ; and 1842, 4, 422.
[55] MS letter from T. S. B. Reade (J. B. Reade's father) to his son George, dated 1 April 1839 (this letter backs that of J. B. Reade's letter) in Royal Photographic Society's Collection, London.
[56] *Leeds Intelligencer* 25th May 1839.
[57] A detailed discussion on the genesis of the use of gallic acid in Talbot's Calotype process will be made in Part II of this article.

Manuscript evidence for J. B. Reade's early photography

Until 1960 no contemporary evidence for the Rev. J. B. Reade's photography was known. However, in that year, a manuscript letter was sent to the Royal Photographic Society. It had been written by J. B. Reade on 1 April 1839 to his brother George.[58] Although it could certainly raise doubts that Reade could have made his discoveries concerning the use of nut-galls in 1836, this letter made statements that were too indefinite to enable any definitive answer to be obtained as to the date of his earliest experiments. The most important statement in the letter was:

> ' The exquisite images of microscopic objects which I produce by means of my solar microscope can now be fixed permanently on the paper wh receives them by a certain chemical process. 1 discovered it on Tuesday last [26 March 1839] ... all that 1 lay claim to is the discovery of a prepared paper sufficiently sensitive to be readily acted upon by solar light after it has been greatly attenuated by passing thru' a double French combination of Achromats with an angle of aperture just more than 20°.'

This statement has unfortunately, several interpretations:
'Discovered' could mean 'applied it to the recording of microscope images'; or alternatively it could mean discovered 'a paper sufficiently sensitive' , or it could refer to the use of hypo as a fixer.[59]

New Contemporary Evidence

After searching for some years I have been unable to find any original photographs taken by J. B. Reade; and even though three groups of MSS

[58] The letter was published the following year by Mr. A. T. Gill of the Royal Photographic Society in *Phot. J.,* 1961, **101**, 10-13. Unfortunately no enquiries were made to Mr. S. Raine of Birmingham, who sent the letter to the society, regarding where it was found. Mr. Raine died a very short while before I succeeded in tracing his address. A relative (Miss J. E. Moore, Personal Communication, December 14th 1969) states, however, that because of his interest in Postal History Mr. Raine had access to Solicitors' old deed boxes. In the file, at the Royal Photographic Society, London, which contains Reade's letter of 1 April 1839 is another dated 1848 and signed by a W. H. Harrison concerning an enquiry (almost certainly to a solicitor) regarding the writer's child. This letter has pencil notes on the back (presumably by Mr. Raine) which are extracts regarding J. B. Reade taken from W. J. Harrison's *The Chemistry* of *Photography* (1892). W. J. Harrison, who also published *A History of Photography* (New York 1887 and Bradford 1888), had lived in Birmingham. It is possible to speculate, therefore, that the letter of 1 April 1839 might once have been in the hands of W. J. Harrison. The letter is addressed to George Reade at Guisborough, Yorkshire, not at "Gainsborough" as was transcribed in the *Phot. J.* in 1961.

[59] Mr A. T. Gill, *Phot. J.* July 1968, 108, 215, believes that Reade should still be given the credit for the first use of hypo as a fixing agent. It is however likely that the word 'fixed' was applied to the whole photographic process-which fixed the light images in position on the paper (cf Talbot's 'on the art of fixing a shadow')

letters written by him were found, [60] these contained almost nothing of interest concerning photography. I did, however, find the letter written by Redman of Peckham to Sir John Herschel in 1840 [31] and mentioned by Reade in 1859.

But, at last, in July 1969, I noticed amongst the Royal Society Archive Collection a letter from J. B. Reade, filed under Miscellaneous Correspondence, which dealt specifically with photography.[61] This manuscript letter from J. B. Reade to the Royal Society of London, dated 28 February 1839, gives unequivocal evidence that the Rev. J. B. Reade did not discover photography independently of W. H. F. Talbot; and that he only began his photography, as did many other persons, immediately after Daguerre's and Talbot's disclosures of January 1839.

Peckham Feb : 28 : 1839.

Sir,

I take the liberty of communicating to you some curious results connected with *Mr Talbot's process of Photogenic Drawing,* and you will oblige me by laying them before the Royal Society if you think that any advantage may be gained thereby.

