

AN AWKWARD THING



BRISTOL'S LEAD SHOT TOWER

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"I wish all the men in my army were so regular like this shot"

King George II to William Watts

(Briscoe, 1982:9)

Cover Image: Former Lead Shot Tower Cheese Lane,
10 March 2007. Edited in Adobe Photoshop CS3. E Tsolis

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At the beginning of this essay, I was not aware in how many places I had to look for relevant information about the “crow’s nest” in Cheese Lane. I am grateful that so many people helped me during this project.

Firstly, I want to thank all the affable archivists of Bristol Record Office, the National Monument’s Record and Anthony Beeson, the Art librarian of Bristol Central Library for their patience and the time they spent checking literally for everything. I also thank Graham Briscoe, author of the inspiring article “Industrial Archaeology: Redcliff Hill Style” (*BIRD*, 1982) who was my first contact in the beginning of this research. His knowledge and experience about the history of the lead shot production were more than valuable. I also thank all the people who kindly responded to my advert in the Evening Post; Christopher and Stephen Thomas, former owners of Sheldon Bush & Patent Shot Co., Roger Bidwell & Eddie Inman former employees of Sheldon Bush & Patent Shot Co., David Blackburn, former Technical Officer of British Gas SW, Mark Howard and George Gallop for sharing their experiences and let me use their archives.

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James Dixon, PhD student, Faculty of Arts, Department of Archaeology, University of Bristol,

Bob Jones, Bristol City Archaeologist and

Andy King, Curator of the Bristol Industrial Museum.

Abstract

This essay has as its main focus the investigation of the preservation principles that have been applied to an industrial building, a shot tower located in Bristol. The research begins with a brief retrospect of the industrial activity of the building and its historical context. It continues with the methodology employed in the research and the debate surrounding the historical significance of the site. The essay also analyses the background of the classification of the tower as Grade II building, and a short timetable of the redevelopment schemes that proposed on the building is given. The last chapter examines the preservation of the tower and evaluates the applied development scheme in terms of heritage management. The conclusions about the advantages and the disadvantages of the scheme can be used as a guide for future preservation of industrial buildings of this category.

Introduction

Walking along Temple Way, crossing the Floating Harbour in St. Philips, a peculiar building that dominates the skyline, will undoubtedly catch one's eye. This "Q-tip"¹ shaped structure is a former lead shot tower, located in Cheese Lane. It is also the focus of the present essay, which attempts to approach this site from an archaeological perspective.

A shot tower is a purpose-made high tower, built to operate a very specific industrial process, the production of spherical lead bullets that are used mostly in the sport ammunition industry. Sheldon Bush & Patent Shot Company built the shot tower in Bristol, in 1668. It was operational until the late 1980's. The tower faced the possibility to be demolished until 1995, when English Heritage decided to schedule the building (Grade II) and for almost a decade, its awkward shape predominated several redevelopment schemes of the surrounding area, known as Former Lead Works. At the beginning of the new century, a development plan that proposed the

¹ My colleague, Rebecca Kellawan, made a quip likening the tower to a "huge Q-tip" in the beginning of my research. I continued referring to the tower using this nickname amongst my fellow archaeologists.

reuse of the tower as part of an office complex was approved by the Bristol City Development Committee. The development plans came into formation at the end of 2005, with the shot tower fully refurbished and available to lease, as a boardroom.

The aims of this report is to examine the historical significance of the building and the sub-sequent decision to schedule it. Also, to evaluate the process of the redevelopment scheme and the observance of the preservation principles. In other words, to examine whether or not the planning guidance was applied effectively to the site. Another aim is to investigate any elements or actions of the developing pattern to record and preserve some memory of the industrial heritage of the site.

The methodology that was used to attain those aims, was based on the following three principles:

- Research through text and data sources.
- Contact with archaeological organisations that were involved in the archaeological evaluation of the site.
- Collaboration with the local media and organizations in order to encourage public involvement to the project and recording oral testimonies as “central source of primary data” (Casella J. et al. 2006).²

As already stated, the shot tower was erected in 1968.³ However, it seems that the youth of the building is opposite of its historical relations with the surrounding area and the production of lead shot. A brief retrospect of this particular industrial process is necessary to place the building into an archaeological context.

² As cited in Hicks D. et al. 2006:156.

³ Two Notices of Decision upon proposed development for construction (erection) of shot tower and process building dated 29 December 1966 and 4 April 1967 can be found in the archives of Bristol Planning, Transport and Development Services (RefNo 12640A & B). Also, the celebration (topping-out) of the end of the construction of the tower is highlighted in the Evening Post (28 May, 1968).

The lead shot production

From Recliff...

The production of lead shot for sporting purposes, which was based on a simple principle -gravity-, was established in Bristol and continued unaltered for almost two centuries. Two major factors contributed to this development. The raw material, hard lead naturally enhanced by arsenic⁴ and the invention of a local plumber, William Watts, who in 1782 patented an improved method of producing shot “perfectly globular in form” (Watts, 1782).⁵ Prior to his invention, lead bullets were cast in moulds⁶ having imperfections, dimples and scratches on their surface (Watts, 1782).⁷ There are two alternative versions of the story of Watts’ legendary lead shot invention. According to them, Watts inspired by a dream of molten lead, pouring from the top of the tower of St Mary Redcliffe church, shaped into spherical form in water beneath.⁸ Both stories include use of alcohol and night dreaming and are mentioned in almost every local publication related with the lead shot production.⁹ However, it seems that none of them is likely to be true. Bristol was the centre of lead manufacturing at the time and Watts was an experienced plumber who would probably have known of the problems in producing shot (Reid, 1987:105).

The process that Watts improved was simple: he poured molten lead through a perforated zinc tray, allowing the resultant globules to fall “sufficient distance to

⁴ The main source of the lead was the “old Roman lead workings at Priddy on the Mendips” (Lea-Jones, 1981-2). The quality of that lead was superior, containing a good proportion of arsenic oxide (Davies, 1982:48). The existence of arsenic in lead was an important factor in Watts’ success as it provided the hardness essential for the pouring procedure. Unless arsenic is present the molten lead runs in “strings” (*Industrial Archaeology*, vol. 5, 1965:409).

⁵ As cited in Patent No. 1347-1782: *Small Shot Watt’s Specification*, 1854.

⁶ *Industrial Archaeology*, 1968, vol.5, p. 409.

⁷ As cited in Patent No. 1347-1782: *Small Shot Watt’s Specification*, 1854.

⁸ Dix, J., 1839, pp. 8-11 and *Work in Bristol*, 1883:187.

⁹ The earliest references on Watt’s legend can be found at Dix, J., 1839, pp. 8-11 and *Work in Bristol*, 1883:187

harden” (Briscoe, 1982:7). The need of this sufficient distance and the equivalent success of Watts’ patent, led to the erection of a 70 feet tall Shot tower on Redcliff Hill (Barley, 1786), (as cited in Briscoe, 1982:7), using as basis a pre-existing merchant’s house built about 1680-1700 (Briscoe, 1982:7, Hudson, 1965:191).¹⁰ The shot production proved to be very profitable for William Watts who decided to sell his successful business and patent to Colonel Worall, one of his partners (*Work in Bristol*, 1883:188). It is worth to note that finally, he lost his fortune through his involvement in the formation of Windsor Terrace in Clifton, when the astronomical, for the period, amount of £10,000 was spent in the erection of a high retaining wall, still remaining today and known locally as “Watts Folly” (Briscoe, 1982:9, Dix, 1893:13).¹¹ Watts declared a bankrupt on 1st March 1794 (Farley, 1794). The business however, carried without intermission. It changed various owners until 1868 when it was taken over by Sheldon, Bush & Patent Shot Co (Briscoe, 1982:7, *Work in Bristol*, 1883:188).



Figure 2. The Shot Tower in Redcliff Hill, rare colour photograph, unknown date (probably between 1965-1968). Courtesy of the Bristol Industrial Museum. RefNo. 3.28

¹⁰ This basis dwelling seemed to be one of the earliest brick structures in Bristol (Briscoe, 1982:7).

¹¹ See Appendix: Photographic Record

The shot tower in Redcliff, built in an eccentric gothic style,¹² was the “father” of many purpose-built shot towers through out the world (Mosse, 1969:4, Minchinton, 1984:49). Its characteristic castellated top and the basic principles of the shot production remained vitally unmodified, until 1968 (Figure 1). Despite the fact that the tower had been already classified as Grade II building (Briscoe, 1982: 9),¹³ a road-widening scheme necessitated its demolition (Briscoe 1982: 7, Western Daily Press, 13/11/1968). A main reason for this unfortunate decision was the building’s poor structural condition and deterioration (Mosse, 1969:4).¹⁴

...to Cheese Lane, St. Philips

Due to the Redcliff development scheme, the headquarters and the main production centre of Sheldon Bush relocated in St. Philips, on the north bank of the Floating Harbour. The choice of the location was not coincidental. According to *Work in Bristol* (a reprinted series of articles from the Bristol Times and Mirror, 1883), the firm operated existing lead works such as rolling mills and lead pipe manufacture in the area.¹⁵ Thus, the firm commissioned E. N. Underwood and Partners (Structural Engineers) to construct a new shot tower (NMR monument report ST 57 SE 569). The erection of the new shot tower and the demolition of the old one, took place at the second half of 1968. The distance between them was about 700 yards. That gives us a good picture about the historical connection between the two towers and the direct link with a small but vital part of Bristol’s industrial history (Figure 2).

¹² Watts chose this particular style to “remind citizens of the prospect of Westminster Abbey” (as cited in Briscoe, 1982:7, Minchinton, 1981:49).

¹³ According to Briscoe (1982:9) the Redcliff Shot-Tower was designated as a Grade II “building of significant architectural interest” that “its preservation was a matter of national interest and demolition or alteration should not be undertaken without compelling reason”.

¹⁴ The poor condition of the building was also verified by Mr. Christopher Thomas, former owner of Sheldon Bush & Patent Shot Co.

