

# WALTER BENTLEY WOODBURY AND HIS SCIOPTICON

Trevor Beattie



1. Walter Bentley Woodbury, 1834–85 (NMSI Science and Society Picture Library)

**IT IS POSSIBLE TO CLASSIFY** lanternists into five main types:

- the showperson, such as Harry Furniss or Doug and Anita Lear;
- the academic and lecturer, such as Eadweard Muybridge;
- the missionary, with the best example being David Livingstone;
- the inventor and businessman, for example Theodore Brown;
- and, finally, the adventurer, such as Frank Hurley from Shackleton's Antarctic expedition of 1914–16.

The final category is the rarest but it includes some of the most extraordinary people ever to polish a condenser.

Walter Bentley Woodbury (Fig. 1) was one of the greatest of the 'adventurer lanternists'. He was also an excellent example of the lanternist as inventor and businessman, since he invented the highest-quality, most permanent photographic process ever developed, as well as one of the most important redesigns of the lantern. It was the adventurer in Woodbury that drove him forward. Although he only lived to the age of 51 he managed extensive periods in Australia, Java and America, as well as travelling widely across Europe. He set up businesses in three continents, was born in one, married in another and brought his Sciopticon from a third.

Woodbury would have been challenging company. He was a man who never accepted how things were, but asked instead how they should be. He was drawn to novelty; he always had a plan and could spot a good business opportunity long before anyone else.

Woodbury was born in Manchester on 26 June 1834, just a year before William Fox Talbot produced the first paper negative, so it was no surprise that photography dominated his restless life. It was the cutting edge of technology in the mid 19th century, so he was always going to want to be part of it. But Woodbury would not settle for merely taking a part. He had to lead – he had to make it his own.

He was born into a prosperous family who owned a shoe factory and shop.<sup>1</sup> As a child he was fascinated by the camera obscura.<sup>2</sup> When he was 14 he was apprenticed to a local patent agent, an experience which was to serve him well in later years when he was to keep the Patent Office very busy.

In 1849, when he was only 15, Woodbury left England for the Australian goldfields to seek his fortune. He said of this decision:

*My old love, my idol [photography] was shattered and forgotten entirely. Cradles, tents, picks, spades, and*

*revolvers put camera and collodion entirely on one side. I was off to Australia with all the requisites to make my fortune in a few months, and, what is more, I really believed I was going to do it.<sup>3</sup>*

By the time he arrived in Victoria the gold had become very difficult and expensive to extract. Woodbury was out of money, so he had to find a profession fast. Since there was no gold but plenty of miners he decided that construction was the true growth area and became a surveyor.

In the summer of 1853 the 19-year-old Woodbury was surveying the route of a new road in the goldfield town of Buninyong, which was the first inland town in the state of Victoria, 75 miles (125km) north-west of Melbourne. At that time the settlement had only been established for ten years, and Woodbury's party was marking out what is now the centre of the modern town. In one of his regular letters home to his mother he explained that the town had five pubs, but only 20 houses.

Those letters depict a dutiful, homesick son. There are frequent requests to 'send a few hundred kisses' to his many brothers and sisters and he complains that 'it is difficult to save money here'. This is probably why he returned to photography while still a surveyor. The wet plate process had only been announced in 1851, yet by 1853 Woodbury had his own small studio. He wrote to his mother:

*I hear that they take portraits in England for one shilling. I should think you might manage to send the children's likenesses as it would not cost above five or six shillings and they would be worth twenty times that to me. The lowest price I charge here is £1.10s, up to £5, which is the regular price at the dippings.<sup>4</sup>*

These astronomical sums for the time (even allowing for exchange rates and some youthful exaggeration) suggest why Woodbury concentrated on photography and why his business grew so fast. By 1855 he had given up surveying and become a professional photographer with a studio in Melbourne. In 1857 he was in business in Ford Street, Beechworth, in north-east Victoria.

Woodbury built a successful photographic business in Australia which quickly transformed him from a penniless teenager to a man of substance. It is not therefore clear why in 1859, aged 25, he sold up and moved to Java.<sup>5</sup> It might have been his habitual restlessness – he had, after all, been in Australia for exactly ten years by then. I prefer to think, however, that it was the businessman in Woodbury that led him on. There would have been a great deal of competition in the photographic business in Australia by 1859 and he would no longer have been commanding the sky-high prices he described to his mother just six years earlier. He probably hoped to repeat his Australian experience in the unexploited territory of Java.