On commencing my experiments I prepared a saturated solution of Nitrate of Silver and a saturated solution of Salt, that I might be able to ascertain with perfect accuracy the proportionate strength of the diluted liquids wh produce the best effect. I attempted to guide myself as much as possible by Mr. Talbot's directions, but *I found his statement of quantities to be not sufficiently definite to enable me to approach to anything like the beauty of the drawings wh he is able to produce,* and, therefore, when I had ascertained that many variations of the relative proportions of salt, Nitrate of silver, and Iodide of Potassium entirely failed, and that I was perhaps as far as ever from guessing at that proportion wh would secure a permanent design, I felt the strongest inclination to desist from further experiment. It occurred to me, however, that the surface of common "calling cards" being glazed with Isinglass might possibly facilitate the process, not only by possessing a smoothness superior to that of the finest letter paper, but especially by presenting a substance which might at once combine with Nitrate of Silver and thus enable us to dispense with the previous saline preparation. On applying a saturated solution of Nitrate of Silver to one of the cards in question a uniform grey tint was produced by the action of the Sun's rays in the course of a few minutes, and under a somewhat weaker

[60] Lee Correspondence, Hartwell MSS 9110-9116, seven letters dated between 1843 and 1851 from J. B. Reade to Dr John Lee, Buckinghamshire Record Office, Aylesbury : Royal Society of London, MSS, AP 20.14, AP 21.19, AP 23.39, MC 7.73, MC 9.34, MC 9.42. : eighteen letters from J. B. Reade to Miss Salmon, Miss Rushfield and 'Dear Cousin', all dated in 1840s, in 'A. L. Reade Collection' in the possession of Hamilton Reade, Esq., Sevenoaks, Kent.

[61] MS letter dated 28 February 1839 from J. B. Reade at Peckham, Miscellaneous Correspondence, MC 3.15, Royal Society of London.

solution, a delicate pink colour seemed to be diffused over the grey. This pink or salmon colour alone was the resulting tint under the weakest solutions. Being now in possession of what might be properly termed *Photogenic Paper,* I immediately tabulated my experiments, and it appears that the best effects are produced by mixing six drops of a saturated solution of Nitrate of Silver (as obtained from the solution of common Lunar Caustic in distilled water) with quantities of water varying from 80 drops to 240 drops. The specimens wh accompany this letter were prepared with 6 drops of the Nitrate, and 80, 180, and 240 drops of water.

The process of fixing the images is as simple as that of procuring them, and consists in washing the cards with a solution of Hydriodate of Potash, obtained by dissolving one grain of the Hydriodate in 80 or 100 drops of distilled water. The specimens wh I have fixed by this method have been exposed during several hours to the full influence of the Sun ; and it will therefore be evident, from inspection, that they have lost all sensitiveness to the action of light.

I have the honor to be, Sir,
Your obedient Servant
J: B : Reade.

The addressee of the letter is not recorded, but it was obviously either to the Secretary, or the conventional 'to the President and Council', of the Royal Society. Obviously Reade forgot that he had made this communication; and whilst the Reade claim has been a matter of controversy for more than one hundred years, this letter has remained in the files of the Royal Society. No doubt it was filed as not being of sufficient interest for communication at a Society meeting. Perhaps it was responsible for Reade's later exhibiting his photographs at the President's soiree two months later. It is not really surprising that the Society did not publish it, for they had Talbot's own letters available to them[62]; and then Sir John

[62] The situation regarding the publication of Talbot's communications on Photogenic Drawing was an unhappy one for the Council of the Royal Society. Talbot eager to obtain priority for the discovery of the new art wished to receive quick dispensation that his communications would be accepted for publication in the Society's *Philosophical Transactions.* He badly needed this early confirmation, because, in his haste, he had already sent copies of the letters to the weekly journals. Although he wished to publish quickly, he did not wish to publish more than a generalised outline of his work; for he felt that to reveal the chemical details of photogenic Drawing would enable Daguerre, and others, to appropriate the technique. Unfortunately the Royal Society were unhappy about his papers because of this lack of chemical detail. The MSS of Talbot's communications on photogenic drawing are Royal Society MSS AP 23.19-21 and AP 25.13; for the problems of publication see MC 3.5, MC 3.6, MC 17.315, and 'Minutes of Council' 1832-46', vol. 1 p. 210, as well as the Talbot to Herschel letters in the John Herschel Correspondence; HS 17. (letters 279-282) and Herschel's letters to Talbot HS 17.279 bis and 281 bis.

Herschel's great work which was read two weeks later at the meeting held on the 14 March 1839.[63] Reade's trials and modifications of the chemical proportions of Talbot's process bear no comparison with the astonishing series of experiments begun by Sir John Herschel in the last week of January 1839.[64] Merely to compare this letter, for example, which he intended for publication, with Herschel's private letter to Talbot dated the same day [65] highlights its low standing in the advancement of photography.

