

JACOB'S WELLS BATHS

Jacobs Well Road, Bristol

APRAISAL OF THE WATER SYSTEM

April 2024 Revision 1

THE PATERSON ENGINEERING COMPANY, LTD.

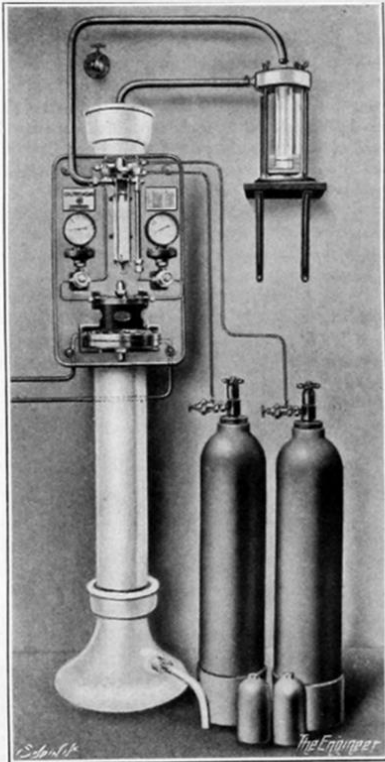


FIG. 29—AUTOMATIC CHLORONOME—PATERSON

Pure Water

The Paterson system of water purification for industrial purposes produces a soft, clear, colourless water from the most unpromising source of supply at a minimum cost of treatment and attention.

Instal "Paterson"

**WATER FILTERS
WATER SOFTENERS
EXHAUST HEATERS
OIL ELIMINATORS**

WRITE FOR THE PATERSON "RED BOOK"

THE PATERSON ENGINEERING CO. Ltd.
74 WINDSOR HOUSE, KINGSWAY, W.C. 2.

A Report prepared for:
Emma Harvey, Trinity Community Arts Ltd
Trinity Centre, Trinity Road, Bristol, BS2 0NW

G.J.O. Wallis C.Eng. MIMech.E Engineering Consultant
www.gwconservation.com

SUMMARY

This preliminary report outlines the technical development of Jacob's Well Bath' water system and identifies, as far as possible with no current access, the sources of the springs which supplied the Baths, and the route of the water into the building.

The three cast iron storage tanks were surveyed from a distance from above and below, and their external condition is described where visible.

Historic drawings and a knowledge of traditional materials and construction have been used where possible to interpret the modest quantity of pipework that survives, most of which is in the boiler house or in the chambers around the sides of the pool.

Brief descriptions are provided of other metal features in the boiler house some of which are of historic interest.

Owing to limitations on access, the presence of debris and poor lighting this report is inevitably preliminary, so the next steps are identified the final section.

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APPENDIX: BRO Yellow Label Plans-36_1 [1] and [2]

High-definition photographic copies of two large, fragmented, original drawings supplied by Bristol Record Office.

Six images totalling 547 MB are supplied separately.

BRO Yellow Label Plans-36_1

Two drawings of the 'Paterson Continuous Bath Purification Plant' date 1929 and 1933.

Low definition extracts of these drawings are included in this report. Please refer to the Appendix for additional clarity.

1.0 INTRODUCTION

Preliminary surveys of the Baths and emergency repair works funded by historic England were carried out in the spring of 2024. As part of these Geoff Wallis (GW Conservation) was instructed by Trinity Community Arts Ltd to carry out a preliminary survey of the water tanks and extant pipework in the boiler house.

A MEWP gave access to view the roof of the tanks from a distance but these have not been inspected fully from above or below. Access to view pipework and other structures in the boiler-house was limited by the presence of asbestos, significant quantities of rubbish and debris, and poor light.

No floorboards were lifted, panels removed or opening up carried out so some historic pipes are likely to be found as restoration proceeds, and should be surveyed as soon as they become accessible.

Historic drawings in Bristol Record Office were researched by the author, but secondary sources including those referenced below have been quoted extensively, supported by site survey. The copyright of the authors is acknowledged.

References: For a history and description of Jacob's Wells Baths please refer to:

- Judy Goldsmith's *Jacobs Wells Baths* published in the Baths and Wash Houses Historical Archives.
- *A Brief History of Jacobs Wells Municipal Baths*, by John Parke.
- *Historical Study of the area known as Jacobs Wells, Clifton, Bristol, England, from pre-expulsion to modern times*. Julian Lea-Jones, July 1998.
- *Transactions of the Bristol and Gloucestershire Archaeological Society*
Jacob's Well, Bristol: Mikveh or Bet Tohorah? by J. Hillaby and R. Sermon 2004,
Vol. 122, 127-152

The assistance of the following is gratefully acknowledged:

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Mary Milton, Archives Officer, Bristol Record Office
Alan Roberts, Bristol Community Dance Centre
Hendy Construction

2.0 TIMELINE

The references above and others sources provide the following Timeline.