He soon went into partnership with James Page (1833–65), a photographer whom he had befriended in Australia and who had been his travelling companion on previous tours through Southeast Asia. Together they created the largest photographic business in Java. Woodbury photographed the Emperor's Court, in photos later to become lantern slides, including his dancing girls, bodyguard and spittoon bearer. The firm of Woodbury and Page continued in business long after Page's premature death in 1865 and Woodbury's return to England.

The climate of Java gave Woodbury an acute appreciation of the lack of permanence of contemporary photographic processes. In 1862 his deteriorating health forced him and Marie Olmeyer, his Javanese wife, back to England, determined to find an answer to the problem of producing permanent photographic prints.

## NOTES

1. Camfield and Deirdre Wills, 'Walter Bentley Woodbury', *Photographic Journal* December 1985, 551–4.

2. Walter Woodbury, 'Experiences of an Amateur Photographer', *The Amateur Photographer* 26 December 1884, 185–6.

3. *Ibid.*, 185.

4. From a letter held by the Science Museum, London, which also includes a picture of Woodbury's first tiny studio.

5. Camfield and Deirdre Wills give a much earlier date of 1854 for the move to Java, but *Cassell's Cyclopaedia* of 1911 gives 1859 and Australian sources tie in with this date.



The newly married couple first set up home in Manchester but in 1864 they settled in Birmingham, at about the same time that Joseph Swan (1828–1914) announced his beautiful carbon prints. Woodbury immediately latched onto the process, but found it too slow, and so he continued to research ways of mass-producing prints that would not fade. By the end of the year he had the answer.

The genius of the Woodburytype process that he patented at the end of 1864 and first demonstrated in 1865 is that, instead of representing variations of tone *across* the surface of the plate or slide, as in a traditional photograph, it produces a three-dimensional model of the image, using the *depth* of the ink to represent changes of tone. It is also highly stable and capable of mass production on a factory scale once the original mould has been produced.

## THE WOODBURYTYPE PROCESS

This is how a Woodburytype is produced from an existing negative. When dichromated gelatine is exposed to light it hardens and becomes insoluble in water. So when a sheet of such gelatine is exposed to light the lowlights remain soluble and the highlights become hard. Lengthy exposures are required – often running into hours. When the sheet is washed in hot water, the temperature of which is gradually increased over an hour, the gelatine washes away in inverse proportion to the exposure it has received. In other words, the softer the gelatine, the more of it is washed away. The result is a contoured sheet of gelatine that relates to the original image – a sort of three-dimensional relief photo. This is washed in a chrome alum solution to harden it, and then dried.

Up to this point in the process there was nothing exceptional about what Woodbury proposed, since the gelatine relief is really a simple carbon print. Woodbury's unique contribution, which related directly to his strong business sense, was to devise a method to use this relief to produce a printing plate for mass production.

At first he tried to electroplate the relief, but he found it impossible to achieve consistent results. Instead he turned to the use of 'soft metal', a mixture of lead and 'type metal' alloy. A sandwich of the relief and a sheet of soft metal was placed between two perfectly flat steel plates and put in a hydraulic press. It needed a pressure of about 4 tons per square inch of the plate for about a minute to produce a perfectly sharp mould of the relief. It is amazing that the apparently fragile gelatine image is not damaged by this process – yet in fact Woodbury stated that 'with ordinary care' one image could be used to produce 20 metal plates.

To print a Woodburytype slide the soft metal mould is oiled and then hot liquid gelatine that has been lightly tinted (usually sepia) is poured into it. The glass is then placed on top, and a press used to apply a light, even pressure to force the gelatine into every small crevice of the mould. This produces a contoured image identical to the gelatine originally washed away. It takes a minute for the gelatine to cool and set, after which the next impression can be made. Woodbury stated that a single mould could make between 600 and 800 'perfect impressions'. Since one negative could produce up to 20 metal moulds Woodbury



2. Surviving Woodburytype press found in the former Eveleigh Locomotive Works in Sydney (reproduced, with thanks, from the Woodburytype Resource Site, [www.geocities.com/woodburytype](http://www.geocities.com/woodburytype))

calculated that at least 12,000 impressions could be produced from a single negative.