After hearing about the brief announcement in Paris that an invention had been made by Daguerre, Talbot, after hurriedly showing his collection of prints to the audience attending an evening meeting of the Royal Institution, made public his work at the Royal Society meetings of the 31st January and of the 21st February 1839. The first report was in rather general terms, but the report of 21 February gave some chemical details of his photogenic drawing process. These letters were published immediately in the weekly journal *The Athenaeum* on February 9th and 23rd. Reade had seen Talbot's specimens and therefore must have been at the Royal Society meetings and read the published letters, and so, immediately in the last week of February 1839 made his first attempts to carry out Talbot's process. Many persons carried out experiments with this 'new art' in the first six months of 1839; by June of that year *The Athenaeum* was complaining 'hardly a day passes that we do not receive letters respecting some imagined discovery or improvement in the art of photogenic drawing'.[66]

The processes described by Reade in this letter of 28 February 1839 are all Talbot's; I have placed in italics two passages in the transcript of the letter which show Reade's dependence upon Talbot's work, and in particular it should be noted that 'fixation' with salt and potassium iodide was used (as suggested by Talbot), and not hypo. He did modify Talbot's technique in one way when he used isinglass – (fish gelatin) - glazed cards; for this reason silver nitrate only was used (a retrograde step), instead of the chloride wash. Talbot's photogenic drawing technique which consisted of treating paper with alternate washes of silver nitrate and salt, was by no

[63] Herschel, who was a member of the Council, had also previously left two' Photographic specimens' for informal exhibition at the meeting of the Royal Society on the 7 February 1839, see Herschel Correspondence HS. 17. 281 and 281 bis, Royal Society, London.

[64] R. S. Schultze, '... photographic researches of Sir John F. W. Herschel 1839-1844', *J. Phot. Sci.,* 1965, **13**, 57-68: Letter from J. F. W. Herschel to A. Brothers, *Brit. J. Phot.,* 1866, **13**, 236.

[65] Ms at Science Museum London ; also published in *Phot. J*., 1937, **77**, 528-531.

[66] *The Athenaeum,* 8th June 1839, No. 606, pp. 435-6.

means an efficient or consistent process, and was suitable only for the production of photograms. Not only was the 'fixation' deficient and resulting in coloured backgrounds, but an incomplete silver chloride with an excess of silver nitrate was needed: Talbot was well aware of the inconsistent results obtained with his method of preparing this print-out salted paper, and Reade's feeling of 'the strongest inclination to desist from further experiment' was felt by many persons in the following months and (especially when the clarity of detail of the Daguerreotype was first seen that autumn) it was not long before the process was largely abandoned. Reade's reasoning regarding the use of silver nitrate only, because the gelatine glazing would 'combine with the nitrate of silver and thus enable us to dispense with the previous saline preparation' , is somewhat obscure. Perhaps if we could fully understand this line of reasoning it might provide a complete understanding of his mode of thought during the following month which led to the use of a wash of nut galls on the paper treated with silver nitrate. But ideas concerning darkening of silver salts in the presence of organic matter might have been involved; this will be discussed in, Part II of this paper. The use of thick cards also meant, of course, that positive prints could not be obtained from them.

This letter gives an entirely new view of Reade's work at the beginning of March 1839; what influence does it have upon our interpretation of his letter to Brayley and his letter of 1 April 1839 to his brother?

Re-assessment of Reade's letter to Brayley, and of the MS letter of 1 April 1839:

J. B. Reade's letter to E. W. Brayley, describing the use of nut galls, was published eight years after it was written as having been dated (or 'communicated') on 9 March 1839. In the light of the newly found letter of 28 February 1839 that date for the Brayley letter is quite ludicrous. From the time-scale of events which can be reliably estimated from Reade's basic published story, and more particularly from the letter of 1 April, then Reade must surely have written to Brayley either on 29 March, or most likely, on 9 April 1839.[67] The Brayley letter was obviously not published in its entirety in 1847; indeed, some extracts from the letter,

[67] Brayley said at the Talbot v. Laroche Trial (in 1854) that he had received the letter in April. It can also be considered that it was possible that Reade did go to the soiree of 9 March, and that it was then that Brayley learnt that Reade was carrying out trials of Talbot's photogenic drawing ; if that date had been mentioned in letters it could in later yews have caused confusion. There is some considerable muddle in Reade's evidence at the Talbot v. Laroche trial about when he first had contact with Brayley which suggests that he showed his prints at Royal Society functions before the meeting of 23 (sic) April and the soiree of 27 April ; this would have to be before 10 April 1839.

which do not appear in the 1847 version, were quoted at the Talbot v. Laroche trial in 1854.[68] Probably some information about his first trials of Talbot's technique was given in the Brayley letter before adding some details of the use of lead carbonate and of nut -galls. A long search for the MS of Reade's letter to Brayley has been unsuccessful.

