The Walsall bombs

John D Harper

ABSTRACT: The so-called Walsall Anarchists Bomb Plot of 1892 has been discussed elsewhere for its historical and political interest and for the alleged use of an agent provocateur to entrap and convict the conspirators. This study focuses on the bombs themselves and how they were made. Surviving castings, contemporary photographs, and reports of court proceedings have been studied in the context of the processes used by the foundry that made them. The design of the castings and of the patterns from which they were made is shown to have been poor. Previously unreported design changes have been discovered, apparently made by the police after the conspirators had been arrested. These findings suggest that the bombs as designed might never have worked effectively. It is concluded that, whether or not they were the victims of a police trap, the convicted men, although guilty of trying to make lethal bombs, were too incompetent to have presented any real danger.

Background

On 23 November 1891 Frank Bullows, managing Alfred Bullows and Company's foundry in Walsall, received an enquiry for 36 iron castings. Not knowing what the castings were for, and not needing the business, he quoted the then prohibitive price of 20 shillings per hundredweight but nevertheless received an immediate order. (Photographs of the enquiry material with his notes survive with other documents in the case in the National Archives/Public Record Office, ref. TNA(PRO) ASSI6/27). However, when his foundry tried to make the castings it was found that the pattern equipment supplied by the customer could not be used: as Bullows was to say later in court 'it had not been made by a practical man'. When a card to the address on the enquiry was returned as un-deliverable he put the patterns aside. He heard no more for five weeks, when the police told him that the castings for which he had quoted were bodies for bombs, and that his intended customers had been arrested as suspected anarchist conspirators.

At that time anarchists, on the left of the Socialist movement, were campaigning for the end of all organized government in order, as they saw it, to liberate the proletariat. The more extreme adherents, active in Russia, Western Europe, Britain and the USA, threatened violence to authority and to the property-owning bourgeoisie. Although often ill-organized and incompetent, they did sometimes carry out successful bombings and assassinations. They were the international terrorists of their time, taken seriously by governments, by the police and by public opinion.

In 1891 and 1892 public opinion in England was concerned enough that the Home Office and the police felt under some pressure to demonstrate their own reliability and vigilance. Terrorist attacks were being reported from all over Europe, including a bomb in Dublin, an attack on the Spanish parliament in Cadiz, and bombings in Paris (The Times 31 Mar 1892, 9, Daily Graphic 5 Apr 1892, 5).

The police had been watching a group of suspects in Walsall for some time, and arrested them in early January 1892. They even detained André Cavargna, a 'crackpot' Swiss inventor from nearby Handsworth, who in 1890 had ordered some small bomb castings which he planned to tie round the necks of rabbits which would then be released down their holes to blow up their warrens and

themselves. Cavargna had tried to patent this plan, which he had hoped would win him an Australian prize offered for a way to exterminate the animals. His case was briefly taken seriously but was soon dropped (National Archives TNA(PRO) File HO144-243).

The accused in the more serious Walsall conspiracy were Jean Battola, an Italian shoemaker, Victor Cailes, a French railwayman wanted in France for incitement to murder, Fred Charles, a clerk from Norwich who had worked in Pittsburgh and Sheffield, and three local men, Joe Deakin, a railway clerk, William Ditchfield, a hame or horse-collar-frame filer, and John Westley, a brush maker. The last two were recruited by Deakin to help with making the patterns. Ditchfield was naïve and illiterate, saying that he did not even know the meanings of the words 'socialist' or 'anarchist'. He and Westley denied knowing that the castings were bombs, having been told that they were for 'electrical lubricators'. Battola, Cailes, Charles, and Deakin, who was later described as a 'simple idealist' by Charles, all held extreme left-wing or anarchist views. Battola was based in London, but the rest were members or guests of the Walsall Socialist Club, through which Westley had found work for Charles and Cailes when they came to Walsall.

They were accused under an 1883 Act of conspiring and possessing substances to cause an unlawful explosion and endanger life or property. 'Substances' were defined as any part of an explosive device, in this case even including the pattern equipment for making bomb bodies.

As well as finding the pattern equipment at Bullows' foundry, the police searched the group's rooms and found anarchist literature in French (National Archives TNA(PRO) ref. ASSI6/27), including a bloodthirsty fantasy on using time bombs to set fire to an opera house and burn the bourgeoisie alive, and a paper, in Cailes' writing, concluding (in translation):

> 'let us occupy ourselves with chemistry and energetically set about making bombs, dynamite, and other explosives, much more powerful than guns and barricades as a way of leading to the destruction of the state… Courage comrades, and Long Live Anarchy!'

The prosecution had these articles read out in court, although saying that they did not form part of the case. Other finds included bomb-making instructions in Battola's writing, a length of fuse (irrelevant, as the bombs were designed to be fired by caps), a plaster model of a bomb body, a brass screw, a pattern for the screw plug, and some clay moulding mixture. Charles was carrying a loaded revolver. All these finds, however suggestive, and with the possible exception of the brass screw, were either incidental, or tools for making bombs rather than actual bomb components. For the case to be proved it would have to be shown that they could be used to make a lethal bomb.

The prosecution, led by the Attorney General, Sir Richard Webster, QC MP, in Lord Salisbury's Conservative government, relied heavily on a full statement and confession by Deakin, obtained after his arrest when he was wrongly convinced that he had already been incriminated by Charles (National Archives TNA(PRO) ref. ASSI6/27 and HO144-242). The defence concentrated on the reported good character and peaceful intent of the accused. Deakin said that he believed making these bombs was no crime because he understood that they were to be thrown at the Tsar of Russia, and not used in this country.

Battola, Cailes, and Charles were convicted and sentenced to ten years in prison and Deakin to five. Westley and Ditchfield were acquitted. After their release, with remission for good behaviour, Charles joined an agricultural community in the Cotswolds and Deakin returned to Walsall, becoming a member of the Trades Council and respected supporter of the Labour party (Roberts 1992, Taylor 1976). What became of Cailes and Battola is not recorded.