Huge presses are required to produce the soft metal mould for even small Woodburytypes – a 4 by 5 inch (10 by 12.5cm) relief for book illustration needed an 80-ton press, while the largest known 15 by 10 inch (37.5 by 25cm) images were made with a 500-ton press. Woodburytypes therefore tended to be small, and were thus ideally suited to lantern slides.

What is probably the last remaining hydraulic Woodburytype press (Fig. 2) was found in February 2000 in the former Eveleigh Locomotive Works in Sydney, where it had been used as an ordinary workshop press.<sup>6</sup> This is one of the presses used to create the soft metal mould from the gelatine relief. It is ironic that it ended up in Australia where Woodbury's own career in photography began.

## COMMERCIAL PRODUCTION

In 1867 Woodbury sold the French rights for his process to a company called Maison Goupil, and they set up a factory at Asnières in the Paris suburbs. Most of their output consisted of reproductions of works of art. Woodbury wrote that they were 'in treaty with one of the foreign governments to produce their postage stamps'.<sup>7</sup> In the USA, Woodbury licensed the Woodburytype process to the photographer John Carbutt, who opened his American Photo-Relief Company factory in Philadelphia in the early 1870s.

However, Woodburytypes were not produced commercially in Britain until 1869, when the Woodbury Permanent Photographic Printing Company was founded to re-acquire the British patent rights from another French company, Disderi & Cie, who had bought them in 1868.<sup>8</sup> A visitor to the company's premises in 1869 noted in the *Photographic Journal* that

*he was much pleased by seeing ten presses mounted upon a circular table and doing duty in succession; for the period was just sufficient to enable the workman to ink and shut the press ten times, and then draw the first towards him for the purpose of removing the finished impression.*<sup>9</sup>

This account seems to describe a true production line long before the concept was coined.

Woodburytype lantern slides are of brilliant quality and clarity. They are not really photographs at all, but prints. They have no grain or texture and are completely stable. Woodbury said that the closest approximation was German lithophanes. The process is an almost poetic combination of the extreme fragility of glass and gelatine and the huge pressures exerted by presses weighing many tons.

Woodbury made numerous improvements to the process, but it had a number of intrinsic problems, particularly its labour-intensive nature and the fact that it was never possible to print more than one image on a sheet, as each had to be trimmed to remove the surplus gelatine. This was a serious limitation on book layouts.

Woodburytypes were used to illustrate John Thomson's famous *Street Life in London* of 1877–8. This book brought together superb photographic skills with the finest technique available for illustrating them, alongside radical social commentary. It was issued in 12 monthly sections, with only about three illustrations per section, so it was ideally suited to the Woodburytype process.

In 1875 Woodbury produced his own book of Woodburytypes, entitled *Treasure Spots of the World*. This was billed as a 'handsome fine art Christmas gift book' and contained 28 Woodburytypes by a number of photographers, including Woodbury himself and Eadweard Muybridge. In his foreword to this beautifully bound and produced book he wrote: 'the proofs being printed in imperishable pigments by the Woodbury process are thus guaranteed from fading or ever losing their brilliance'. His boast continues to hold true, 132 years on. The foreword concluded that 'the endless choice of the earth's beautiful scenery will enable us, should the present volume receive the esteem of the public, to present yearly a collection of the camera's choicest readings'. Sadly, the book does not seem to have received the 'esteem of the public', since no more were produced, but it remains in my opinion one of the most beautiful books ever produced.

6. For more on the press and process see the *Woodburytype Resource Site*, [www.geocities.com/woodburytype](http://www.geocities.com/woodburytype) (web address correct at time of going to press).

7. Walter Woodbury, description of Woodburytype process in *Photographic Journal*, 16 March 1869.

8. See Bill Jay, 'Walter Bentley Woodbury 1834-1885 and the history of his

Woodburytype process', *Bill Jay on Photography*, [www.billjayonphotography.com/writings2.html](http://www.billjayonphotography.com/writings2.html) (web address correct at time of going to press).