¹⁵ See also Appendix: Maps

The new shot tower

Instead of building a typical shot tower, the owners of Sheldon Bush had something different on mind. In 1967, Christopher Thomas, one of the partners of the company, visited the United States to investigate the lead shot production techniques in the other side of the Atlantic. They also received about £25,000 from the City Council as compensation, for their property in Redcliff Hill. That made them comfortable to create something more experimental.¹⁶ The tower cost almost £50,000, in 1968.¹⁷

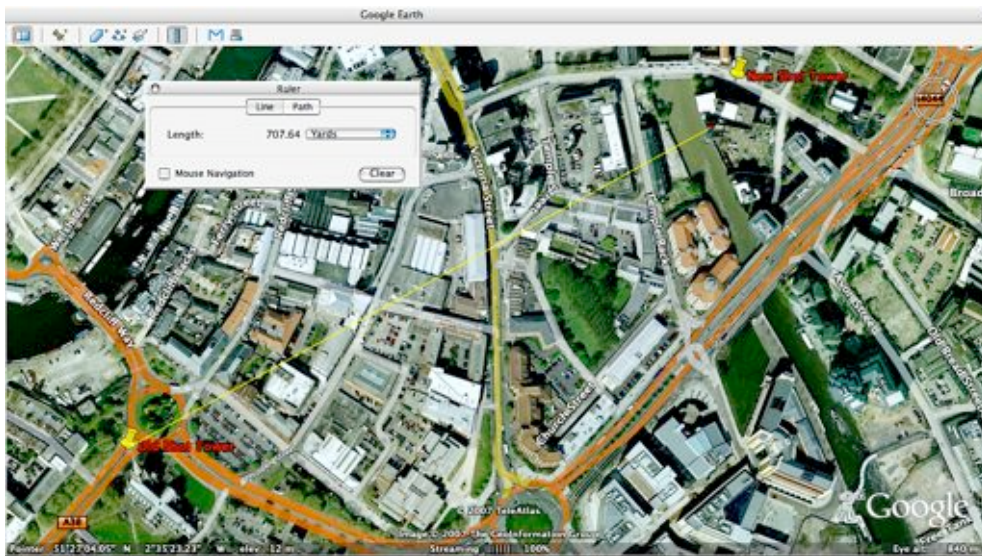


Figure 2. Satellite image, indicating the distance between the shot towers.

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¹⁶ According to Mr. Christopher Thomas, former owner of Sheldon Bush & Patent Shot Co.

¹⁷ This amount is about £1,6 million in 2005 rates using the GDP system (the economy's total output of goods and services in money terms; a measure for large-scale projects. Source: www.mswth.com).

The Structural Engineers, who designed the building,¹⁸ introduced a “Y” shape for the main shaft of the shot tower. The “drop” of the lead and the hoist, each occupied one arm, whilst the emergency concrete staircase (155 stairs)¹⁹ used the remaining arm plus the central “hub” area. The “Y” form of the shaft also formed the support for the near circular or “barrel shaped” crucible room capping the tower. The water tank, necessary for the cooling procedure of the molten lead, stayed in a hopper form at the foot of the building. A conveyor-elevator used to raise the shot from the water tank and transfer it into hoppers near to roof level in the process building. Sulphate resisting reinforced cement was used in the foundation tower (Underwood E. N. Partners, 1966-8).²⁰ The “drop” of the lead was through 120 feet, and the total height of the tower, including the 24 feet diameter crucible room on the top, was 142 feet.²¹

The shot tower in Cheese Lane was the only industrial structure of this type built in the United Kingdom during the 20th century. Its construction was highlighted with reviews and articles in local newspapers, magazines and journals.²² As Bryan Little has vividly put in his article in *Gloucestershire Life*:

Other shot towers exist, so I am told, in London and at Chester, but this Bristol building is inevitably, a constructional and architectural rarity of whose appearance the city may well be proud (1969).

¹⁸ Underwood E. N. & Partners (1959-1976) as cited in the library of the Institution of Structural Engineers (www.istructe.org).

¹⁹ Planning Notes & Supporting Information: Proposal for the Former Sheldon Bush Lead Works, (9 January 2003), Bristol Planning, Transport and Development Services, RefNo. 91202, p. 6.

²⁰ This document extracted from the *Technology file on the Redcliff Hill Shot-Tower*, which is located in Bristol Museum and Art Gallery. The industrial Museum of Bristol and the Bristol Record Office, also retain a copy of this document.

²¹ See Appendix: Shot Tower Architectural Drawings

²² Evening Post, (10 April 1968, 28 May 1968), *Industrial Archaeology Journal*, (1968, vol. 5, p. 410), Little, (1969).

The architects of the new tower received the Civic Design Award from Bristol Civic Society for the year 1969 (Briscoe, 1982:9).

Lead shot production in the new tower (1969-1990)

The production of lead shot continued in the new tower, without significant changes. A 4-ton gas-fired cast-iron cauldron on the crucible room was used for melting the lead ingots. Lead was imported from Australia or other sources overseas (Davies, 1982:48), as the Mendip mines were exhausted by the end of 19th century (Briscoe, 1982:9). 1-2% of antimony or arsenic was added to the lead to provide the appropriate for the drop, hardness of the mixture (Briscoe, 1982:9).

Usually, 4-5 workers were enough to operate the shot tower.²³ The chief shot maker was ladled the molten lead to a shot “card” at the top of the tower.²⁴ Another man at the bottom was investigated the quality of the sample, using a telephone to confirm the quality of the sample to the chief shot-maker. The rest of the personnel was inspecting the sorting, grading, polishing and packaging processes.²⁵ The carbon dust, which was used as a lubricant on the shot, covered the surfaces of the interior of the tower making them very slippery.²⁶ No other dangerous conditions were reported; the personnel have to make blood tests every six months to detect any high levels of lead in their blood.²⁷

The most notable differences from the old shot tower were the lift, used to carry both personnel and lead ingots (Minchinton, 1984:50) and the use of a series of “cards” perforated in a variety of diameters. The production of different sized shot

²³ See Appendix: The Lead Shot Production

²⁴ (Illustrated Bristol News, August 1960, p. 36).

²⁵ According to the interviews with former employees.

²⁶ According to Bob Jones (Bristol City Archaeologist) who visited the place in the early 1990's and Dave Blackburn (Technical Officer of British Gas SW) who used to visit the site in operational mode from 1980 to 1990.

²⁷ According to Mr. Christopher Thomas, former owner of Sheldon Bush & Patent Shot Co., Eddie Inman and Roger Bidwell, former employees of the firm. Mr. Thomas also recalled that one of the chief shot-makers who worked for more than 35 years for the firm, died in the age of 90!

required only one collection point, the water tank at the bottom. Contrarily, in the old tower, despite the use of different “cards” too,²⁸ only the biggest size of shot (BB) collected at the bottom (Briscoe, 1982:9). Smaller sizes were collected from capturing stations across the “drop”.²⁹

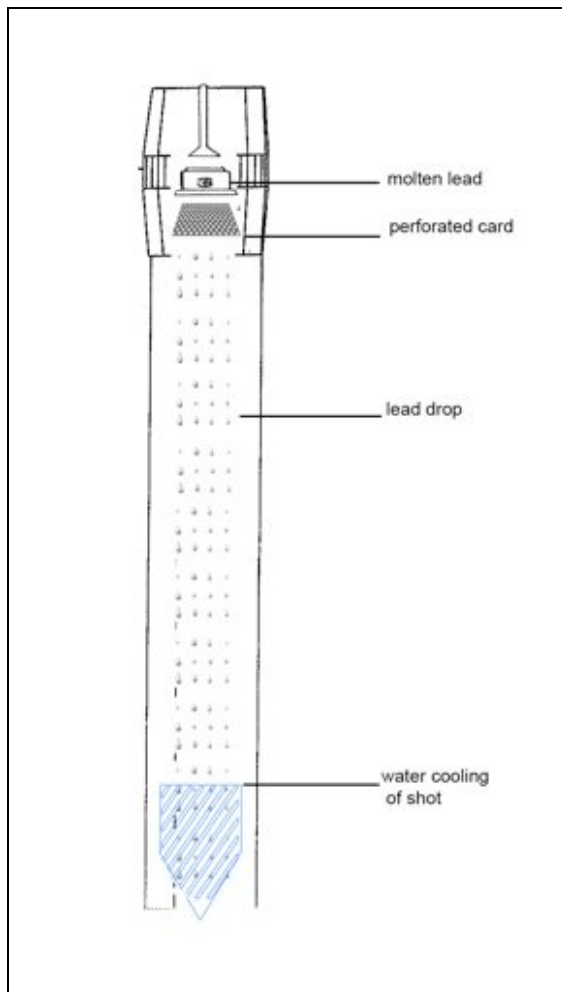


Plate 1. The lead shot production in the new tower continued almost unaltered. Most important difference the collection of the all sized shot form one collection point. Drawing: E Tsolis. 2007

²⁸ *Industrial Archaeology Journal*, 1968:409.

²⁹ This interesting technical difference came to light after an interview with Mr. Christopher Thomas, former owner of Sheldon Bush & Patent Shot Co. The use of different “cards” is also noted by Lea-Jones (1981-2), and Mosses’ (1969:5). An architectural drawing of the old tower shows 5 collecting stations (See Appendix: Photographic Record). I am not aware of any reference that mentions this significant difference.

Tons of lead was converted to shot in a daily basis,³⁰ until the late 1980's.³¹ Sheldon Bush Co produced a variety of sizes for sport ammunition. A major market for the firm, was also fine lead dust to the steel industry to be added as an alloying element to steel during the production of free cutting (i.e. easily machined) steel (Minchinton, 1990, Lea-Jones, 1981-2).³²

In 1990, Christopher and Stephen Thomas, decided to sell their business to British Lead Mills. It was a move motivated by retirement reasons and a prediction of a general decline in lead market.³³ Already from 1983, the Royal Commission's reports underlined the danger of lead poisoning on birds.³⁴ The lead shot production was not the major part of Sheldon Bush's activities, but soon, other lines like the lead pipe production³⁵ became not profitable, due to environmental issues related with lead poisoning. The production finally ceased in 1994.³⁶

The post-production period

Between 1990 and 1995 the site changed hands from British Lead Mills to Sopworth Lead Ltd, a subsidiary company of Shell UK Ltd (Harwood, 1995).³⁷ Probably, during this period the machinery was removed and sold to other lead firms

³⁰ According to Mr. Christopher Thomas, former owner of Sheldon Bush & Patent Shot Co (interview), and Corfield, B., (*Evening Post*, 20 April 1983).