Attention has already been drawn (p. 18 and footnote 17) to the important consequences of Sir David Brewster's comment about Reade's use of gallic acid before Talbot took out his Calotype patent: Brewster's other comment, which preceded his printing of Reade's letter to Brayley, has been badly overlooked by historians, although it can now be seen in its true light. Brewster stated,

> 'The communications of Mr Talbot to the Royal Society could not fail to draw the attention of philosophers to so curious an art, and accordingly we find that the Rev. J. B. Reade, F.R.S., a gentleman to whom the sciences owe valuable obligations, had made important additions to the photogenic processes, and had himself applied them to the delineation of objects of natural history, of which he took pictures by the solar microscope '.[69]

And also twelve years after this (and note that this was after the Talbot v. Laroche trial.) Brewster stated in the article on photography in the 1859 edition of the *Encyclopaedia Britannica* that, "(in April 1839) the Rev. J. B. Reade *was led by Mr Talbot's paper* [my italics] to delineate objects of natural history by means of the agency of Light."

[68] Although the letter was read out in court the text was unfortunately not recorded however, the judge, in his final speech, did disjointedly quote some extracts from the letter which are recorded in the verbatim account of his speech in the *Art J*., 1855, 60-51. The most reliable parts of the Judge's statement were: 'Mr Reade ... had made many experiments ... they substantially resulted in two plans which he gives in more detail ... he says "I need not enter into the details ... it would be tedious" and so on. Then he gives his first plan. "For plants, prints, &c., that the ground may retain the precise tint which is received at first, I use, not common paper, but card-board"- this is the very one – "coated with white-lead, and highly glazed. This surface is washed with a weak solution of nitrate of silver, consisting of from two to four grains in one drachm of distilled water. The card is dried before the fire, and the design, after being procured in the ordinary way, is fixed by immersing the card for a few minutes in an ounce of distilled water containing from ton to twenty grains of hydiodate of potash. This paper is not remarkably sensitive" ... In his letter to Brayley he says – "to make it more sensitive I use nitrate of silver upon a glazed card, with carbonate of lead, and 1 fix with iodide of potassium" ... he goes onto the next process. "The more important process, and one, probably, different from any hitherto employed ... [quoted as in 1847 version up to] ... Pharmacopeia" .'

[69] *North Brit. Rev.,* 1847, **7**, 465. The inclusion of the word 'had' was, however, the source of some ambiguity, which drew attention away from the important word 'accordingly' .

The evidence from the published letter to Brayley has always provided the strongest support for the claim that Reade was the first person to fix with hypo, a claim still accepted by modern historians.[70] Now, as a result of this new evidence, this is an honour which with certainty belongs solely to Sir John Herschel.

Without the definitive evidence of the MS letter of 28 February, Reade's letter to his brother, dated 1 April 1839, would have remained equivocal (see pages 30–31 and footnotes 3 and 4.); but we can now see, with some certainty, that his comment to his brother that 'all that 1 lay claim to is the discovery of a prepared paper sufficiently sensitive to be readily acted upon by solar light after it has been greatly attenuated' is the most important (and indeed prophetic) phrase of that letter, and that it can only refer to the use of nut galls on the 26 March 1839.

Re -assessment of the events of March and April 1839

During March and April 1839 J. B. Reade made his first attempts to record solar microscope images photographically, which Talbot, and Thomas Wedgwood before him, had suggested as being an ideal application for the use of their sensitive papers. In April 1839 he also made trials of other silver compounds; ammoniacal silver nitrate[23] was one compound, and, of course, a wash of nut galls onto silver nitrate which formed, he believed, a more sensitive compound of tannate or gallate of silver. As a newly elected Fellow he was eager to attend meetings of the Royal Society which were held on the 7th, 14th and 21st of March, and then, after the Easter recess, on 11 April 1839 (the day after Brayley's talk at the London Institution). It is possible [67] that Reade went to the Marquis of Northampton's soiree held on the 9 March at which photogenic drawings were exhibited, but he was surely at the Royal Society meeting on 14 March 1839, for he communicated a paper on agricultural chemistry by his associate Robert Rigg.[71] At this meeting he would have heard Sir John Herschel's magnificent paper: 'Note on the Art of Photography'.[72] Unfortunately only a rather short report of Herschel's paper has been recorded; what suggestions he might have made to the meeting about his

[70] For examples see A. T. Gill, Phot. J., 1968, **108**, 215 ; and G. E. Matthews and J. J. Crabtree, *IMAGE,* May 1953, vol**. 2** (No. 5) p. 26.

[71] '... Formation of alkaline and earthy bodies, with reference to their presence in plants ... by Robert Rigg Esq., communicated by the Rev. J. B. Reade, M.A., F,R.S.', *Proc. Roy. Soc. London.,* 1839, **4**, 130-131, and *The Athenaeum*, 23 March 1839, No. 595, p. 223.