9. Report of a meeting of the Photographic Society of London on 9 March 1869 in *Photographic Journal*, 16 March 1869.





3. Woodburytype slide 294: 'Thebes – The Temple of Karnak. The Hall of Columns &c.' (photographed by Frank M. Good, early 1870s)



4. Woodburytype slide 944: 'Soap Bubbles' (photographer unknown, early 1880s)

### WOODBURY SLIDES

I have identified seven main types of Woodburytype slide, which can be placed in a rough chronological order:

**Type 1** (Fig. 3) The original Woodburytype slide which measures 3¼ by 4¼ inches and has an ornamental mount announcing 'The Woodbury Lantern Slide'. This was designed to fit the special carriers of the Sciopticon, whose manual stated that

*in placing this slide in the lantern, the additional length of the glass allows the corners to be held by the thumb and forefinger, without being visible upon the screen, as is sometimes the case with the square slide. Then again it is easier to place in its proper position (right side up), having only one chance of error instead of three.*<sup>10</sup>

This type of slide was produced from 1872 until about 1880. They are numbered sequentially in white handwriting and they sometimes credit the photographer on the mount. By 1875 there were 518 in the series and the highest number I have seen is 1,048.

**Type 2** (Fig. 4) is a later version of Type 1 with a simpler – and presumably cheaper – design and the words 'Woodbury Lantern Slide'. This version never credits the photographer. It is possible to find all numbers from the series of at least 1,048 in this design, but the higher numbers are much more common. This design can be roughly dated between 1876 and Woodbury's death in 1885, since the 1875 third edition of the *Sciopticon Manual* illustrates only Type 1.

**Type 3** has an elaborate mount, similar in design to Type 1 but in 3¼ inch square format with a circular mount titled 'The Woodbury Slide' showing the address '157 Gt Portland Street, London'.

**Type 4** is the Type 3 mount with the same text adapted for a square format. It is tempting to assume that Types 3 and 4 are simply parallels of Types 1 and 2 in a different format, but they are not considered in the 1875 *Manual* and they tend to display much higher numbers – and sometimes none at all. I therefore think that they are later, perhaps between about 1880 and 1885.

**Type 5** slides do not use Woodbury's name but just the trade mark 'Sciopticon'. They were produced by Woodbury's partner in the improved Sciopticon, George Smith, who traded as 'The Sciopticon Company' from Woodbury's death in 1885 until his own death in 1897. He introduced his own numbering system, but produced the whole range of Woodbury slides, right from the original number 1, as a catalogue in the Science Museum Library demonstrates. This catalogue lists over 2,300 slides.<sup>11</sup>

**Type 6** are late slides that have a distinctive red mount and are titled 'The Woodbury Lantern Slide, Eyre & Spottiswoode, London.' They are not very common and the only subject I have encountered is statuary. They reflect the transfer of the Woodbury name to the publishers Eyre and Spottiswoode and are therefore later than all of

the other types I have mentioned – probably turn of the century. Eyre and Spottiswoode marketed a series of photographic postcards under the 'Woodbury' name in the late 1900s.

**Type 7.** This final category is an oddity. They are certainly Woodburytypes and are quite common, although again statuary is the only subject I have encountered, from a single series of at least 112. The trade mark is 'Orion', although the style of mount is exactly the same as Smith's Sciopticon brand. They were produced from 1895, when the trade mark was registered, and were advertised in the *Optical Magic Lantern Journal* in January 1896 as being produced in Stoke Newington, north London, for the wholesale trade.<sup>12</sup> They are described as 'permanent carbon slides for colour and stereoscopic effect', with subjects being statuary, flower studies and a series on Japan. This advert says that their quality is 'only equalled by one maker' – presumably a reference to Smith's continuing production.

It is also possible to find Woodburytypes with no brand or identification at all – and some of Smith's slides were produced with only a number or just a number and title. Others have his brand name printed on the slide binding.

There is a great deal more to learn about these fascinating slides. My typology is only a starting point and is unlikely to be comprehensive. I would be most interested to hear from anyone who can add to this information, particularly if you have encountered different types of Woodbury slide.