³¹ An article in *Evening Post* dated 17 October 1988, shows the tower still in operational use.

³² David Blackburn, former Technical Officer for British Gas SW also verified this information.

³³ According to Mr. Christopher Thomas, former owner of Sheldon Bush & Patent Shot Co (interview).

³⁴ Corfield, B., (*Evening Post*, 20 April 1983). The ammunition for wildfowl hunting gradually turned from lead to steel, due to environmental issues related with lead poisoning on birds.

³⁵ For a long time, generally up to 1970, lead was used for water pipes (<http://www.dwi.gov.uk/consumer/faq/lead.htm>).

³⁶ Snook C., (*Evening Post*, 21 August 2003).

³⁷ Elaine Harwood was the principle investigator of English Heritage on the post-war listings survey in the early 1990's. The Official Listing Document dated July 1995, is from her personal archives.

or scrapped.³⁸ In 1990, an outline permission granted for a five-storey office building (7400m²). This permission was extended to include the demolition of the shot tower on 24 February 1993.³⁹ English Heritage suggested listing at that point, but its advice was rejected. It took 3 more years for the building to be classified officially as a listed building (Grade II).⁴⁰

Methodology of Research

One of the main advantages of the archaeology of recent sites is the potentially overwhelming amount of relevant information, supporting documentation and in some instances large collections of contemporary photography (Cocroft et al.) (as cited in Schofield et al. 2006:17). Newspaper articles, local publications, articles in archeological journals, archives from several organizations, documentaries, material culture displayed in museums and finally, the ultimate provider of information, the Internet, were available for this project.

Surprisingly, the first results of the research on the new shot tower were ambiguous. Many of the references on Bristol's lead shot production hardly dedicated more than a paragraph on the new shot tower. The main focus was, in most occasions, William Watts' legendary story and subsequently the history of the old tower in Redcliff Hill. Even in the most recent articles according to the redevelopment of the new shot tower, little attention is given to its historical significance. Instead, the reader is redirected to "William Watts' intriguing story" (Janisch, 2006:9). The available visual material, a BBC film⁴¹ was a documentary prior

³⁸ Mr. Christopher Thomas, former owner of Sheldon Bush & patent Co verified the sale of the rolling mill. Also, Roger Bidwell, former employee of the firm recalled the sale of the machinery around the middle 1990's.

³⁹ www.bristol-city.gov.uk/committee/2000/wa/wa001/0927_a.pdf, Planning Notes & Supporting Information: Proposal for the Former Sheldon Bush Lead Works, (9 January 2003), Bristol Planning, Transport and Development Services, RefNo. 91202.

⁴⁰ NMR Monument Report, NMR number: ST 57 SE 569, Un. Id: 1352687

⁴¹ Redcliff Hill shot tower Film, BBC, 1968, Bristol Record Office, RefNo: 40758

to the demolition of the old tower. Another documentary from HTV West focusing on the new shot tower was unfortunately not found.⁴²

Missing documentation of recent aged sites is not unusual. Wayne Cocroft and Louise Wilson in a project about Cold War era sites are underlining this possibility; they suggest the use of oral testimonies of personnel who were stationed at a particular location to fill the missing parts of the site's history (2006:17).

As importantly, oral testimony may also be used to document the social history of these places, the lives of the personnel and their daily routines that may not be preserved within the official records (Cocroft et al. 2006:18) (in Schofield et al. 2006).



Figure 3. © Evening Post. 2007

⁴² Roger Bidwell stated that he had seen this documentary on HTV West. Unfortunately, I didn't manage to find the film.

The starting point of collecting oral testimonies was to contact Graham Briscoe, the author of an article about the old tower in Redcliff Hill, in 1982. He had deposited an impressive archive of his research in Bristol Record Office. A Google search provided his email address and he welcomed the opportunity of opening his files again. He also suggested to send a letter to the local newspaper and to contact the Parish office of St. Mary Redcliffe in order to track down former employees of the firm. The advert was published in the Evening Post (Figure 3) on Tuesday 13 March 2007 and people's response was above expectations. As a result, attachments with photographs from several periods, supporting information from former technical officers and safety inspectors, oral testimonies from two former employees and the former owner of Sheldon Bush, were added to project's research material. The available resource material was verified comparing sources with each other and some new directions about the industrial activity in the new shot tower came to the surface:

The industrial activity and the production of lead shot were in many cases underestimated. Andy King, the industrial curator of Bristol Industrial Museum, argued against the historical importance of the building. He stated that there was no regular industrial activity in the new shot tower. Due to technological changes, shot production in Italy was cheaper, thus more competitive to the market.⁴³ Roger Bidwell, who worked in the shot tower until 1979, also verified his thesis. He stated that by the time he left the firm, the tower was operational, but the production was reduced, especially when compared to production in the old tower. The basic reason was the cheap Russian shot!⁴⁴

Mr. Christopher Thomas, former owner of Sheldon Bush & Patent Shot Co., provided a different perspective on this debate. The global awareness of the

⁴³ Andy King was more than helpful to provide information and letting me see the remaining industrial relics from the old shot tower, and all the available archive resources, despite the fact that the Museum is closed for redevelopment. The information about the Italian shot is not verified.

⁴⁴ The information about the Russian shot is not verified.

environmental risks on the use of lead was probably the main factor of the end of the production. Nevertheless, that happened soon after he sold Sheldon Bush. Eddie Inman, was a former employee of the company in the mid 1970's. His memories from the lead shot production supported Mr. Thomas' thesis. He recalled that the production in the tower was so busy, that even in case of lift malfunction, the workers had to carry the lead "pigs" using the emergency staircase and continue the lead shot manufacture. David Blackburn has visited the site several times, as a Technical Officer for British Gas SW from 1980 to 1990. He remembered the battered old lorries carrying weights of scrap material backing into the delivery bay and onto the weightbridge. The personnel could sometimes not believe the weight that some vehicles had carried on the roads through Bristol.⁴⁵ This seems to be reasonable concerning the market competition. The shot tower was already built and the whole process was the epitome of simplicity itself.

It also seems, that the "father" shot tower in Redcliff Hill, even demolished, worked as a protective shield for the new shot tower. Having nothing in common in their design, they undoubtedly shared two centuries of an unaltered industrial past. Prior to the demolition of the old shot tower, there was an outcry of the local community, through a series of articles in the local newspapers, even discussing possible alternatives to preserve it.⁴⁶ Nelson Meredith former Bristol City Architect had suggested the preservation of the tower, proposed a plan that was rejected from the City Engineer and Planning Office. (Meredith, 1960).⁴⁷ The feelings of the local community can be described:

It is unfortunate that this first shot tower in the world must disappear; future generations of road users must decide if demolition was justified". (*Industrial Archaeology*, 1965:410)

⁴⁵ According to the notes that David Blackburn kindly attached for me via email (See Appendix: Lead Shot Production).

⁴⁶ *Evening Post* (11 June 1968), (4 November 1968), *Western Daily Press* (13 November 1968).

⁴⁷ See also Winstone, R., Save Shot Tower, *Evening Post*, 21 October 1960.

Scheduling

English Heritage took probably those feelings under serious consideration when in 1995 recommended and finally managed to classify the shot tower as a Grade II building. The chief argument was made by Anthony Blee and Gerald Eve on behalf of Sopworth Lead Ltd.⁴⁸

The Argument

Anthony Blee doubted the historical significance of the building. To support his thesis, he noted that the surviving tower in Chester (listed Grade II*) was much earlier. In addition, Eve noted a flour mill in Hull that was later adapted for the use of making lead shot; no evidence of this was found in English Heritage's historic buildings records. Blee also argued that the Sheldon Bush site is not a historic site, as Watts made his invention about a mile away in Redcliff. None of them mentioned that the site was related with Lead works from the 1880's,⁴⁹ but Eve quoted the many local representations suggested that the site had a longer historical significance for the industry in Bristol as well as being the physical demonstration of city's most important invention.

According to the great depth of local and national objections to the demolition of the new shot tower, Blee remonstrated the relatively little concern expressed in 1968 when the original tower was demolished. However, the available newspaper articles of the period show a public outcry rather than ignorance. He also did not take under consideration that the Bristol City Engineer and Planning Office had enough power to take decisions to demolish listed buildings, despite the different opinion of the archaeological organizations.⁵⁰ Elain Harwood noted to this objection:

This is not a relevant reason for allowing the present tower to be demolished; rather, it is an argument for not making the same mistake twice.

⁴⁸ From the Official Listing Document (Elain Harwood's personal archive), July 1995.

⁴⁹ See Appendix: Maps

⁵⁰ According to Robert Jones, Bristol City Archaeologist.

Both Blee and Eve agreed that the tower was no longer viable. Blee contended that it was too small for economic reuse, Eve that it was too large. Harwood noted that in any case, the tower occupies only a tiny portion of the proposed development site.⁵¹ She also added:

In Gerald Eve's report, it is noted the depth of local feeling for the retention of the shot tower, and that in the previous planning concept, in 1990, have insisted that the tower should be retained.

According to Blee, the retention of the tower could cause environmental problems. However Eve admitted that the decontamination of the site if the tower were removed would be even more difficult.