The case aroused not only public interest, but also controversy. In May 1892, after the trial, David Nicoll, an anarchist journalist, was imprisoned for incitement to murder because he wrote in his paper that the judge and police inspector in the Walsall case were 'not fit to live' (The Times 28 Mar & 7 May 1892, Nicoll 1894).

The case has continued to be discussed and even dramatized (Oliver 1987, Porter 2 003, Quail 1978, Roberts 1992, Barnsby 1992?, Calcutt 1992?, McCarty 2004), largely because of the allegation that Chief Inspector Melville, of Scotland Yard and the Special Branch, not only used paid informers but also employed one Auguste Coulon as an '*agent provocateur*' to set up the case from the beginning, with the sole object of incriminating the accused. Coulon, like Battola, Charles, and Deakin, was a member of the anarchist Autonomie Club in London. According to Deakin's statement it was Coulon who introduced Cailes and Battola to the Walsall men, and had later assured Cailes that the bomb instructions they were following were 'all right'. After the Walsall ar-

rests he was accused of acting for the police, and was expelled from the Autonomie Club. Melville admitted knowing him, but refused to say whether or not he had given him money. In court it was ruled that questions about Coulon and his connections with the police were out of order. The Home Office later said that there was no evidence against Coulon and denied the *agent provocateur* allegation. A year later he was found to have been making dynamite in the cellar of an anarchist school in London (Thomas 2004). In 1895 P MacIntyre, who had worked for Melville in 1892, wrote that the accused 'were undoubtedly ensnared by Coulon' (Reynolds News 14 April 1895). This article was cited in an unsuccessful appeal for the early release of those convicted (National Archives TNA(PRO) ref HO144/292).

However suggestive all this evidence may be, we cannot know for sure whether Coulon did set up and direct the entire conspiracy on behalf of the police, whether he was a paid informer, whether he just distanced himself from the conspirators when he realized that their plans were going wrong, or whether he knew nothing about the plot at all.

The atmosphere of intrigue, secrecy, and ambiguous loyalties surrounding the case, featuring a subtle and possibly double-dealing police officer, and international ramifications including a French *agent provocateur,* is echoed in Joseph Conrad's *The Secret Agent,* which although based on an 1894 explosion at Greenwich, probably also drew on the Walsall case.

Attention has focused on these 'political' issues, and little or nothing has been written about the bombs themselves, how they were designed, how they were made, and how real a threat they posed.

The surviving bomb castings

Although no castings, let alone a finished bomb, had been made at the time of the arrests, the police persuaded Bullows to try again. By altering the method of supporting the core in the mould a number of castings were eventually made. Two were produced as evidence at the magistrate's court and later at the trial. At least three still exist: two in the author's possession, inherited through the Bullows family, and one kept by the police and now in the Walsall Museum. These three castings were polished, and two of them were chrome plated to be kept as souvenirs. They are shown in Figures 1 and 2, and key measurements are shown in the following table. The pointed screwed plugs closing the top of the castings are made of brass. The police found one of these plugs,

Figure 1: Bomb castings in the possession of the author.

Figure 2: Bomb casting in the Walsall Museum

and another made of lead alloy, presumably as a pattern. No evidence was given about whatever explosive was to have been used.

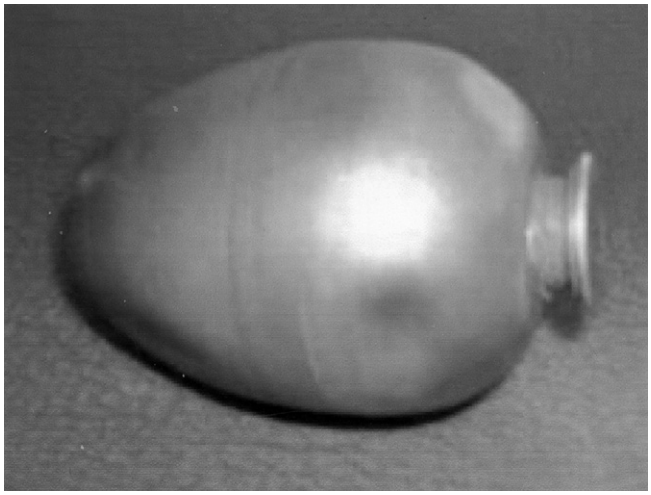

Figure 3: Item passed to the Walsall Museum with the bomb casting shown in Figure 2

Another item (Figure 3) was passed to the Walsall Museum as a bomb and kept with that shown in Figure 2 (Heaven 1996), although no second type is mentioned in the court proceedings. It is larger and lighter than the iron bombs, and is not a casting but has been made by spinning, a process in which rapidly rotating thin discs of ductile metal are formed into dished shapes. Two such shapes have been skilfully soldered together, and fitted with a screwed cap. The metal, probably a tin alloy such as Britannia metal, is too soft and thin to make an effective bomb. Instead it can probably be identified as the item produced in court when Frederick Brown, a Walsall electrical engineer, testified that the castings must have been for making bombs, not lubricators. To probe his conclusion he was shown real lubricators and other objects, one of which he said could conceivably be used as a bomb. This was identified as a muff warmer, which in use would have had a cloth cover and been filled with hot water. If this is indeed the item in Figure 3 the police of later generations presumably took it for a bomb because of its shape.

Making the patterns

The reports of the court hearings show that none of the accused, lawyers, or journalists knew much about foundry work. Some of the reported evidence is confused by misunderstandings of the differences between models, patterns, moulds, cores, core-boxes, and castings (see glossary in Appendix 1).

Deakin and his colleagues had spent several weeks in largely ineffective attempts to make patterns from which the bomb castings could be produced. They presumably started with the instructions in French in Battola's writing. A photograph of a copy of this sketch with translated notes is shown in Figure 4 (National Archives TNA(PRO) ref.ASSI6/27). In this form it hardly constitutes a useful set of instructions, although it does specify the use of cast iron, and shows three protrusions on the base, representing nipples for caps. Other contemporary anarchist literature, from which it may in part have been derived, is more detailed, including instructions for making bombs in publications such as those produced in evidence after the Chicago Haymarket riots in 1885 (*eg* 'A.A.' 1885).