### WOODBURY AND THE SCIOPTICON

In 1869, just as Woodbury had perfected the Woodburytype and prepared it for mass production, Lorenzo J. Marcy announced his Sciopticon (although it had not yet acquired the name) in the *Journal of the Franklin Institute* in Philadelphia. The timing was perfect. Woodbury was by then looking for a new challenge and was frustrated that contemporary lanterns could not do justice to the slides he proposed to produce. Within two years he was in America to meet Marcy in person. In the same year of 1871 Marcy's first *Sciopticon Manual* was published in Philadelphia, which probably marks its first commercial production in the US.

Woodbury later wrote that 'next to inventing something useful myself, there is nothing that gives me greater pleasure than to introduce a foreign invention which I think may prove of use to my fellow countrymen'.<sup>13</sup> I have a feeling that money may have entered into the picture as well: there was a wonderful commercial opening since Marcy's lantern was a great advance over what Woodbury called 'the clumsy ill-lit things we were using' and Woodbury could package his new slides as part of the product. The slides would benefit from the reputation of the lantern and vice versa. Market domination beckoned.

By May 1872 Woodbury had issued a patent to cover the

10. *The Sciopticon Manual*, third edition (c.1875; reprinted London: Magic Lantern Society, 1989).

11. *Lantern Pictures* (London: The Sciopticon Company, n.d.).

12. *OMLJ* Vol. 7 No. 80 (January 1896), xvi. The 'Orion' trademark was owned by Williams Brothers, of 205 Albion Road, Stoke Newington —

see Michael Pritchard, 'Trade Marks and the Lantern', *NMLJ* Vol. 10 No. 2 (Autumn 2006), 28.

13. Walter Woodbury, 'The Modern Magic Lantern', *British Journal of Photography* 1 March 1878, 98.





5. The Woodbury Improved Sciopticon lantern of 1881: a pair of lanterns

Sciopticon, but it was very short and incomplete. This lazy oversight was to cost him dear. In the same year he formed the Sciopticon Company, and in this first year of production 400 lanterns were supplied to the British market. W.J. Chadwick commented that Woodbury's failure to complete the patent meant that many cheaper imitations were soon being produced by other companies, and estimated that one firm supplied 1,000 of these in 1873 alone.

The Sciopticon (Fig. 5) was not cheap but it received rave reviews from the outset, chiefly because it was a radically different design that gave two or three times as much light as the usual oil lantern. Its key features were:

- two flat wicks placed parallel to the optical axis;
- two chambers which create an effective combustion chamber and separate the flame from the paraffin reservoir to keep it cool and safe;
- a very tall extendable chimney to increase the updraught;
- double plano-convex condensers which, at 4 inches diameter, were larger than normal;
- a tubular body no larger than necessary to contain the lamp and condensers. The first review in the *British Journal of Photography* compared it to 'a small locomotive' in shape;<sup>14</sup>
- a separate sliding lens section that produces an adjustable slide stage ideal for scientific uses.

Despite the claims for the Sciopticon made at the time, paraffin had been used for lanterns prior to Marcy's invention, double plano-convex condensers had appeared before and a two-wick burner had already been produced. What the Sciopticon did, however, was to bring these important developments together for the first time in a major improvement in lantern design. It was a truly integrated design that set the standard for all future lanterns.

The enormous improvement that the Sciopticon represented is evident from the speed with which it spread across the world. As soon as 1873, for instance, the Liesegang company introduced the Sciopticon to Germany. In Germany and Austria the name eventually became the standard term for all optical projection devices.

The first Sciopticons had a flame chamber that was integral to the body of the lantern, but structurally separated from the burner and the paraffin reservoir. This version was produced from 1872 to 1880. The burner was produced as a separate unit that could be removed from the body of the lantern, increasing the separation and convenience.

In the first phase of Sciopticon manufacture, from 1872 to 1875, the division between the two chambers was fixed to the body of the lantern. In the second phase, from 1875 to 1880, this division was made removable to allow for the introduction of limelight, but the wicks still had to be lit awkwardly by a taper inserted into the back of the lantern. In 1877 a supplement to the *Sciopticon Manual* described a new limelight attachment.