The final point of the objection was the tower's ambiguous architectural design. Blee claimed that it had neither any traditional entasis, nor was it sufficiently phallic to be a good modern design. The architectural reward that the tower received from the Civic Society in 1968 was not cited. Harwood responded as following:

In its approach, the architecture of Sheldon Bush (tower) is closer to that of modern communications towers, none of which we have so far recommended for listing, and with the exception of a few lighthouses and the Telecom Tower in London, an idiom found in greater numbers world-wide than in Britain. Sheldon Bush is one of Bristol's most distinctive landmarks, and this is born out by modern commentators.

The above thesis was also supported by Julian Holder (1992), a writer for the *Architects' Journal and Building Design*, who had commented:

The Sheldon Bush tower has clearly been designed with due regard to its impact on the skyline and has real architectural quality. It is not, like earlier examples, a merely utilitarian structure devoid of interest. The tower makes a very real and unique contribution to the cityscape with views of it

⁵¹ See Appendix: Maps

being framed by the Broadmead shopping area where it often forms the focus of carefully controlled vistas.⁵²

In summation, the scheduling of the shot tower was based on the following criteria:

- The historical significance of the building, as the physical demonstration of one of Bristol's most important inventions. However, the tower's contribution to the continuity of this glorious past was not supported sufficiently. The official listing document contains more details about Watts' invention than to the production that happened inside the tower.
- The architectural value of the building, even characterized by ambiguity or awkwardness was a major factor of the listing decision.

The rarity of its type made probably the English Heritage's decision imperative. English Heritage noted the industrial importance of the context of the site. Nevertheless, the absence or recognition of the importance of the industrial history that happened inside the building, affected the management and conservation plans of the building, having as a result the preservation of the shot tower as an "empty shell".

Redevelopment

The classification of the building took place in 1995. In 1999 an application for the redevelopment of the site for residential use was submitted and withdrawn. An archaeological investigation was carried out at the same period. In 2000 a permission granted for 59 residential units, 2 live-work units and to seal and protect the shot tower.

The existence of the shot tower in the site was probably an unwelcome factor for the developers. This can be shown clearly in a redevelopment plan applied to

⁵² As cited in the Official Listing Document (Elain Harwood's personal archive), July 1995.

Bristol Development Control Committee on behalf of Persimmon City Developers Ltd dated 27 September 2000.⁵³ In this proposal, there was no suggestion for a new use of the shot tower. This was a result of the constraints by the design of the building, such as the absence of adequate fire escapes and the very cramped space leading up to the top of the Tower. The reuse of the tower as a telecommunication mast, was an option that never applied. Nonetheless, the repair/refurbishment of the shot tower started at this period (Onions, 2002:25).



Figure 4. Satellite image of the Former Lead Works during the redevelopment.

© Google Earth. Europa Technologies, the Geoinformation group. 2007

⁵³ www.bristol-city.gov.uk/committee/2000/wa/wa001/0927_a.pdf

The redevelopment scheme

In 2002 the site was sold to Hyland Properties/The Shot Tower Ltd. A reuse of the shot tower as a boardroom (office use) was submitted in 2003. Hyland's granted proposal applied in 2004 and completed at the end of 2005.⁵⁴

The redevelopment scheme of the shot tower, proposed the following:

- The demolition of the surrounding unlisted storey industrial premises and the construction of a, similar in dimensions with the previous premise, 3-storey low energy office building with a coloured glazed façade. This colourful transparency aimed to expose as much of the tower as possible, allowing public viewing of the fluted base of the tower. Nighttime feature lighting was also proposed for the tower.⁵⁵

- In order to provide an effective reuse to the existing tower room, the existing lead smelting cauldron (approx 1.5m diameter X 1.8 m high), would be dismantled and reconstructed at the site entrance. It was also envisaged that the cauldron would be preserved as a piece of public industrial art, available for viewing 24 hours a day, seven days a week.⁵⁶ This would meet the English Heritage's conditions concerning the demonstration of the archaeological interest of the site in a satisfying way.⁵⁷

⁵⁴ Planning Notes & Supporting Information: Proposal for the Former Sheldon Bush Lead Works, (9 January 2003), Bristol Planning, Transport and Development Services, RefNo. 91202, Janisch, 2006:8.

⁵⁵ Planning Notes & Supporting Information: Proposal for the Former Sheldon Bush Lead Works, (9 January 2003), Bristol Planning, Transport and Development Services, RefNo. 91202, pp.11 &17.

⁵⁶ Planning Notes & Supporting Information: Proposal for the Former Sheldon Bush Lead Works, (9 January 2003), Bristol Planning, Transport and Development Services, RefNo. 91202, p.10.

⁵⁷ www.bristol-city.gov.uk/committee/2000/wa/wa001/0927_a.pdf

How the scheme was applied

The above proposals were part of the wider redevelopment scheme of the Former Lead Works. The present essay, investigates mainly the parts that were directly related with the archaeology of the site and the listed shot tower.

The archaeological evaluation of the site, concerning the 19th/20th century lead works, resulted in a detailed plan and photographic record that had been carried out by BaRAS. Further archaeological research was not required to record the structures of the earlier period of lead production.⁵⁸

The external surface of the tower was restored with concern to its architectural significance. According to the structural report (White Young Constructing Engineers) the tower was in a very good condition considering its age and the lack of recent maintenance. After the cleaning process with water jetting, the concrete was coated with Xypex, a protective material for concrete waterproofing.⁵⁹ The existing windows were replaced with new laminated double glazed safety glass. The repairs applied also on the roof of the crucible room. A cathodic protection system was also installed to prevent electrochemical corrosion of the concrete reinforcement.⁶⁰



Figures 5, 6. Restoration works in the shot tower.©Evening Post. 26 January 2002.

⁶⁰ Planning Notes & Supporting Information: Proposal for the Former Sheldon Bush Lead Works, (9 January 2003), Bristol Planning, Transport and Development Services, RefNo. 91202, pp. 14-15. According to the cathodic protection, it was part of the refurbishment but I did not manage to verify if it was actually installed.

Although, the interior of the tower remained intact, most of the steelwork (including columns, walkways and staircases) was removed to enable suitable work and living space. This decision supported (and granted) as following:

Whilst this approach would result the loss of much of the industrial archaeological interest within the building, these structures are not considered to be of sufficient interest to justify retention.⁶¹

The existing doors were replaced with new to suitable fire safety standards as well as a new hatch and basement access ladder and a new lift, which required new openings in the concrete. The lead shot drop duct was sealed with toughened glass infill panel.

On 17 November 2004, a modified scheme applied with some significant changes, concerning the preservation of shot tower's industrial heritage. Specifically, the relocation of the cauldron at the bottom of the tower would be delayed in order to decide an appropriate fit-out contract.⁶² However, a few lines later, an alternative than the display of the cauldron is given:

Other than the display format for the cauldron information it is intended that the public art inclusion will be a combined approach between the two parts of this development and we understand that a scheme will be prepared by Alec French Partnership possibly as an applied pictorial or symbolic scheme applied to the face of the ventilation louvers to the basement car park viewable from the harbourside walkway (2004, condition 9).⁶³

⁶¹ www.bristol-city.gov.uk/committee/2000/wa/wa001/0927_a.pdf

⁶² Planning Approval Ref 02/04382/F, condition 7, p. 3, Bristol Planning, Transport and Development Services, RefNo. 91202.

⁶³ Planning Approval Ref 02/04382/F, p. 3, Bristol Planning, Transport and Development Services, RefNo. 91202.

It seems that it was decided (and obviously approved by the Bristol Planning Services) the preservation of the industrial past of the site through demonstration of modern art, than the restoration of its original industrial remains. It was not possible to find out what happened to the cast-iron cauldron. The last public document where the cauldron is mentioned is in Claire Snook's article in the Evening Post (21 August 2003). Alistair O' Kingsley from Hyland properties reply obscurely alluded to the contaminated condition of the cauldron, giving no further details about its present existence, verifying also that there is no future relocation scheme.⁶⁴



Figure 7.8. The shot tower before (2000) and after the redevelopment (2007). The label in the first image is a sales announcement. A panel across the main shaft of the tower, in the second picture, is the same thing. Photos: © NMR. J. O. Davies. AA011705/2000. E. Tsolis. 2007.

⁶⁴ I contacted Alistair O Kingsley via email and telephone on March 2007, only to receive the above information for the cauldron. He also denied my enquiry for a visit to the tower, giving as an excuse that the building was occupied from a company, despite the label in the entrance of the tower, which informs that the site is vacant for leasing.

Conclusions

The Sheldon Bush shot tower redevelopment scheme was undoubtedly an ambitious and complicated project that managed to safeguard the existence of a 20th century industrial building, under the strict sometimes for the developers, conditions of English Heritage. The external appearance of the tower was preserved with respect to the special architectural and the historic interest of the building making it available to public view, “allowing the scale of the Listed Tower to be expressed as an exclamation mark at the end of a decreasing crescent”.⁶⁵

The development plan, met the Planning Advice requirements as it can be seen in the Bristol Planning Services archives, and archaeological investigations and excavations of the site, were carried out satisfactorily by BaRAS.

However, specific heritage management policies were not applied sufficiently or completely ignored. According to Burra Charter,⁶⁶

Significant *fabric*, which has been removed from a *place* including contents, fixtures and objects, should be catalogued, and protected in accordance with its *cultural significance* (1999:9,art. 33).

Maybe the removal of the interior steelwork can be accepted for its minor historical importance. On the other side, the “missing” cauldron can be seen as an infringement of the ICOMOS policy.

Also,

Records about the history of a *place* should be protected and made publicly available, subject to requirements of security and privacy, and where this is culturally appropriate (1999: 9, art.32.2)

⁶⁵ www.bristol-city.gov.uk/committee/2000/wa/wa001/0927_a.pdf

⁶⁶ The Australia ICOMOS Charter for Places of Cultural Significance.

However, the public access, even to watch the displayed modern art on the face of the ventilation louvers is restricted, as the harbourside walkway is private. Unfortunately it was not possible to acquire a permission to visit the interior of the tower. There is yet unlikely to be any supporting information about the industrial history of the site. The tower's webpage, even if it has an impressive and artistic appearance, gives absolutely no detail about the historical context of the former use of the tower.⁶⁷



Fig. 9.10. The displayed modern art in the face of the ventilation louvers, across the harbourside. The commemoration of the lead drop is profound. However, there is not any supporting information. Most importantly, the access to public is not allowed.