In court it was stated that the original sketch was marked '5/8 inch' (the tapped hole in the castings is just under 5/8 inches (16mm) in diameter, although it is not shown in the sketch), and that traces of an erased outline of the screwed plug could be seen. It is unfortunate for this study that this exhibit, unlike the other French language documents in the case, was photographed and filed as a copy of a translation and not of the original which may have contained more information – which perhaps the

Table 1: Key data and measurements of the surviving castings

Number	1	2	3
Location	J Harper collection	J Harper collection	Walsall Museum
Material	grey cast iron	grey cast iron	grey cast iron
External surface	black	polished, plated	polished, plated
Screwed plug	brass, drilled for turning bar. Some damage from later opening	brass, plated and drilled. Some damage from later opening	brass, plated and drilled.
Height and width	86mm and 60mm	86mm and 60mm	86mm and 60mm
Casting weight	772g	584g	(the plug was not removed)
Weight including screwed plug	806g	620g	800g
Metal wall thickness	*c* 8mm	*c* 5.5mm	presumed as No. 1
Internal depth	*c* 77mm	*c* 80mm	presumed as No. 1
Base thickness	*c* 11mm	*c* 6mm	presumed as No. 1
Internal volume	*c* 68cm^3	*c* 90cm^3	presumed as No. 1

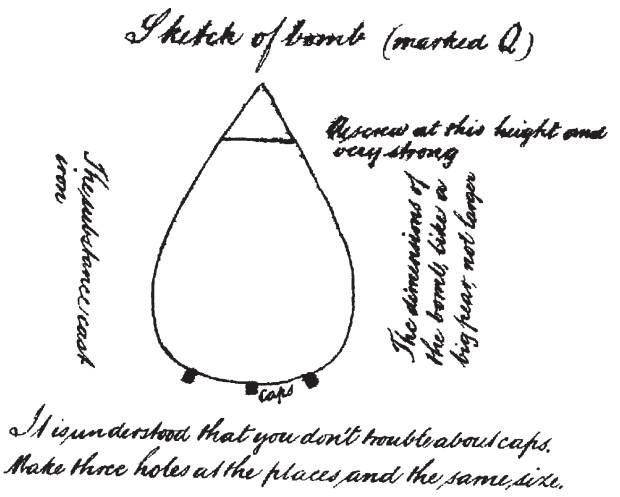

Figure 4: Sketch and translated notes from the photograph in the National Archives/PRO file TNA(PRO) ASSI6/27

authorities did not wish to make public.

Deakin's statement explains that he originally intended to have the equipment made by a pattern-maker in Birmingham, but eventually decided that he and Westley could make a wooden model themselves. This model was made in two halves and hollowed out, the 'strength' (presumably meaning thickness) being measured with callipers. Deakin and his colleagues may not initially have realized that such a model, without core-box or core prints, could not be used to make moulds for casting.

There was then some delay in getting a properly-made pattern and core-box. Eventually Ditchfield approached Bernard Ross, a Walsall pattern-maker, whose brother Thomas worked for a brass foundry. They too were told that the castings were for 'electrical lubricators', and were paid 17s 6d (£0.875) to make a plaster pattern and core-box from the model, and use these in turn to make a metal pattern and core-box.

To test this equipment a core and mould were made from it and a brass casting was produced. Battola, allegedly sent by Coulon, came from London to inspect this casting. He said that it was too small, and used the clay moulding material to model the necessary changes. Ditchfield's rambling statement in court confuses this episode, as he said that the brass casting was rejected because it was too heavy, that instead of brass it should have been made of glass, but that it would be light enough in iron. It is not surprising that the design was debatable, as on the sketch the only guide to dimension is the phrase 'like a big pear, not larger'. Ditchfield had asked whether it should be like a Tettenhall pear ('Tettenhall Dick' is a local variety of hard, sour and small pear) but Charles told him that it should be larger.

The Ross brothers were then asked to make new equipment. The trial brass casting was lost (Ross said it was never paid for), but the police found a plaster model in Ditchfield's house, where his little daughter was using it as a doll. Ditchfield said that it had been made from the first wooden model. He also said that he had destroyed the original plaster core-box when he realized that something was wrong and that the police were watching him. The plaster model is included, apparently blotched with paint, in a contemporary photograph (National Archives, TNA(PRO) ASSI6/27) of items produced in court, including sample castings and pattern equipment, including a lead pattern and a split cast iron core box. This photograph is reproduced in Figure 5.

The photograph also seems to show that the extension forming the core print on the pattern was a separate loose piece fitted to the pattern, rather than made integrally as would be normal practice. Ross said that when he first saw the pattern, at that stage presumably the model, it was without a 'tenon'.

The partly flattened shape of the pattern and castings differs from both that of the plaster cast shown in Figure 5 and the sketch in Figure 4. There is no reference to change of shape during the various pattern-making attempts. The change was probably made after Battola ruled that the prototype was too small and that a new pattern had to be made.

Figure 5 shows two castings. That on the right contains a bolt with a thread like that on the brass plugs. The other has a crack (not easy to distinguish in the reproduction), and is probably the one produced at the trial and described as being broken. The original photograph of this shows marks of what could be hammer bruises, so perhaps it was broken deliberately.