[72] John F. W. Herschel, Proc. *Roy. Soc. London,* 1839, **4**, 131-133, and in *The Athenaeum*, 23 March 1939, No. 596, p. 223 and Phil. Mag., May 1839, **14**, 365-7.

four varieties of processes involving metallic salt reduction and 'blackening by a variety of agents' , and what stimulating unrecorded ideas on photographic chemistry he might have presented to the audience can only be conjectured. His detailed paper on photography, published in the *Philosophical Transactions* the following year,[73] can perhaps supply us with some tantalising clues about the unrecorded part of his paper of 14 March 1839. We do know, however, that Herschel made public the use of 'liquid hyposulphites' for fixing. Indeed, this paper was instrumental in very quickly spreading the knowledge in England that hypo could be used as a photographic fixer; for J. Cooper, the Polytechnic chemist (who already by March 16th was advertising his photographic paper in *The Athenaeum)* was on 19 May 1839 acknowledging that Herschel discovered the method of fixing photogenic drawings 'by removing the whole of the silver from the paper'. 'This is affected', said Cooper, 'by what Sir John Herschel proposed for the purpose, viz., a solution of the hyposulphite of soda'.[74] One can imagine Reade discussing the new art with other persons present at the meeting, and showing specimens of his own early modifications of Talbot's process, after listening to Herschel's paper; indeed, it could have been then that Brayley saw Reade's prints.[75] It was not necessary for Reade to have already used nut galls before being invited by Brayley to give an account of his experiments on photography to the soiree held at 8 pm at the London Institution on 10 April. [76]

At the Royal Society meeting held on the 21 March 1839, at which Northampton was chairman, Talbot communicated a short paper on the preparation of a new, more sensitive, paper using silver bromide; but we have no evidence that Reade went to this, or any other of the Society's meetings until the '23rd April' (sic. 25th April?). There was no particular reason why Reade should have gone to that meeting, for the only paper was one concerning the Compass on Iron ships, but his associate, and nominee, Robert Rigg was elected a Fellow at that meeting; so it was obviously at this time that Reade received an invitation from the President chairman to go to his soiree which, we are told, was held on 27 April 1839. It was late in March, on the 26th, when Reade first used a wash of nut gall infusion on silver nitrate prepared paper. This, he tells us, was used to

[73] *Phil. Trans*., 1840, **180**, 1-59.

[74] *Trans. Soc. Arts*., 1839, **52**, 193-6.

[75] The possibility must also be considered, however, that Reade originally submitted an unsolicited letter to Brayley, perhaps intended for publication in the *Philosophical Magazine.*

[76] This date for the soiree is confirmed in *A descriptive catalogue of the lectures delivered at the London Institution,* London Institution, printed not published, 1854, p. 20 and p. 30 ; and 'List of Lectures at the London Institution 1838-39' in *London Institution Reports 1830-50*, Guildhall Library, London, Ref., AN 16.8.

obtain photographs of the magnified images of a favourite specimen, a flea, and other specimens, in his solar microscope; photographs which he says were shown at the soiree. On 29 March he travelled to Leeds for the Easter holiday, staying five days before leaving on 3 April for Manchester, and presumably London. It is most likely that it was after returning from Leeds that he sent details of his photographic experiments to E. W. Brayley. Whilst it must have been before leaving London for Leeds that he visited Andrew Ross, and spoke about his recent experiments with photographic paper and nut galls; a visit which had some consequences when Mr Talbot visited Ross within a very few days.

Reade's later photography

There is no substantial evidence concerning how long Reade continued to use nut galls, or indeed any other paper process. As the letter[31] from his 'pupil' T. S. Redman to Sir John Herschel in March 1840 does not mention gallic acid it may be that nut galls were used for only a very short period. Reade recalled at the Talbot v. Laroche trial in 1854 that he had taken shadow profiles of his friends, and of his gardener outside his greenhouse at Peckham,[24] which must have been in the summer of 1839. Apart from the photomicrographs shown at the London Institution and the Royal Society meetings in 1839 he also presented to Sir Richard Owen two photomicrographs of a section of a fossil tooth which were engraved and published by Owen in 1840.[77] He seems also to have done some early work with his friend John Waterhouse of Halifax,[78] but otherwise there is no evidence of the extent, if any, of his photography in the 1840s.

In the 1850s he took astronomical photographs on collodion negatives and we can catch a glimpse of him photographing friends in 1856.[79] Apart from the poor evidence of engravings taken from a few of his photographs, which were used in a friend's book,[80] there is no evidence as to the quality of his photographs. Surprisingly there is no record of his having continued to use photography in his microscopical work.