⁶⁷ www.vertigo-bristol.co.uk/main.html, see also Appendix: Shot Tower Webpage

It is unreasonable to expect from an estate company, which probably counts most on the “cool £1,8 million worth” (Janisch, 2006:8) of the site, to demonstrate the industrial history of the shot tower. The contamination of the site, which was a direct by-product of 100-years industrial activity, is not the best thing to remember in the estate business, even after the application of the environmental recovery scheme.⁶⁸

Nonetheless, the refurbished tower is an example of successful redevelopment and time will tell if the adoption of an office use was successful. The future of the tower is safeguarded and it will continue to pierce the skyline of central Bristol as a constant reminder of a 200-year-old vision, even if the tower itself is “a bit quirky”.⁶⁹ An interesting question is also, what would have been the decision of the English Heritage if the old tower still existed.



Figure 11. The refurbished former shot tower is an impressive example of redevelopment, despite the major omissions in terms of heritage management and the doubtful, for many, architectural value of the building. © <http://www.vertigo-bristol.co.uk>

⁶⁸ Planning Notes & Supporting Information: Proposal for the Former Sheldon Bush Lead Works, (9 January 2003), Bristol Planning, Transport and Development Services, RefNo. 91202, pp. 4 & 7.

⁶⁹ As Richard White, project manager, had put it in Janisch (2006:8).

Finally, the minor consideration of the industrial remains, which disappear during the refurbishment, can be a reminder for any future projects, such as the preservation of Chester’s shot tower, which remains intact with most of its machinery *in situ*, still in desrepair.⁷⁰

William Watts, the bankrupted inventor of lead shot production, would probably appreciate the irony in the commemoration of his patent. “Watts Folly” in Clifton and the “bare” shot tower in Cheese Lane are the vague reminders of Bristol’s visionary plumber.

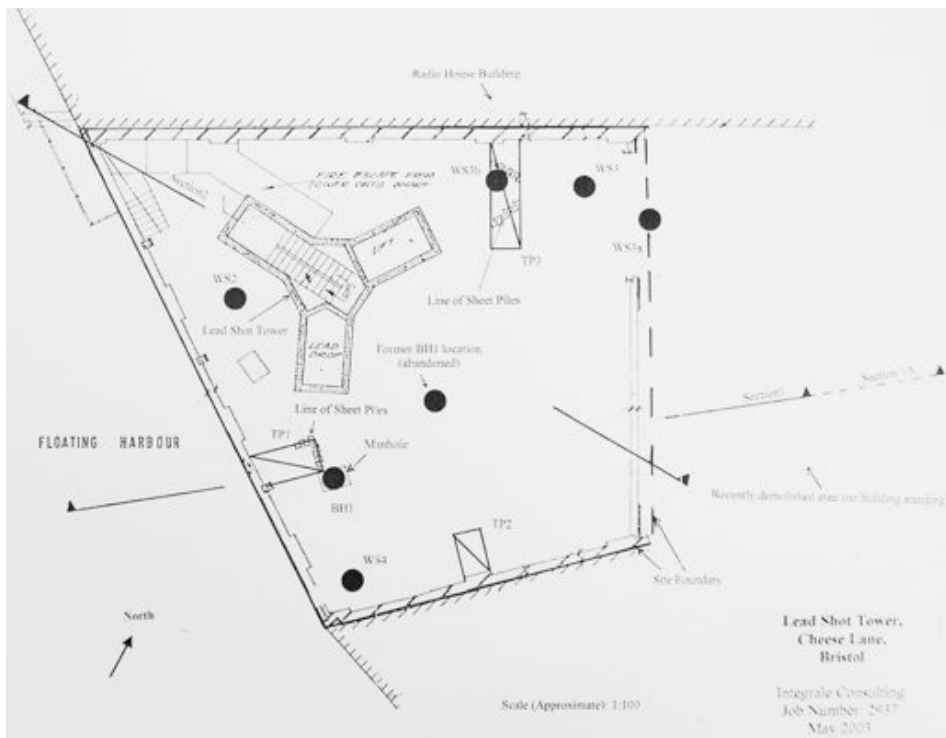


Plate 2. The Former Lead Works, prior the application of the redevelopment scheme.

© Integrare Consulting, 2003.

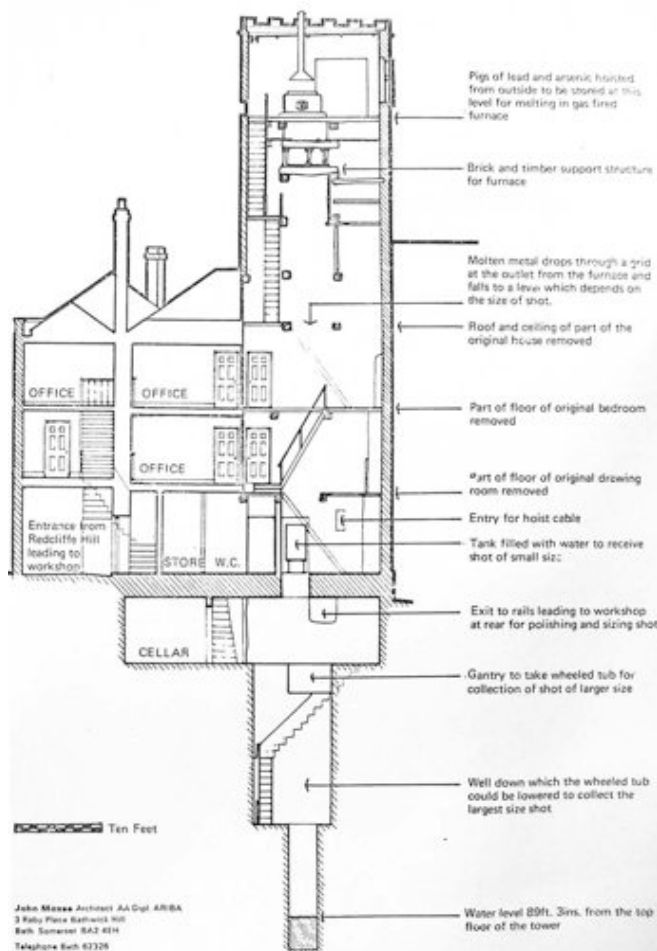
⁷⁰ www.lightingthedarkness.co.uk, June 2006.

Appendix 1. Photographic Record



Ap. 1. "Watts' Folly", Clifton, Bristol. William Watts lost his fortune in the construction of this high retaining wall.

© Stevie B. <http://Flickr.com>



Ap. 02. Drawing of the old shot tower in Redcliff Hill.

Mosse J., BIAS vol. 2, 1969:5



Ap. 03. The old shot tower in Redcliff Hill shrouded in scaffolding prior its demolition. November 1968.

Photo courtesy of Bristol Industrial Museum. (D9332)

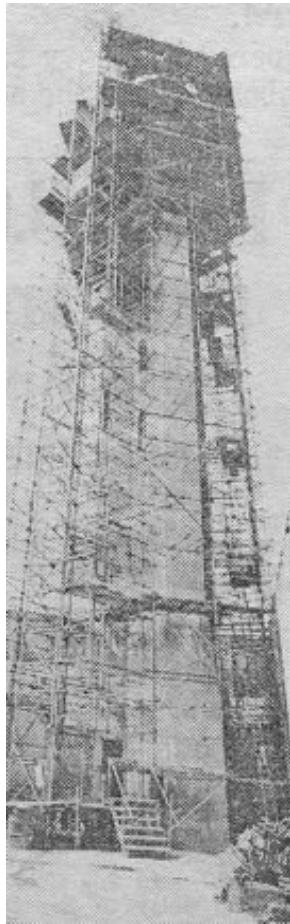
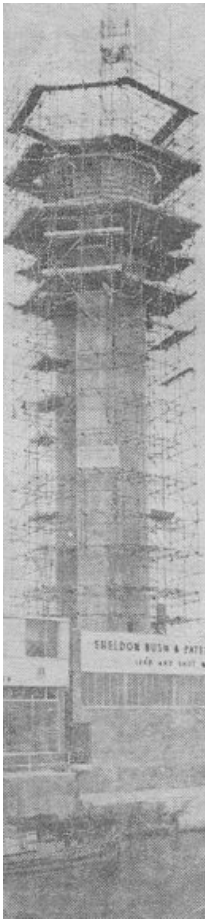
Ap. 04. The demolition of the old shot tower in Redcliff Hill. November 1968.

Photo courtesy of Bristol





Ap. 05 (Above). The topping out ceremony after the construction of the new Shot Tower. 24 May 1968.



Ap. 06. 07. (Left to right) The new shot tower being erected. 10 April 1968, 28 May 1968.

© Evening Post



Ap. 08. (Above left). View of the shot tower in 1978. © George Gallop.

Ap. 09. (Above right). Artistic view of the shot tower during the Balloon Fiesta week in August/September 1985.

© George Gallop.

Ap. 09. (Bottom left). A backside view of the shot tower taken on 17 February 2002.

© Nicks Hobbs, <http://www.flickr.com>



Ap. 10. The sign of Sheldon Bush & Patent Shot Co. at Cheese Lane, unknown date.

Photo courtesy of Bristol Industrial Museum (3.29)

Ap. 11. The shot tower captured from Temple Way in August 2000.

©NMR, J. O. Davies AA011709





Ap. 12. *In situ* interview, with Eddie Inman, former employee of Sheldon Bush & Patent Shot Co., on 14 March 2007.

Ap. 13. Aerial photo taken from a balloon, in 16 July 2005.

Photo: I.A. Pingstone



Appendix 2. The Lead Shot Production

Dave Blackburn, who used to visit the Former Lead Works during the 1980's as a Technical Officer in Industrial & Commercial Sales, sent me a detailed text of the industrial activities of Sheldon Bush & Patent Shot Co. The lead shot production was only a minor part of the lead production but the text describes vividly the working conditions in Cheese Lane during the 80's.