Making the castings

In 1890 a probate inventory was made of Alfred Bullows' factory (Walsall Local History Centre, Accession 595). This shows that the foundry used 'tub moulding', a technique which is no longer generally employed. Skilled moulders worked at tubs containing prepared sand, which they rammed around patterns in shallow moulding boxes, typically measuring about 60 x 30 x 5–10cm deep. Several different patterns would be included in each mould, connected to a common runner system to

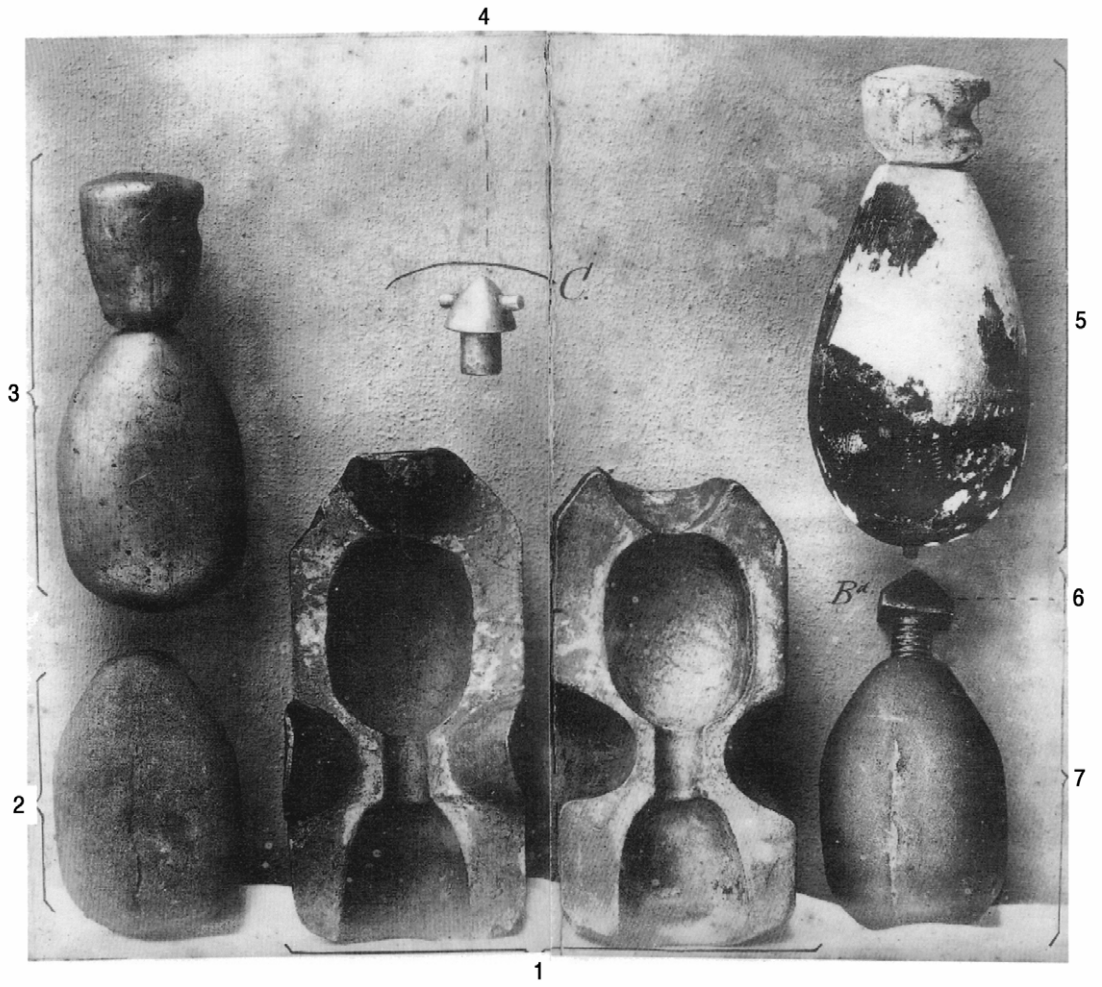

Figure 5: Contemporary photograph of the pattern equipment and castings in the National Archives file TNA(PRO) ASSI6/27. Notes in the margin of the original read as follows:

1 Core Sticks A found by Chief Const (at) Bullows' 7th January (1892)
2 Casting made by Messrs. Bullows which the lead bolt fits
3 Ditchfield Lead Pattern found at Bullows by Chief Constable January 1892 B
4 Lead Bolt (marked C) Found by Inspector Mellville at Charles' 7th January 1892
5 Plaster Cast found by C.C. on Jany 7th 1892 at Ditchfields
6 Brass Screw (B^d) Handed to C.C. 7th January 1892
7 One of the Castings made by Messrs Bullows from Core Stock and lead pattern, which has been tapped in the neck to fit the brass screw

channel the molten metal to each mould cavity. After the patterns were stripped from the sand mould, cores to form any internal hollow or undercut shapes were inserted. Bullows said that his cores were made with sand from Moxley mixed with resin (at that time this would probably have been a natural vegetable gum, or more commonly linseed oil, rather than the synthetic resins used today), cured in a stove, and coated with charcoal dust. The two half moulds were then clamped together and often, as probably in this case, set vertically for pouring the molten iron from one end, as illustrated in Appendix 2 (McCombe 2004).

These bomb castings were difficult because the design required that the core body be supported from its print by a thin neck of core sand forming the hole in the top of the casting. After cutting the screw thread this hole is only 14mm in diameter, and in the casting must have been still smaller. This fragile piece of cured sand had to hold the core body in position while the mould was up-ended for pouring and while the liquid iron ran in and solidified. It also had to allow gas produced when the core was heated by the metal to escape rather than form blow-holes in the liquid iron. Unsurprisingly, several of the castings eventually made were 'wasters'. The neck of core sand would be even more fragile in a half core, which is presumably why Ross made the core-box in cast iron which could be used as a 'dryer', to hold a complete core in the stove until it was cured, rather than being 'bedded out' in loose sand or set in halves on a flat plate as is done with less fragile cores before curing.