He had quite a number of letters and short papers published in the late 1850s and 1860s on a range of photographic subjects, and we have the opportunity to read many 'chairman's remarks' when he often officiated at meetings of the Royal Photographic Society in the late 1860s. But none of these publications records any really substantial work.

[77] Owen's *0dontography,* Balliere, London, 1840, plates 6 and 7.

[78] *Proc. Roy. Soc. London.,* 1879, **29**, xxviii.

[79] Edit. B. W. Richardson, *Thomas Sopwith Diary,* Longmans and Green London, 1891, pp. 5-6, 247, 255; see also R. D. Wood, *Phot. J.,* 1969, **109**, 412, 536.

[80] W. H. Smyth, *Addenda Aedes Hartwellianae,* London 1864, pp. 9-10, 244.

How did Reade's claims arise?

Reade's claims which he made in the 1850s and 60s, to have begun his photographic work in 1836-7, can now be seen to have been due to confused memory. Given the stimulus of Sir David Brewster's slightly misleading words in 1847 and of the events of 1854, how did Reade's confusion develop?

Knowledge and use of silver nitrate treated paper for photometric purposes in the mid 1830s was much more widespread than is commonly accepted by historians of photography. I would particularly point out that there was a strong current of such work in botanical studies prior to 1839, which J. B. Reade would have been in a receptive position to be aware of as he had an especial interest in plant chemistry in the late 1830s. However, Reade's major interest in the mid 1830s concerned the second major field of study in which the use of silver salts was well known: that of studies on solar light heat rays (infra–red), and parallel work on the so–called 'chemical' rays (violet and ultra–violet light).

I therefore put forward the hypothesis that J. B. Reade's claims began when he confused the memories of the times when he obtained photographs of his flea specimen using his solar microscope illumination system in 1839, with using the same apparatus at the time he first invented it, in the 1836–7 period, and was then merely drawing or tracing the same specimens. This illumination apparatus of Reade's, believed both by himself [81] by J. J. Woodward,[46] the most expert pbotomicrographer of the 19th century, and in recent times by C. H. Oakden,[2] to be the major reason for his success in pbotomicrography, is not evidence, as Oakden thought, that Reade was doing photomicrography in 1836; but on the contrary, it is evidence for a confusion between the ability to examine a flea mounted in canada balsam with intense light without burning, and the ability to take photographs of the same specimen, due to the intensity of the light being sufficient for that purpose. The first aspect was familiar to Reade in 1836, the second in 1839; but in later years these two aspects became merged in his mind. This confusion is well demonstrated in an article [36] published in his old age, in which he recalled his first scientific publication, and which had been submitted thirty–three years previously to the Royal Society. His muddle over this becomes more understandable when we consider a wider aspect, which also involves W. T. Brande's *Manual of Chemistry*. This popular book was the standard textbook of the day, and was used by

[81] The most important point is that Reade himself believed that his lens system was removing the heat from the illuminating beam. That today we might not agree that this was so is irrelevant. For our consideration is what paths were scientists led into due to their concepts concerning the 'three parts' of solar light.

Reade.[82]. The whole purpose of Reade's 1836 solar microscope illumination system was to separate two 'parts' of light – to separate the calorific (heat) from the colorific (luminous) rays. There was a widespread interest in the relationship between radiant heat and light in the mid 1830s due to the work of Macedonio Melloni (1798–1854) with which Reade was familiar. The idea, current in the early nineteenth century, that light consisted of *three* parts originated from the work of the Swedish chemist Carl W. Scheele.[83] Brande,[84] in the chapters on Light in his *Manual,* discusses this classic work of Scheele's regarding the three parts of light and especially that concerning the 'chemical effects of solar rays'. The most likely editions of Brande's *Manual* that Reade would have had in the late 1830s would be either the third (1830) or the fourth (1836). In the edition of 1830 we find, [85]

> Scheele threw the prismatic spectrum upon a sheet of paper moistened with a solution of nitrate of silver, a salt quickly decomposed by the agency of light. In the blue and violet rays the silver was soon reduced producing a blackness upon the paper, but in the red ray scarcely any similar effect was observed… It has been thus ascertained, that solar beams are refrangible into three distinct kinds of rays: the calorific; luminous or colorific; the decomposing rays or those which have a tendency to interfere with the chemical constitution of bodies. In the prismatic spectrum these three sets of rays are imperfectly separated, and arranged according to their respective refrangibilities. The heating rays are the least refrangible; the colorific… more refrangible; and the decomposing… (or "chemical rays") the most refrangible.

J. B. Reade knew [47] of Scheele's ideas on the calorific and colorific rays, and there could easily have been every reason for him to have extended his experiments to include work on Scheele's third 'chemical part' of light with his solar microscope.