The *Lead Works in Cheese Lane* was a strange as it was in the centre of the city. Although it was beside the floating harbour, it did not to my knowledge use the river for transport, though they might have used the water for cooling. Everything came in and went out by road. There were several furnaces all of the pot type where a cast iron or steel pot sits in a brick lined shell. Each had a single gas burner firing through the wall at one point and there was a flue at high level.

The process started with mainly scrap material being brought to the site by anybody who had some old lead to sell. I can remember battered old lorries (dubious MOT pass!) carrying huge weights of scrap pipes, tanks sheets etc backing into the delivery bay and onto the weighbridge. The driver would be paid by the load. The staff could sometimes not believe the weight that some vehicles had carried on the roads through Bristol.

The scrap was then tipped into a huge pile and the first stage in the process was to melt it all down with a flux to get to molten lead generally free from impurities. Lead is almost unique amongst common metals in that it is easily recycled and can simply melt down and used again without too much additional work. The lead in batteries is a different matter see below.

The primary melting pot was huge, from memory about 3m across and 3m high. It probably held 80 – 100 tonnes of molten lead. The scrap would be picked up from the pile by a grab on the overhead crane, and dropped in the pot. As the first loads melted down, so more scrap would be added until eventually the pot was full. Although it was a large mass the melting point of lead is low and the metal only had to be raised to about 350°C. It was actually quite frightening at times being near the big pot. The scrap pipes had often come from houses where they were being ripped out and had generally been cut with shears. This in effect sealed the two ends of the pipe, which could still contain water. As a pipe fell into the molten lead pool the water boiled and the pipes would explode spitting molten metal over the side.

The molten metal was allowed to simmer in the pot for some hours so that any impurities (paint, bits of copper and brass), would rise to the surface and

form a slag, which could be raked off. The lead produced at this stage was an amalgam of everything that had come through the door but for certain uses other elements needed to be added to give the required properties. Therefore, the lead from the big pot was run off into ladles and taken by overhead crane to the next point of use. Sometimes it could be taken directly to one of the smaller pot furnaces but generally it was cast into pigs, which were small blocks of lead about 400mm x 100mm x 75mm in a continuous machine. These pigs could then be stacked up, stored and used as required.

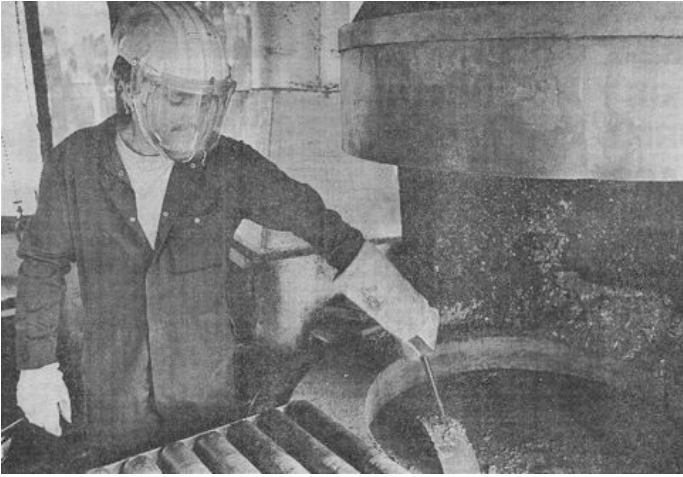
Lead Shot

This is where the tower came into its own. The pigs were taken up to the top of the tower to the furnace room where there was a small melting pot furnace (about 1m diameter and 750mm deep and holding about 3 tonnes of metal.) Again there was a gas burner providing the heat and when the melt was at the correct temperature, the tap at the front of the furnace was opened and the molten lead flowed into sieves. These looked like large frying pans but had a large number of very small holes drilled in the base. The lead ran through the holes and formed droplets. The spout of the tap and the pan were positioned directly over a hole in the floor of the furnace room and this hole was at the centre of the tower. There was a clear drop of about 45m into a tank of water at the shop floor level. There was a conveyor belt system to lift the shot from the water and the process was more or less continuous. Because the shot had to be graded it then went into a sloping rotating tube with holes in. The holes started small at the input end and were large at the output end. The shot dropped through the appropriately sized hole into wooden hoppers beneath producing batches of shot within strict dimensions.

The shot was used for gun cartridges but also a major market was to the steel industry to be added as an alloying element to steel during the production of free cutting (i.e. easily machined) steel.

The Tower

The new Bristol tower was built of concrete and had a central core and three wings. In one wing was the lift shaft to take personnel and the lead to the top. In the second wing was an emergency staircase and the third wing contained the services, gas pipe, water pipe electricity cables etc. At the top there was an almost circular room about 5m diameter with windows all around. The furnace was positioned so that its output spout was over the central hole. There was very little spare room as the piles of lead would take up much of the floor and there were always a number of the sieves each with different sized holes. There were also bags of chemical (from memory caustic soda), which was used to



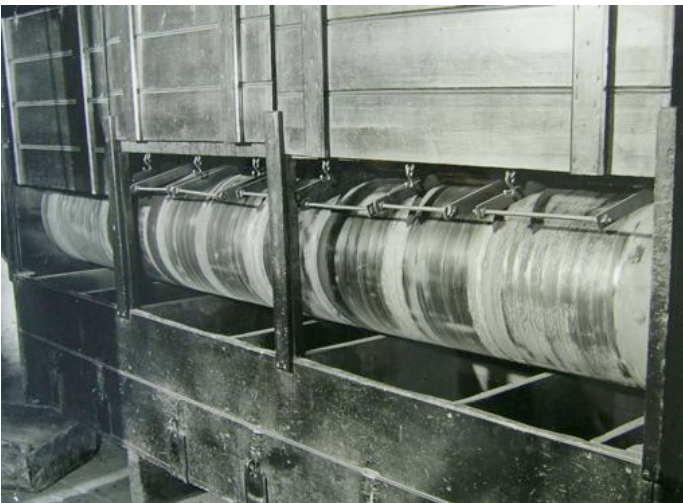
Ap. 14. Phil (Clifford) while warming the perforated card in molten lead before starting to pour it, on October 1988.

©Evening Post, 17 October 1988



Ap. 15. Shot running on glass. The proper shot had sufficient speed to jump the gaps to the end. However, the imperfect ones fell down and rejected. The picture was probably extracted from the BBC documentary.

Photo courtesy of Bristol Industrial Museum.



Ap. 16. The grading of the shot. The perforated rotating drum was used to grade each size in a separate container. The picture was probably extracted from the BBC documentary.

Photo courtesy of Bristol

coagulate any impurities into a slag. There was usually only one operator up there, a lonely life but with a nice view. He had a telephone link to ground level who would tell him when to start pouring and which sieve to use.

Reminiscences

I came to Bristol in 1979 when I joined South Western Gas as a Technical Officer in Industrial & Commercial Sales. I had studied metallurgy at university and indeed joined East Midlands Gas as a metallurgist in 1967. As time went on I became more involved with gas conversions and then worked on the development of specialist furnaces to try and compete with the electricity industry. When I came to Bristol I was the only person in SWG with experience of high temperature furnaces and I therefore tended to get involved with any job where the temperature got higher than 100 deg C.

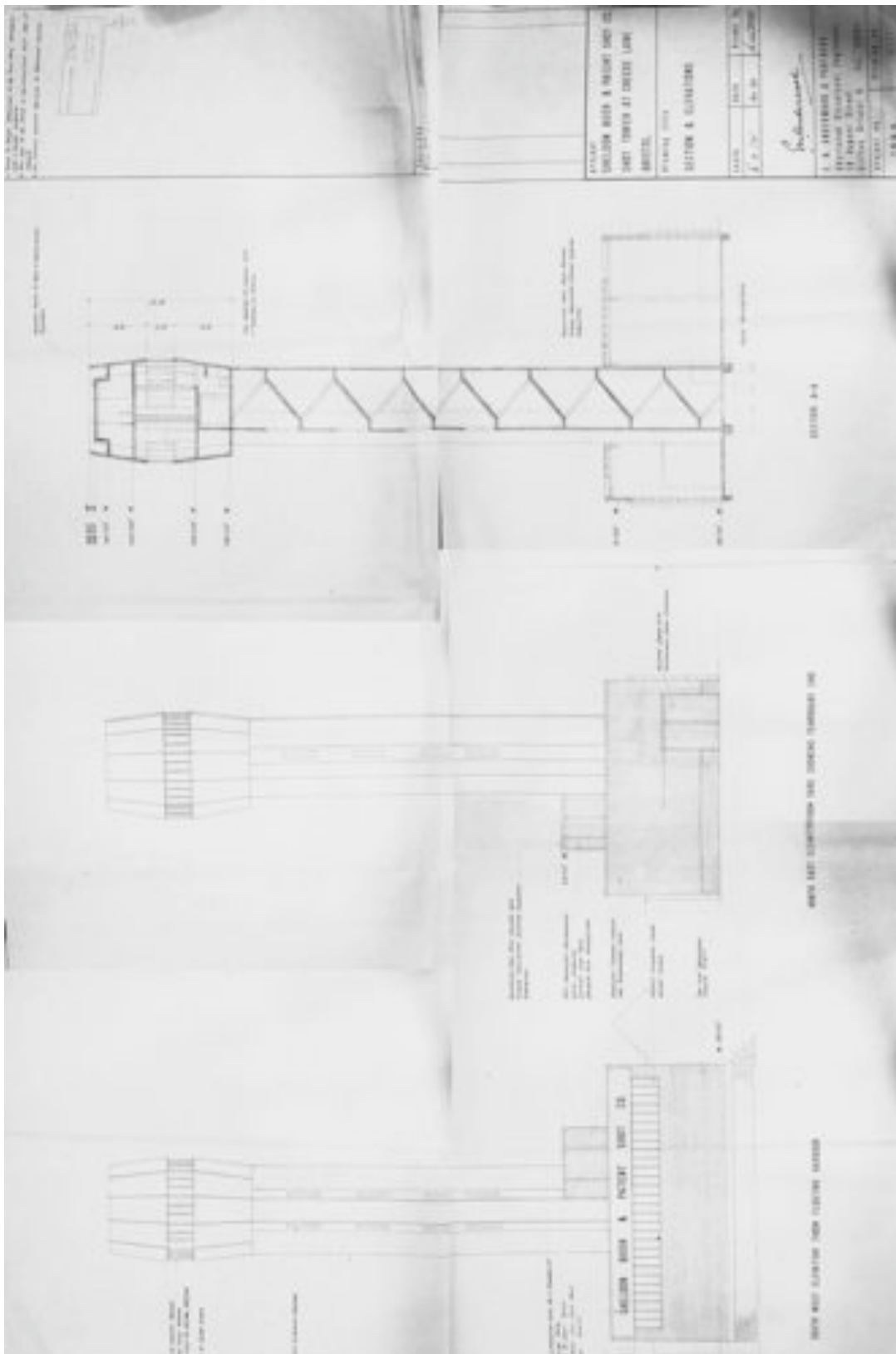
Sheldon Bush was quite a large gas customer and I tended to look after them and their furnaces. As time went on we tried to bring them into line with developing safety standards and generally get them to accept that the 20th century was really here. The tower was new but the original rolling mill was very old. It was, as noted above, replaced by a new mill in the mid 1980s. If a burner failed then they called us in. It was a fairly harsh environment with heat dust and lumps of metal flying around. Generally the problem was that they had crashed into the burner with a fork lift truck and damaged the controls or the pipework. Production was everything and I well remember once checking a fuse before carrying out some work on a furnace. The correct fuse about 10 Amps had been replaced by the ubiquitous 3" nail jammed into the fuse holder, good for (about 1000 amps) so no problem of that blowing!