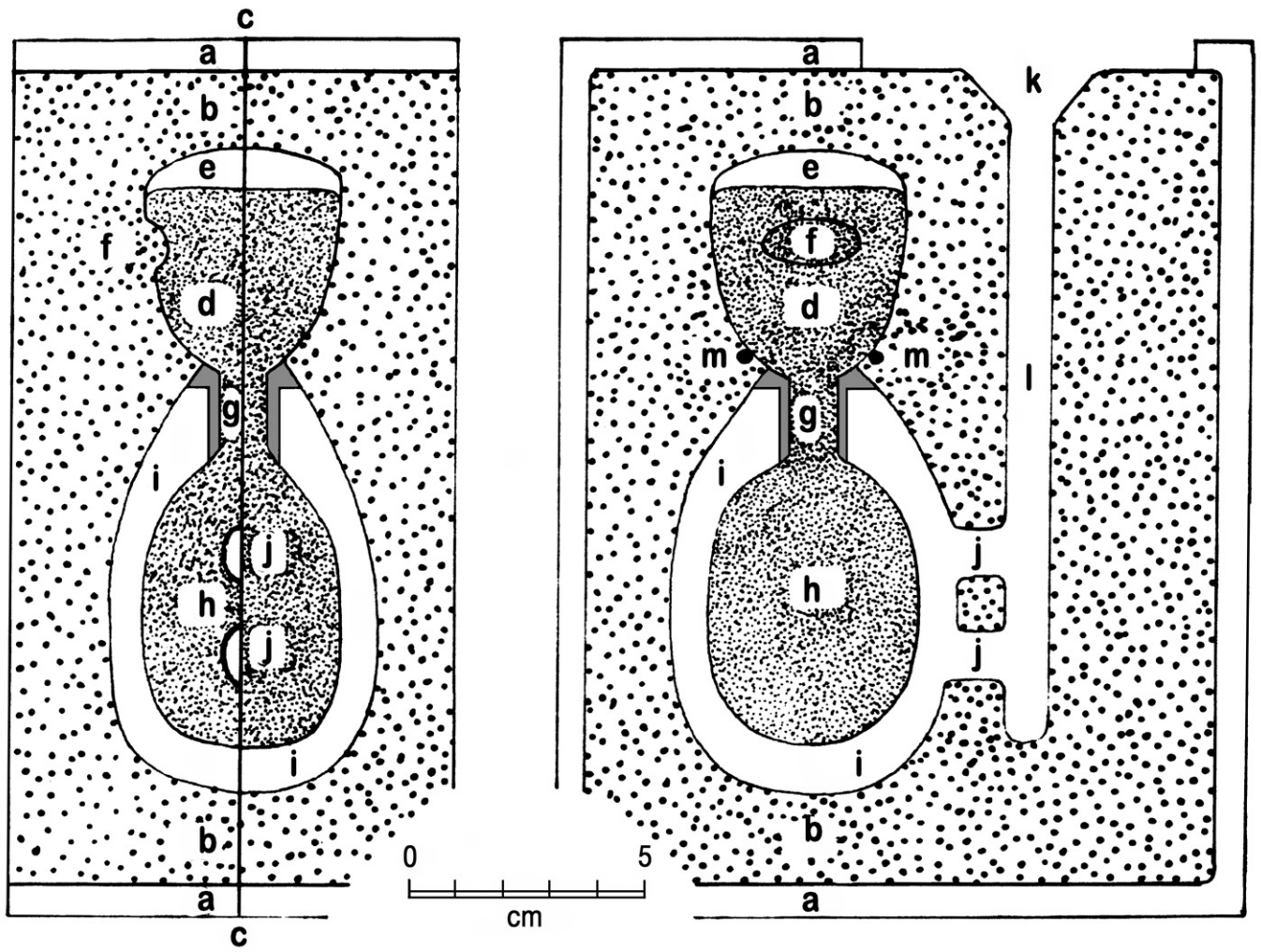

Figure 6: Probable mould layout; in practice the mould would have been larger, with other patterns on the same runner bar. Key to the labelled parts is as follows:

a	*moulding box*
b	*moulding sand*
c	*the mould joint*
d	*core print to hold the core in the mould*
e	*clearance—the core print on the pattern is longer than that on the core*
f	*ridge and groove in one side of the mould to help locate the core*
g	*narrow neck of core sand (shaded area represents metal machined away from the raw casting when facing the top and threading holes)*
h	*main body of core, forming the mould cavity*
i	*mould cavity which forms the casting*
j	*ingates—entry for the molten metal*
k	*pouring basin to receive the molten metal from the ladle*
l	*runner bar to channel molten metal to the ingates*
m	*possible location of strengthening nails to hold the core*

The shape and size of the core print appears inadequate to hold the core body firmly in place in the mould. If the part of the pattern that formed the core print was a separate piece this could have introduced further errors. Bullows explained that at their first attempt the core gave way, despite being strengthened by nails. When asked to make castings by the police, the foundry succeeded by putting other nails under the core to stop it falling against the inside of the mould. Figure 6 illustrates the presumed moulding method.

The author's two castings, although externally identical, are different inside. One is heavier, with a smaller internal cavity and thicker base than the other. (See Figure 7 and the Table 1). Scaling the proportions from the photograph of the original pattern equipment (Figure 5) shows that the heavier casting with the thicker base is to this original design.

Internally both castings have clean well-formed surfaces: neither core has been made from the other by abrading sand away or building up additional thickness. Either

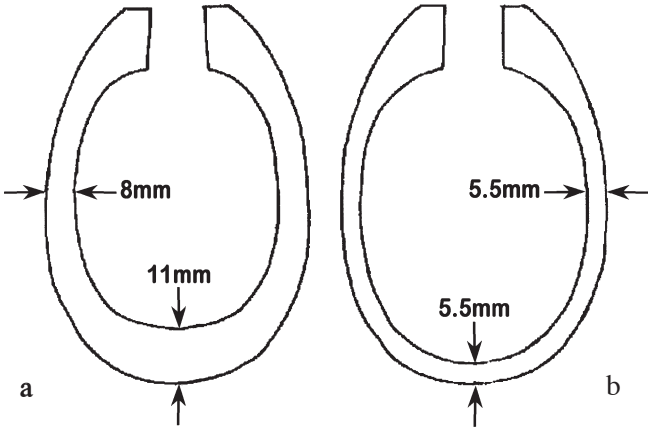

Figure 7: Internal shapes of the castings; a from the original core box; b from the second core box

two separate core boxes were made, or after producing the first castings the original box was altered to make a further batch with a larger core. In either case the change would have incurred some time and expense. It is unlikely to have been made to suit the foundry, since a larger core suspended by the same small sand neck would increase the casting difficulties. So it was presumably made at the request of the police, although there is no mention of this in the records.