[82] Apart from the (unreliably) recalled story by Reade of finding the use of hypo as a silver solvent in *Brande.* he also refers to this book in other publications. There is no definite information as to which particular edition of the *Manual* Reade used in the late 1830s; but quotations found in the 1830, 1836, and 1841 editions were, however, given by Reade in 1844 *(Trans. Micr. Soc.* 1844, 2, 24.) and in 1857 *(Adv. Sci. Brit. Assoc. Rep.***,** pt 2, p. 55.)

[83] For Scheele's work see *The collected papers of C. W. Scheele,* trans. L. Dobbin, Bell and Son, London 1931, sections 60, 63, and 66, of 'Chemical Treatise on Air and Fire' 1777, are the most important. For Scheele's life (1742–1786) see G. Urdang, *The Apothecary Chemist C. W. Scheele.,* American Inst. Hist. Pharm., Wisconsin, 2nd edn, 1958.

[84] W. T. Brande (1788–1866) had succeeded Davy as professor of chemistry at the Royal Institution in 1813 and filed that post until 1854. In that year he also appeared, in support of Talbot, in the Talbot *v*. Laroche patent trial (see *The Times,* December 21st 1854, p. 11), but unfortunately there is no record of his evidence. For his life, see E. Ironmonger, 'Forgotten worthies of the Royal Institution: W. T. Brande', *Proc. Roy. Instn. G. B.,* 1961, 38, 450–461; and C. H. Spiers, 'William Thomas Brande, Leather expert', *Ann. Sci*., 1969, 25, 179–201.

[85] W. T. Brande, *Manual of Chemistry,* London, 3rd edn., 1830, vol. 1, p. 125.

The above quotation from this edition of Brande's *Manual* alone could have led Reade to such further experiments, and thus to discover photography in 1836–7 as he later claimed. This applies with even greater force when we find that, in the enlarged edition of Brande's *Manual* of 1836,[86] Brande extends this discussion of Scheele's work with silver 'nitrate' (in fact chloride) and the separation of solar ray elements with a report of Thomas Wedgwood's photographic experiments of 1802:[87]

> … a pretty experiment, showing the action of light upon nitrate of silver, was devised by Mr Wedgwood: a piece of paper, or other convenient material, was stretched upon a frame and sponged over with a solution of the salt; it was then placed behind a painting upon glass; and the light, traversing the painting, produced a kind of copy of it upon the prepared paper; those parts in which the rays were least intercepted being of the darkest hues. Moistened chloride of silver is another compound, also very sensitive ... Scheele was the first to whom the ingenious idea occurred of ascertaining whether all the rays possessed similar chemical powers ... (etc).

That J. B. Reade could have been familiar, in 1836–7, because of his experiments with his solar microscope illuminator, with the above two quotations (which were well indexed and cross referenced with related subjects) also receives some speculative support from his work with nut galls, and with ink (see Part II of this article); although there is no evidence regarding the date in these cases.

The use of hypo as a silver salt solvent is given in Brande's *Manual* in the section on Silver and its Salts, and this section is cross referenced with the two quotations given above. Reade then *could* have discovered a silver nitrate/hypo photographic process in 1836–7. The report by Brande in 1836 of Thomas Wedgwood's early photography has most unaccountably been missed by historians of photography; I suggest that there is some evidence that Talbot was influenced by Brande's book. Brande himself, and indeed any reader of his very popular book, was therefore in a position to have discovered photography in 1836. Reade, however, was especially interested in light, and with its morphological application with the solar microscope. As well as Brande's *Manual* there were in fact quite a number of publications in the mid–l830s that describe the use of paper treated with silver salt for photometric purposes. In particular there were two

[86] *Manual of Chemistry,* London, 4th edn., 1836, p. 184.

[87] An account of a method of copying Paintings upon Glass, and of making Profiles, by the agency of Light upon Nitrate of Silver, Invented by T. Wedgwood, Esq. with Observations by H. Davy', *J. Roy. Instn.,* 1802, **1**, 170–174; also reprinted in *Nicholson's J. Nat. Phil.,* 1802, **8**, 167. It has been widely suggested that this first use, by Thomas Wedgwood, of the photo sensitivity of silver salts for graphic purposes, had no influence upon later experimenters because the journal in which it was published had little circulation.

such papers published in 1836 by Professor Charles Daubeny [88] and by Mrs Somerville [89] which were in fields of study of close interest to J. B. Reade at that time. Unlike Daubeny, Mrs Somerville, or Brande – whose concepts were more likely to be trapped within the world of Chemistry – Reade's interests brought all the elements together which might have fully converted photochemistry and photometry into photography. He could so easily have done this; but the manuscript letter of the 28 February 1839 tells us that, in fact, *he did not.* We are able however to appreciate fully why, many years later, he began to think he had indeed discovered photography in 1837.