In 1879 George Smith patented a separate cylindrical lamp house that was to become the heart of the 'Improved Sciopticon'. This was launched in 1881, marking the third phase of Sciopticon design.<sup>15</sup> The 'Woodbury Improved Sciopticon' was described in the fourth edition

of the *Sciopticon Manual*, published in 1881. Now the lamp and the combustion chamber formed a single removable unit, avoiding the difficult junction between the two in the previous version. In addition the condenser was mounted on its own ratchet adjustable by a screw on either side of the body of the lantern, rather than sliding freely.

In June 1889 the Improved Sciopticon was still being advertised by Smith's Sciopticon Company in the first issue of the *Optical Magic Lantern Journal*, although the references to its brilliance had by then been replaced by the somewhat more dubious distinction of being 'the only one in the market which has a rackwork movement in the front'.<sup>16</sup> At the same date, however, T.C. Hepworth in his second edition of *The Book of the Lantern* discussed the Sciopticon in the past tense:

*It was constructed on scientific principles, and was far in advance of anything of the kind before produced [...] the lantern, however, had its faults. The front glass of the lamp was apt to break, and a dark vertical line was always seen upon the sheet – a line which was in reality the image of the dark space between the two wicks.*<sup>17</sup>

#### THE END OF WOODBURY

Woodbury did not live to witness this decline. By 1882 his sight was failing and he had contracted diabetes, but he was nonetheless hard at work on a system of musical railway signals which he patented in 1884. He died aged 51 in 1885, just four years after the introduction of the Improved Sciopticon. By then this man of huge vitality had handed over the reins of his business to George Smith.

On 4 September 1885 Woodbury had travelled to Margate, Kent, for a weekend with his family. During the night he died from an overdose of the laudanum which he had been taking for some time to treat his failing health. The verdict of the inquest was that 'the deceased met his death from the effects of an overdose of laudanum administered by himself but the evidence is not sufficient to prove whether it was intentional or otherwise.'<sup>18</sup> I suppose it is possible that he committed suicide, since his debts had by then caught up with him and he was clearly a sick man, but I don't think that this sounds like Woodbury. He still had plenty of plans – there is, for example, a record of an application by him for a patent for a process for sound recording on discs that had not been submitted at the time of his death.

Had Woodbury lived longer I have no doubt that he would have continued to produce inventions that would have kept him in the forefront of lantern technology. Sadly, most of his patents – he registered a total of 20, at the rate of one a year for the last 20 years of his life – sank without trace.<sup>19</sup> They included photoceramics, a system of balloon photography, a photometer and a tourist camera. Even so, the impact he made is still felt today. Modern printing techniques owe a lot to Woodbury, and there are still a number of 'Woodburytypists' operating. As recently as 1999 a grant was made for research into the relationship between Woodburytypes and 20th-century rapid prototyping technology.<sup>20</sup>

I don't think that Walter Woodbury receives the credit he deserves for his role in the history of photography and the magic lantern. He was a driven man – a Victorian Bill Gates, acting (like Gates) with the latest technology, using patent law in usually futile attempts to make money by carving out sections of the market to dominate on a monopoly basis. But Woodbury was much better as an inventor than as a businessman. He generated widespread commercial success but somehow never managed to make much money for himself. All his spare cash went into new inventions and patents. Instead he achieved something far more important. He set out to produce a truly permanent photographic printing process and now – more than 140 years on – we can appreciate just how well he succeeded.

**TREVOR BEATTIE** works in property and has been interested in Woodburytypes ever since he purchased a Sciopticon as his first lantern more than 25 years ago. This article is a revised version of a talk given at the Society meeting in Birmingham in April 2006.

14. *British Journal of Photography*, 31 January 1873, 58.

15. George Smith, British Patent 3,968 of 1879.

16. *OMLJ* Vol. 1 No. 1 (June 1889), v.

17. T.C. Hepworth, *The Book of the Lantern*, second edition (London: 1889), 6.

18. See Camfield and Deirdre Wills, op. cit., who conclude: 'if you encounter an image which appears to be a photograph from the Victorian era that has not deteriorated in quality and at the same time

possesses a beauty of its own then it is almost certainly an example of a Woodburytype.'

19. See Woodbury's obituary in *The Amateur Photographer* 20 March 1885, 384-5.

20. Carinna Parraman, AHRB Research Grant for 'A feasibility survey of the nineteenth-century Woodburytype print process and its potential relationship to twentieth-century rapid prototyping technology', University of the West of England