1846 The Baths and Washhouses Act enabled provision of public baths including open air swimming baths. Act amended 1878 to encourage covered swimming pools for health exercise and leisure.

1849 Broad Weir Baths, Bristol, opened . Jacob’s Well Baths were planned to be bigger and more commodious.

1850 Bristol “Report to the General Board of Health” a Hotwells resident, Mr J Hyde, commented;

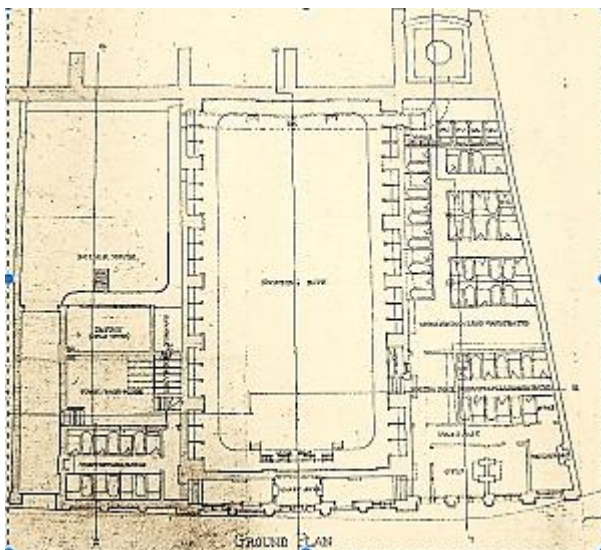
“I also beg to say there is a considerable quantity of water running to waste through Jacob’s Well, that may, with a moderate outlay, be used in a public bath, similar to the one now erecting at the other end of the city” (in Broad Weir).

1863. Report that ‘..there is an open dipping place at Jacobs Wells, Woodwell Lane, which has plenty of water’.

1875-7 The proposed new Hotwells hot baths were to serve the populous wards of St Augustine and Clifton-Hotwells. They were close to Jacobs Wells Industrial Dwellings, built without bathrooms or even gas inside the flats for the working poor, many of whom worked in Bristol docks.

1876 Plans for the baths were well under way. An offer was made for the land on 20th March 1877.

1879, April. Plans submitted to the Baths Committee by Josiah Thomas., and unanimously approved.