The Rev. Joseph Bancroft Reade did not make his claims for reasons of personal aggrandisement; on the contrary he was a genial and 'homely' man. There was no mock modesty in his words to George Shadbolt: 'I hope I shall not be accused of pushing myself unduly forward when I merely answer the questions of friends'.

In the early 1850s, after the stimulating introduction of the collodion process, many professional photographers were fretting under 'the shackles' that Talbot seemed to be trying to maintain in his attempts to impose his Calotype patent upon users of the new collodion technique. When it was noticed that Reade's letter to Brayley, published a few years earlier, described the use of 'gallic acid', this suggested that Talbot's

[88] C. G. B. Daubeny, 'On the action of light upon plants ...' *Phil. Trans.,* 1836, **126**, 149–175. This paper was read to a meeting of the Royal Society in December 1835. Pages 150–152 and 158 are relevant for the use of paper treated with silver nitrate.

[89] Mary Somerville's paper, 'Experiences sur la transmission des rayons chimiquee du spectre solaire, à travers differents milieax', was originally read at the Academy of Sciences, Paris, and later reprinted in the *Edinb. New Phil. J.,* January 1837, **22**, 180–183. She makes just those deductions which have been made above concerning the way in which J. B. Reade's interest in the separation of beat from light could have led to experiments with silver salts in 1836. Indeed the feasibility of the above speculations gains from having been made before the author was aware of Mary Somerville's work. Following on a study of the work of M. Melloni on the separation of radiant heat from luminous rays of sunlight, D. Francois Arago and J. B. Biot, at the Paris Academy of Sciences, in December 1835, made the tentative suggestion that the subject might also be investigated from the point of view of separating the 'chemical rays' from the luminous rays *(Comptes Rendus Acad. Sci. Paris,* 1835, **1**, 508–9.). However, neither of these two great French Scientists did, in fact, carry out any experiments on this; but Mary Somerville, using paper treated with silver chloride did; Michael Faraday, early in 1836, prepared the purest silver chloride solution for her. She wrote to Arago reporting her experiments and he read the letter to the Paris Academy of Sciences on 17 October 1836 *(C. R. Acad. Sci. Paris,* 1836, **3**, 473–476.). The intention was to find the best filter to remove both the heat and the 'chemical' rays from sunlight, so as to 'retain its simple illuminating power' only. Mary Somerville did not, however, extend her photometric experimentation with silver chloride any further. This work by her also influenced J. W. Draper, the early photographer, in America.

patent might be shown to be invalid. Reade was therefore brought forward in opposition to Talbot. When Reade, confusing his memories, added the claim regarding the 1836–7 date to the more substantial claim of having used nut galls before Talbot, then credence could most certainly be given to this. Reade's very affability contributed both to the development of this additional claim and to its acceptance. His friends in their personal regard for him, and the professional photographers with their detestation of Talbot, had no special reason to contradict this claim. Nor did historians of photography (who have sometimes shown as little sympathy with Talbot's desire for fame as did contemporary professional photographers), noting the more valid gallic acid claim, find any substantial reasons for rejecting further reminiscences about the pre–1839 date for Reade's early work.

Conclusion

The recently found manuscript letter dated 28 February 1839 shows that the Rev. J. B. Reade began his photography immediately following the announcement to the public by W. H. F. Talbot of his Photogenic Drawing process early in 1839. This article has shown that, contrary to previous claims, Reade was not an independent inventor of photography, and was not the first person to use hypo.

Reade's name, however, will not disappear from histories of photography. Even though there are no original prints available from which to judge the quality of his work, he will rightly be remembered as one of the earliest photomicrographers; and his words 'all that I claim to is the discovery of a prepared paper sufficiently sensitive to be readily acted upon by solar light after it has been greatly attenuated' are also of historical importance: for Reade's use of nut galls to make photogenic paper more sensitive may have had important consequences in the evolution of the photographic process. The Talbot v. Laroche trial of 1864 revealed that Talbot had learnt from Andrew Ross of this use of nut galls by Reade in April 1839, and that this information later led to Talbot's discovery that gallic acid developed a latent image. J. B. Reade's part in this is firmly established in today's histories of photography. The significance of his use of gallic acid in regard to the most important stage in the evolution of the photographic process – the discovery of the Latent Image and Development – therefore remains to be re–considered.

Part II of this article will re–examine Reade's use of nut gall infusion and events in the 1840s and 1850s involving gallic acid and Talbot's Calotype process.

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