The effectiveness of the bombs

The prosecution needed to prove that bombs made from the conspirators' patterns could cause a lethal explosion, despite a defence argument that the castings produced in court had been made by the police and not by the accused. Evidence was given by Colonel Ford of the Home Office Explosives Department, who stated that the patterns would indeed make effective bombs, and by Frederick Brown who had exploded one of the castings electrically from 100 yards away, using ¼ ounce, about 7g, of guncotton explosive (not ¼ pound, about 115g, as suggested in one report in *The Times*). In court Brown said that if he had used a full charge it would have been most dangerous to life. Even with this small charge, and although he used clay instead of the metal plug to close the top, the bomb shattered into 16 fragments, some of which were driven deep into the ground.

Brown's test proved the bomb's destructive potential, but did not show that it would have exploded with the conspirators' intended detonation arrangement, which, as shown in Figure 4, consisted of three caps set on the base of the bomb. Copper percussion caps, containing a small amount of highly explosive chemical, were used to fire guns before modern cartridges were universally adopted, and would have been readily available in the 1890s, as they are today, especially in America where reproduction muzzle-loading sporting guns are popular. To fire a gun a cap was pushed over a hollow nipple screwed into a hole in the breech of the gun. Pulling the trigger released a spring loaded hammer which struck the cap and produced a spark or flame which fired down the nipple into the main powder charge.

Using such caps to detonate bombs or hand grenades was not easy because caps will only fire when they strike with a sharp blow on something hard. The Walsall bomb caps were set on the base, which on the original design was thicker than the rest of the casting, presumably in the mistaken belief that the heavier end would fall first and the caps would hit the hard ground. In fact weight makes no difference to the speed of falling, as famously demonstrated by Galileo, and a heavy base cannot affect the angle at which anything falls. In any case the conspirators' design failed to make the base much heavier – it only just outweighs the thicker metal round the screwed top hole, and the centre of gravity is barely 5mm below half way down the bomb. Newspaper reports of the magistrate's court proceedings show that there was some discussion about which was the heavier end, and whether the core could be raised or lowered at will, but the context in which the matter was raised does not appear.

Uneven weighting was not an original idea of the Walsall conspirators. It is mentioned in an article of 1885 in the American anarchist journal *Alert!* translated by an anonymous 'A.A.' from the German in the journal *Freiheit* edited by Johan Most, an anarchist active at different times in England, America and on the continent. It is not unlikely that whatever instructions Battola's sketch followed went back to the same source as that of this article. The *Alert !* article also admits that successful cap-fired bombs had caps on every surface so that one would strike on whichever side the bomb fell. It mentions as an example the bombs used by Count Orsini, an Italian revolutionary who in 1858 had killed several people in an unsuccessful attempt to assassinate Napoleon III.

Hand grenades used in the American civil war 30 years earlier, as described by collectors and enthusiasts on the internet (*eg* http//armscollectors.com/mgs/grenades!.htm) were either spherical, sometimes in a double shell, and completely covered with caps, or had a long wood, cardboard, or cloth tail, creating enough air resistance at the rear to keep them steady when thrown so that a single cap on the nose would strike the target. Even so they were not very successful and were rarely

used. Hand grenades were rarely if ever used by the late Victorian British army (Hall 2004), and Ford stated that he had no personal knowledge of bombs fired by percussion caps, although he had heard of those used by Orsini. Later hand grenades, by the time of the 1914–18 war, used time fuses instead of caps.

The author's bomb castings, thrown from 7 or 8 metres on to the ground, over-arm, under-arm, upwards or level, at different angles, and with or without any attempt to spin them, invariably tumbled in the air and landed on their base less than three times out of ten. They occasionally fell on the top point but on their sides most of the time. There was no discernible difference between the behaviour of the two castings of different weight and internal shape.

At the trial in Stafford, Chief Constable Taylor of the Walsall Police testified that he had fitted a bomb with nipples and percussion caps and with a wooden plug instead of the brass one. He had shown this bomb to Ford, and then tested it (presumably without an explosive charge) by throwing it in various ways on the road outside Walsall, including bowling it like a cricket ball. He reported that at least one of the three caps had fired in 18 out of 20 tests, *ie* 90% detonation. In view of the problems noted above this result is surprising.

So the surviving bombs pose two unanswered questions: why the police redesigned the internal shape and thickness of the castings, and how they were able to report a high detonation rate despite the problems of using percussion caps at one end of the bomb.

The larger core would have held more explosive, but Brown's electrically detonated bomb on February 6th had already shown serious destructive potential with less than a full charge. On that same day Frank Bullows had testified in the magistrates' court, when describing how he made the good castings, that the foundry had 'had no instructions to alter the core at all.' Brown must therefore have tested a casting to the original design. A bigger blast later on would have served no useful purpose. The thinner casting wall by itself would not have affected the detonation, as caps can be used through metal thicker than the 11mm base of the original design (Bonney 2004).

One can speculate that perhaps Taylor achieved his result by putting caps on every surface, which might have been easier to fit on castings of uniform thickness. Or he may have retained the three caps in the base, but fitted the bomb, like the American grenades, with a streamer or tail on the other end, which could easily be attached through the small hole through the screwed cap (Bonney 2004). A strip of cloth 80cm long and 15cm wide wired onto either of the authors' castings through this hole ensured that they landed on the base every time. A lighter casting might then have been needed to allow it to be thrown far enough despite the added air resistance of the streamer. More simply, Taylor may just have falsified his results, although he testified that he was assisted by a colleague who would have to have been either deceived or implicated.