The site was very dusty and slippery. Carbon dust was used as a lubricant on the shot and the rolling mill and the floor became highly polished.

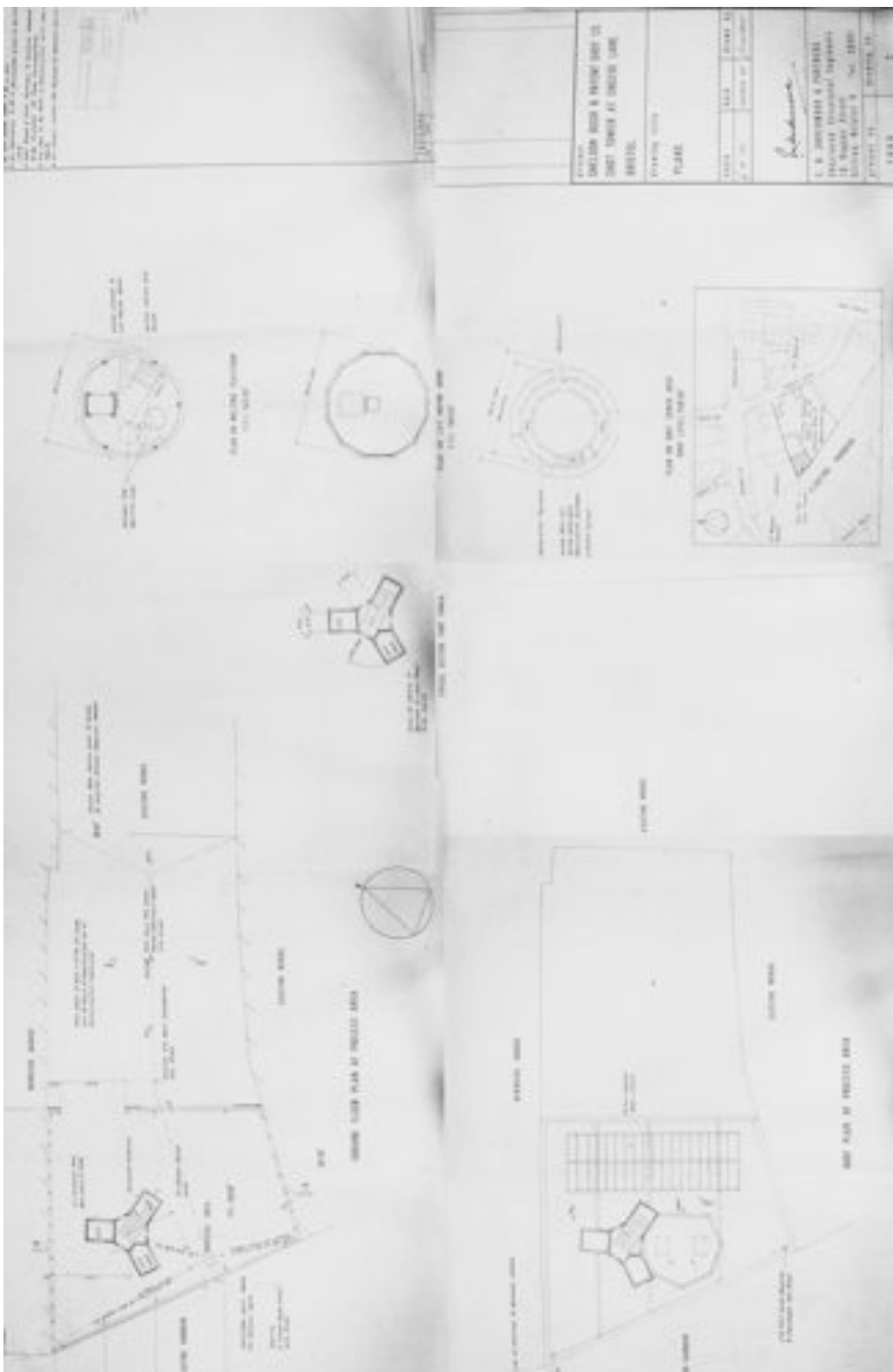
I remember once getting a call from the work's manager one day to say that the burner on the big pot wasn't working. I got there to find that the pot on the large 80 tonne furnace had cracked and dumped 50tonnes of molten lead into the base of the furnace. It had then flowed out through the burner fan. The whole lot had then frozen solid, not a happy sight. I left them to recover the furnace whilst I scoured the country for someone with a suitable replacement burner on the shelf. They were industrial packaged burners and not the standard units used on boilers.

David Blackburn, 18 March 2007.

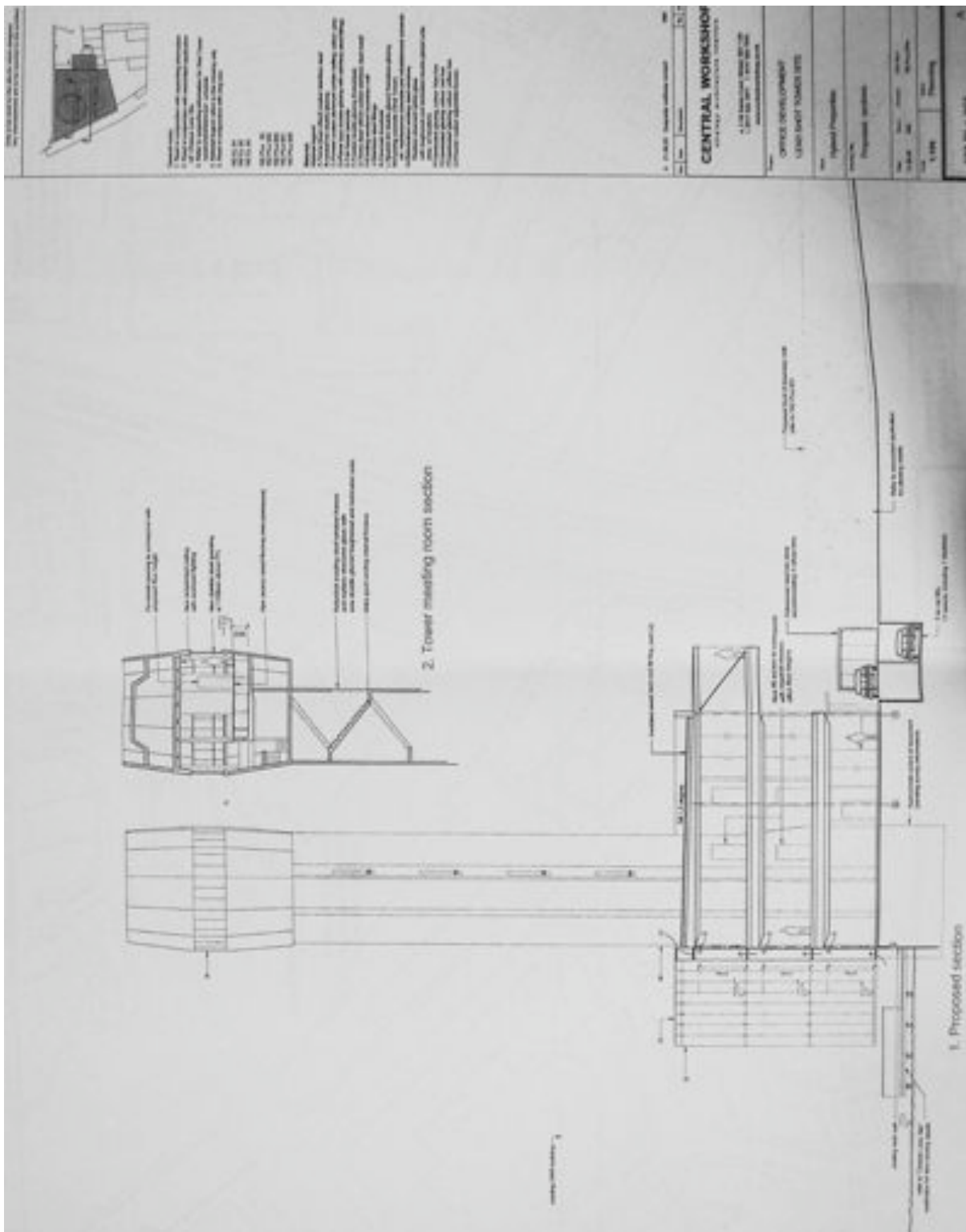
Appendix 3. Shot Tower Architectural Drawings.