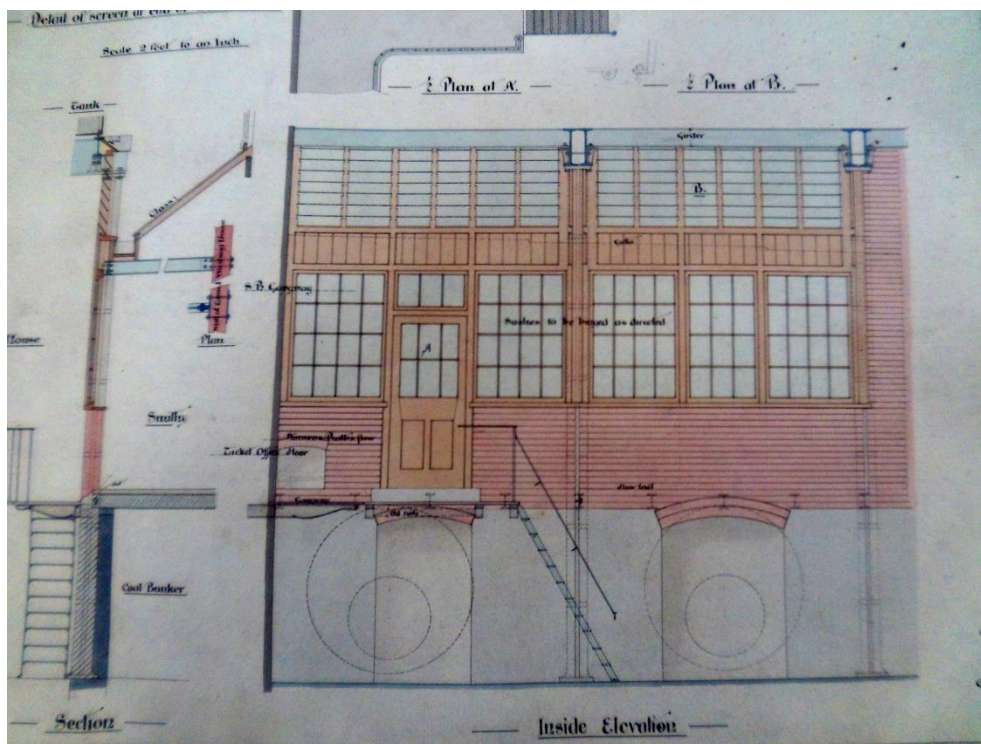


1886. Original tender of £15,170 by A. Krauss, builder was reduced to £7,140 and accepted, as was the tender of Sampsons engineer at £1,090. For mechanical work W Fraser's tender was accepted.

1886 The Dean and Chapter of Bristol Cathedral offered the spring water for the use of the baths at a nominal rent, to be used together with the Water Company's supply. Springwater was fed by gravity through the old Cathedral Pipe, the Abbey Conduit, at the junction of Constitution Hill. This conveyed fresh spring water from the bottom of Brandon Hill, with a ball valve system controlling the flow to the tanks.

Terry Gardiner reported that the springs produced 60,000 gallons per day. (Page 28, John Parke).

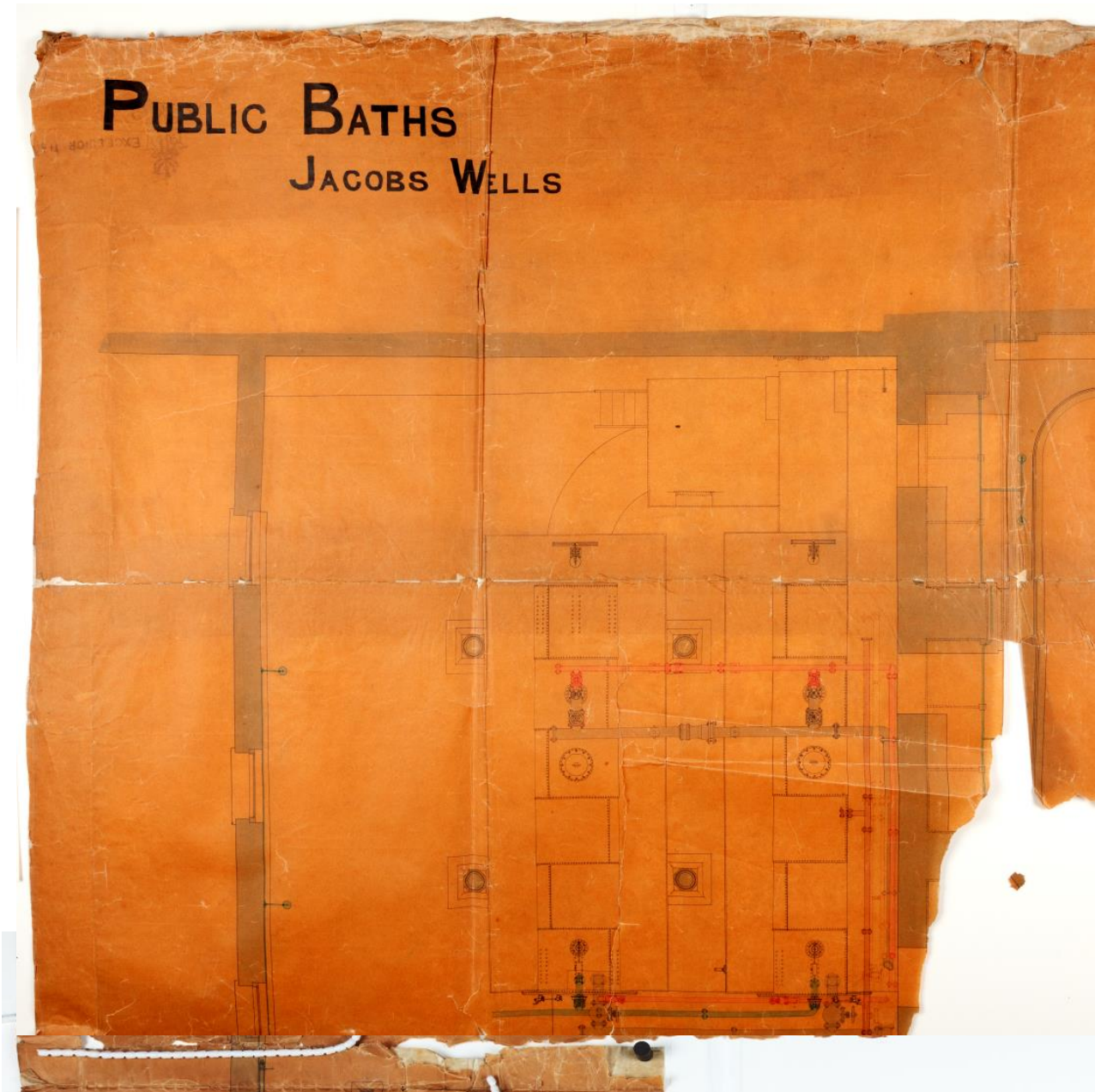
1888 Sampsons engineer added £849 for a tank to store the spring water.