Both Taylor's career and that of Chief Inspector Melville depended on gaining a conviction in what had become a highly publicised case. They both had a strong incentive to produce persuasive evidence of the bombs' potential to inflict damage. It is not impossible that to do so they altered the design of the bombs that were tested, or falsified the results of those tests. Melville was said to have 'the habit of bending the rules' (Wood 2002) and Taylor was later dismissed 'on account of his conduct'– details not specified (Anon, UAW22 Walsall Local History Centre). In either case it is not surprising that nothing was said in court: if the defence had known that bombs to the original design did not explode they could have argued that their clients were innocent of possessing 'explosive substances', although not perhaps innocent of conspiracy.

All of this can only be conjecture. There is no direct evidence of any falsification, and there may be unreported but altogether innocent reasons for the use of the second core box and for the apparently unexpectedly successful detonation results. In the event Melville and Taylor were well rewarded, Taylor by a cheque for £50 (his starting salary a few years earlier had been just £230 per year) and Melville by a diamond pin from the Tsar and a continuing successful career in the Special Branch – he is reputed to have been the origin of 'M' in Ian Fleming's James Bond stories (Wood 2002, Cook 2004).

Conclusion

Despite the unanswered questions, the physical evidence and trial reports leave no doubt that the principal conspirators, whether or not victims of a police trap, were guilty of trying to make bombs for terrorist purposes. They were not however very competent. The design of the bombs, and of the patterns and casting method used to make them, is technically inept, showing ignorance of foundry methods and elementary ballistics. More competent terrorists would have recruited someone with technical experience and briefed the pattern-makers

more carefully. The questions surrounding the detonation results and the second core box suggest that the conspirators' design might not have worked at all. This technical incompetence was matched by the disorganized way in which they set about trying to get the pattern made. Their carelessness with incriminating material, including Charles' loaded pistol, the plaster model, the written instructions and the anarchist propaganda left openly for the police to find, shows that they had no realistic sense of security.

This incompetence might support those who argue that the conspiracy was not genuine, but led by an *agent provocateur* on behalf of the police, whose object may just have been to incriminate the accused, with no intention of ever making an effective bomb. On the other hand there is no firm evidence for this kind of deception, and real anarchist terrorists were operating throughout Europe at the time. Men with backgrounds like those of Battola, Cailes and Charles might well have wanted to make bombs in England, either for use elsewhere or in this country.

In either case one can only doubt the ability of this particular group to actually build a working bomb, let alone to carry out a successful terrorist attack.

Acknowledgements

Mr H Alexander at the National Archives for locating original photographs and records; Ms R Barker and others at the Walsall Museum, for permission to study the bomb in their collection, and for information on their 1992 centenary exhibition; Lt Col N Bonney of Brunel University, and Mr N Hall of the Royal Armouries, for information on Victorian explosives, weapons, and detonators; Ms E Harper and Professor P Howard for comments on an early draft; Mrs S Harper for preparation of illustrations; Mr C McCombe for details and photographs of the tub moulding process; Mr B Roberts, organiser of the 1992 Walsall exhibition, for valuable recollections; Professor B Porter whose article initiated this investigation; Ms R Vyse and colleagues at the Walsall Local History Centre for help with accessing their collection; the staffs of the British Newspaper Library and the Birmingham Central Library for help with consulting contemporary publications.

Appendix 1: Relevant foundry terminology

Table 2 lists the meanings of some of the special terms used in the foundry. Note however, that some of these may have, or have had, different meanings in other foundry processes or in other industrial regions.

Table 2: List of some technical terms used in the foundry

Term	Meaning or description
Model (N.B. Modèle in French means pattern)	Three dimensional representation of an object for prototype or design. Not used in production.
Casting	Metal product made by pouring molten metal to solidify in a shaped mould cavity.
Pattern	Form used to make a mould cavity. Patterns can be of wood, plaster, or metal.'Pattern Equipment' also includes core boxes.
Mould	Sand rammed round a pattern, which is then removed, leaving a cavity of the required shape.
Mould joint	The joint plane between two half moulds
Moulding box	Metal frame in two halves holding the sand which is rammed round one or more patterns.
Core	Separate piece of hardened sand forming hollow or undercut shapes impossible to make by stripping a pattern directly from a mould.
Core box (or Core stick, or Core matrix)	Part of the pattern equipment whose shaped cavity is used to make cores.
Core print (or tenon, or bearer)	Part of a core not forming part of the casting shape but used to hold the core in the mould. Term also used for that part of the core box, of the mould cavity, or of the pattern that makes or holds the core print.

Appendix 2: Tub moulding

Examples of tub moulding in progress are shown in Figures 8 and 9, photographs taken some years ago in a Birmingham brass foundry, one of the last few shops to use tub moulding

Figure 8: Photograph of the moulding operation in a Birmingham brass foundry, In the foreground a half-mould shows the pouring basin at the front, runner bar and mould cavities for several castings, some with cores already in position. Behind, the moulder is working on the other half-mould, tapping on the half-embedded patterns to loosen them before stripping from the sand. Photograph by, and by courtesy of, C McCombe

Figure 9: Photograph taken in the same foundry as Figure 8, showing the pouring of metal into the mould. The moulds are closed and clamped together and are standing on their ends to receive the molten brass, in this case from a crucible. At Bullows' the iron was melted in a larger cupola furnace and would have been poured from a ladle with a handle at the side. Photograph by, and by courtesy of, C McCombe

References

Unless otherwise specified, references to evidence or statements made in court are not noted individually in the text, but are taken from press reports of proceedings as shown in Table 3.