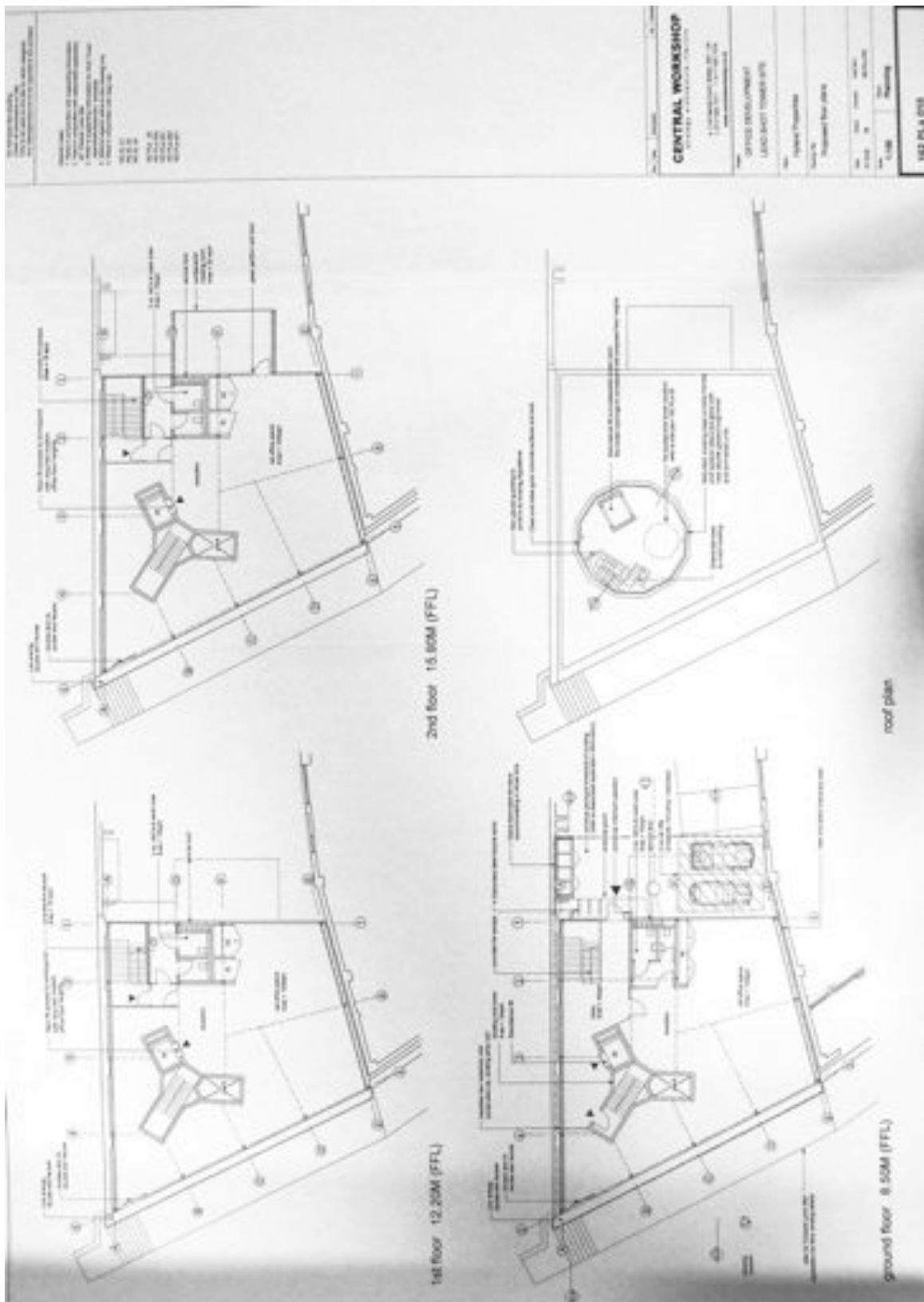
Ap. 17. The architectural drawings for the construction of the shot tower. E N Underwood 1966



Ap. 18. The architectural drawings for the construction of the shot tower. E N Underwood 1966

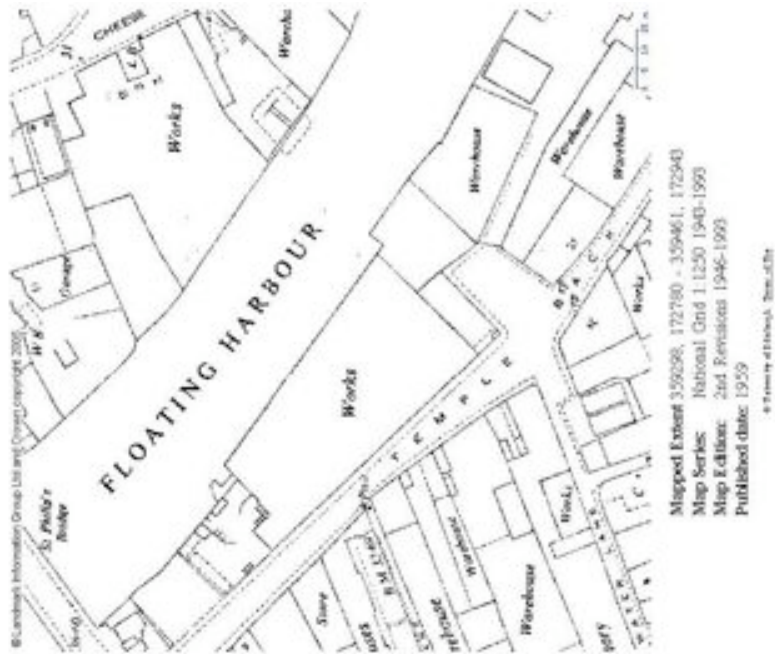


Ap. 19. The Architectural Drawings for the redevelopment of the shot tower. Central Workshop 2003



Ap. 20. The Architectural Drawings for the redevelopment of the shot tower. Central Workshop 2003

Appendix 4. Maps.





Scale 1:1000



Map Information: 1:1000
 Date: 1974
 Author: Ordnance Survey
 Publisher: Ordnance Survey
 Copyright: © Ordnance Survey 1974

EDINA
 Digimap



Mapped Extent: 359287, 172779 - 359471, 172962
 Map Series: National Grid 1:1250 1943-1993
 Map Edition: 4th Revision 1953-1992
 Published date: 1974

© Crown Copyright 1974

Appendix 5.

NMR MONUMENT REPORT

SHELDON BUSH AND PATENT SHOT COMPANY LIMITED

Unique Identifier: 1352687

NMR Number: ST 57 SE 569

Location

Cheese Lane

Bristol (Civil Parish)

City Of Bristol (District)

Avon

OSGB Grid Reference ST 5957 7284 (centre / point)

Summary

It was in 1728 in a house on Bristol's Redcliffe Hill that William Watts perfected the manufacture of lead shot for muskets by pouring molten lead from a great height into water. When shot making was transferred to Cheese Lane in the 1960s, the Sheldon Bush and Patent Shot Company commissioned E N Underwood and Partners (Structural Engineers) to construct the new shot tower. It has a reinforced concrete structure of concave bi-lateral planned form with vertically set slit windows in the tower. The twelve sided top has a central band of vertically set windows with a band of ventilation slits beneath. It is a unique 20th century shot tower and one of only three shot towers of any period now surviving in England. Watts original tower survived in Bristol until 1968 when it was demolished as part of a road widening scheme.

Status

LISTED BUILDING GRADE II

Other Identifiers

NBR Index Number - 106687

Listed Building List Entry Uid - 458483

Notes

Sources

- 1 List of Buildings of Special Architectural or Historic Interest, Vol 901-1
Bristol, 5th amendment, 24-NOV-1995

Related Events and Archives

Any event and or archive records linked to this monument are outlined below. For further details please contact the NMR (see covering letter) quoting the Unique Identifier and NMR Number of this monument record and the identifying numbers and titles of items of interest.

Related Event Records

613515	Investigation by RCHME/EH Architectural Survey	Architectural Survey	14 Aug 2000 - 14 Aug 2000
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Related Archive

File Number

BF106687 SHELDON BUSH AND PATENT SHOT COMPANY LIMITED, 10-14 CHEESE LANE, BRISTOL.

File Number

BF108921 Buildings of England: Bristol

Appendix 6. Vertigo Webpage

vertigo | about | image gallery | contact | location | contact



Overview
Vertigo will provide a new landmark building and office space in a prime location in the heart of the city. The building will be a prime example of modern architecture.

Only one company will make it to the top



Description
Vertigo will provide a new landmark building and office space in a prime location in the heart of the city. The building will be a prime example of modern architecture.

Only one company will make it to the top



Specifications

- Plot Area
- Second Floor
- Third Floor
- Ground Floor



Total Area: 100 sq.m - 1000 sq.m

Specifications

- Plot Area
- Second Floor
- Third Floor
- Ground Floor



Total Area: 100 sq.m - 1000 sq.m



101	vertigo office
102	Central Bank
103	104
105	106
107	108
109	110
111	112
113	114
115	116
117	118
119	120

Physical Properties
Number of floors: 10
Total area: 1000 sq.m
Plot area: 100 sq.m
Construction year: 2010

Vertical Properties
Name: [Form]
Telephone: [Form]
Email: [Form]
Address: [Form]
Suburb: [Form]

Disclaimer
The information is provided as a guide only and does not constitute an offer of any financial product. The information is provided for general information only and does not constitute an offer of any financial product. The information is provided for general information only and does not constitute an offer of any financial product.

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The company is registered for GST purposes.

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The company is registered for GST purposes.

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The company is registered for GST purposes.



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icecore 23/7/07 17:55

Comment: Excellent

Publications and Books

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