An original elevation drawing viewing the ventilated screen and the stairs to the smithy from inside the boiler house also shows the location of two the boilers in outline.



A view of the windows on the south elevation of the boiler house before being boarded up. The boiler house must have been well-lit by natural light. Photograph: Mike Britton 2016.



This original plan of the boiler house shows two single furnace ‘Cornish’ boilers with riveted shell-plates. The flues and dampers can be seen at the west end, and mid-way along the boiler, man-hole covers allowing entry to the boilers for inspection, cleaning and maintenance are visible.

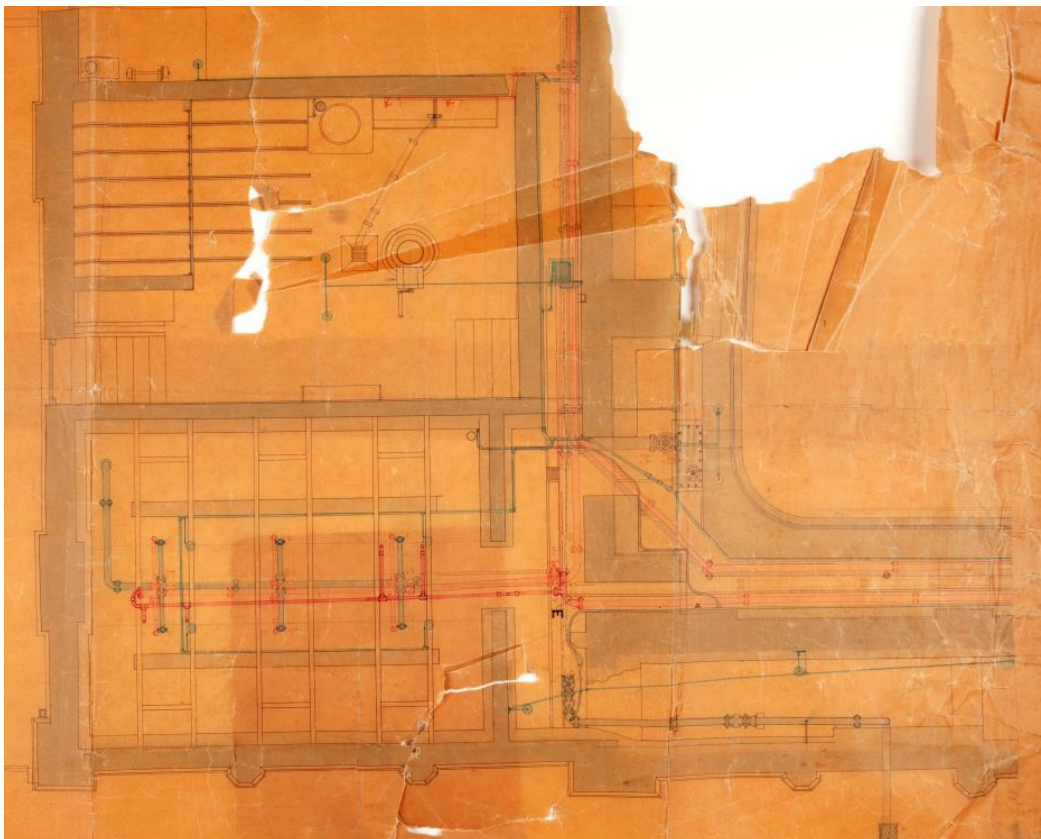
There appear to have been two water circuits: a high temperature flow and return for showers and baths drawn in red, and a lower temperature circuit to and from the pool. The supplies are taken from the top of the boiler mid-way along it, and the returns are at the front end (bottom of the image), probably at mid height in the lower half of the circular boiler front-plate.