Table 3: List of references (all dates are within the year 1892)

Testimony or statement		Court Proceedings		Press Reports		
		Walsall Magistrates	**Stafford Assizes**	**Walsall & South Staffs. Observer**	**Birmingham Daily Post**	**The Times**
		Date			**Date**	
F Brown	Electrical engineer	29 Jan 3 Feb	1 Apr	30 Jan p5 6 Feb p3	30 Jan p5 2 Apr p5	2 Apr p8
F Bullows	Foundry manager	3 Feb	30 Mar	6 Feb p3	4 Feb p5 31 Mar p5	31 Mar p8
J Deakin	Accused (16 Jan statement)	Cited 21 Jan	Read on 31 Mar	23 Jan p7	22 Jan p4 1 Apr p7	1 Apr p8
W Ditchfield	Accused	29 Jan	31 Mar 1 Apr 2 Apr	30 Jan p5	2 Apr p5 4 Apr p7	1 Apr p8 2 Apr p8 4 Apr p7
A Ford	Home Office explosives expert	9 Feb	31 Mar		10 Feb p7 1 Apr p8	10 Feb p11 1 Apr p8
J Melville	Chief Inspector, Scotland Yard	9 Feb 15 Feb	1 April		10 Feb p7 2 Apr p5	10 Feb p11 2 Apr p8
B Ross	Pattern-maker	4 Feb	30 Mar	6 Feb p3	31 Mar p5	31 Mar p8
T Ross	Brass founder	4 Feb	30 Mar	6 Feb p3	31 Mar p5	31 Mar p8
C Taylor	Chief Constable, Walsall Police	13 Jan 15 Jan 21 Jan 30 Jan Feb 15	30 Mar 31 Mar	16 Jan p5 23 Jan p7 30 Jan p5	16 Jan p8 30 Jan p5 31 Mar p5 1 Apr p7	31 Mar p8 1 Apr p8
J Westley	Accused		2 Apr		4 Apr p5	4 Apr p7

Notes: J Battola, V Cailes, and F Charles did not give evidence. J Westley did not give evidence in Walsall. A printed version of J Deakin's written statement of 16 Jan 1892 is in the National Archives, TNA(PRO) ref HO144-242, with copies in Walsall Local History Library, file UAW 22.

Bibliography

Contemporary

National Archives (Public Record Office), TNA(PRO) ref. ASSI6/27 includes photographs of exhibits, documents, indictments and depositions, made at Walsall Magistrates Court for the Stafford Assizes, 15 Feb 1892.

National Archives (Public Record Office), TNA(PRO) ref.HO 144-242 Home Office papers on the prosecution of the Walsall conspirators.

National Archives TNA(PRO) ref. HO 144-243, Home Office papers on the arrest of Cavargna A.

National Archives TNA(PRO) ref. HO 144-292, Home Office records on the unsuccessful appeal.

(N.B. Copies of many of the above and other documents are in Walsall Local History Centre, file UAW22).

Inventory for the executors of Alfred Bullows, 1890, Walsall Local History Centre, Accession 595.

'A.A, The Terror of Tyrants', *Alert!,* Chicago, May 2 1885, translated from *Freihiet,* ed J Most, cited as exhibit 044 in www.chicagohistory.org/hadc.

Nicoll D J, The Walsall Anarchists, [London 1894], reprint Kate Sharpley Library, London 2004.

Press Reports of police and legal proceedings (see reference table above):

The Birmingham Daily Post 9 Jan – 16 Feb, and 31 Mar – 5 Apr 1892;

The Daily Graphic, 22 Jan, 1 Apr, 2 Apr, and 5 Apr 1892;

The Times 16 Jan – 10 Feb, and 31 Mar – 5 Apr 1892;

The Walsall Observer and South Staffordshire Chronicle 16 Jan to 10 Feb 1892.

Subsequent publications

Conrad J 2000, *The Secret Agent,* (London).

Cook A 2005, *M: MI5's First Spymaster,* (Stroud).

Heaven A 1996, '19th century anarchy in the UK', *Express and Star, Walsall Edn,* 14 Mar 1996, p 6.

McCarty N, 2004, *The Walsall Boys* Radio play, The Saturday Play, BBC Radio 4, 31 Jan 2004.

Oliver H 1987, *The International Anarchist Movement in Late Victorian London* (New York), 77–112.

Porter B 2003, '9/11…1910', *History Today,* November 2003, 54.

Quail J 1978, *The Slow Burning Fuse* (London), ch 6.

Roberts B 1992, '*The Walsall Anarchists' Bomb Plot of 1892'*, Booklet and Educational Resource Pack, Walsall Museum & Art Gallery.

Taylor E 1976, 'J. Deakin', in Bellamy J and Saville J (eds), *Dictionary of Labour Biography* (London)

Thomas M 2004, 'Nobody telling us what to do: Anarchist schools in Britain 1890–1916', *Historical Research,* 77, No 197, Aug 2004, 415–417.

Wood E T 2002, *War on Terror* (Cambridge).

Unpublished Sources

Anon, *History and development of the Walsall Police Force,* File UAW22, Walsall Local History Centre.

Barnsby G, The *Walsall Anarchist Bomb Plot 1891–2*, typescript, Walsall Museum, 1992?

Bonney N, Personal communication on grenades and explosives, December 2004.

Calcutt D, *The Fall of Joe Deakin*, Typescript for Radio play, unpublished, Walsall Museum, undated.

Hall N, Personal communication on Victorian Weapons, December 2004.

McCombe C, Personal communication on tub moulding, January 2004.

The author

John D Harper MA, C Eng, FICME, is descended from two 'Black Country' iron foundry families, the Harpers and the Bullows. From the latter he inherited the two bomb castings referred to in this study; Frank Bullows, who is mentioned in the text, was his great uncle.

John Harper studied metallurgy at Cambridge and in foundries in the UK and abroad, and worked in and directed John Harper & Company from 1957 to 1979. He then became a foundry consultant with Geoffrey Lamb Consultants Ltd, and later a technical manager in the World Bank's International Finance Corporation. Since retirement, he has taken a post-graduate course in history at Birkbeck College in London. He has been a member of the Historical Metallurgy Society since 1966.

Address: 143 East Beach Road, Selsey, West Sussex. PO20 0HA