At the east end can be seen cold water feed pipes, pressure-relief valves, and gauge-glasses which showed the level of water in the boiler.

Details of these fragmented drawings may be seen more clearly on the high-definition photographs of the original drawings in the Appendix.



The bricked-up entrance to the horizontal flue can be seen on the west wall of the boiler house



Pipework detail for six women's hot baths and the towel wash house. For a higher definition image please refer to the Appendix.

These incomplete fragments of drawing show the hot and cold supplies to the mens' facilities to the north of the pool. (See also a higher definition image in the Appendix)



Some early, probably original, cast iron pipes survive in the chambers to the east, south and north of the pool, but limited access prevented a full survey.



This photograph from Bristol Community Dance Centre archives shows the chimney.

The chimney stack was 120 feet high, in a gap between two hillsides, Cliftonwood Slopes and Brandon Hill.

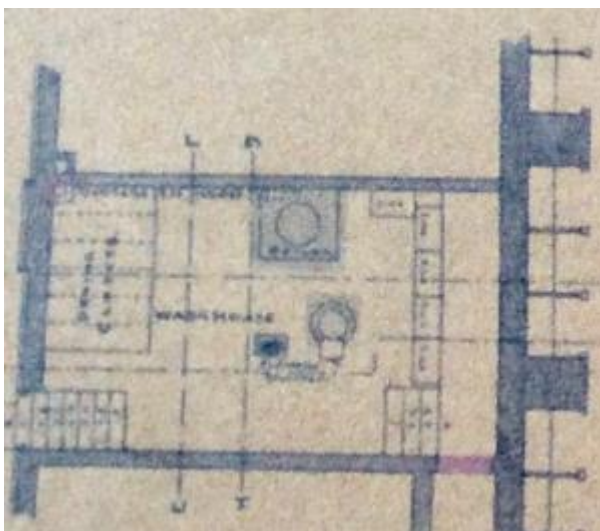
Shortly after 2006 it was reduced in height due to worries about stability in storms.

Judy Goldsmith reports that the rubble from the top of the chimney was dropped inside, and the top was capped, see below.



The pool was reported to be 80' long X 35' wide X 6 feet deep at the deep end and held 80,000 gallons of water. The Western Daily Press in Sept 1888 boasted;

“Considered to be one of the finest in the kingdom. The bottom and sides are of glazed brick and the building is exceedingly lofty and well ventilated.



(Left) Detail from a 1930 plan

The Wash House used to wash towels and hired bathing costumes. The plans show sinks, a coal fired boiler, drying closets on rails similar to ones in other swimming baths, steps up and down. In the centre may be a Victorian washing machine, with a crank handle. The wash-house was in the South wing separated from the smithy leading into the women's warm baths. Two extra sinks have been added since the 1880's layout.

1889 After long delays, City Surveyor Josiah Thomas' building officially opened, comprising:

6 First Class men's' warm baths, 18 second class,
6 women's' warm baths all of one class.
Waiting rooms,
Attendants' rooms,
Office and storeroom,
Towel washing room,
Boiler room and smithy,
Swimming Pool 80' long and 35' wide, 6 feet deep at the deep end, holding 80,000 gallons of water.

The Western Daily Press in Sep 1888 boasted;

"Considered to be one of the finest in the kingdom. The bottom and sides are of glazed brick and the building is exceedingly lofty and well ventilated."

1898, 14th May. Mr. Jones the boiler man complained of the long hours without relief, and asked for more money. Another man was appointed at a guinea a week.

1900 The spring water was tested as plates in the boilers were corroded. Water tanks were occasionally cleaned to improve the condition of the spring water held in them.

1891 Boilers and water pipes within the boiler house were protected by Bells Asbestos.

1892. the pipe bringing water from Jacob's Well was leaking. This occurred again in October 1900.

1892, 11th April. A disgruntled client investigated smoke in the Baths, and writes to the Bristol Mercury:

"the boiler room was completely enveloped in smoke, whilst the large amount of sulphur was most unendurable. On opening the furnace doors, I found that the fires were almost devoid of flame, and on stirring the coals, dense volumes of flame and smoke came out of the fire grate doors with such force as to drive me back from the boilers". He demanded a refund.

1896, June. Staff payroll was p.a. 1 Engineer £90, 1 Stoker £ 55, 2 Bath Attendants £10, 2 Swimming Attendants £55 + £25, 2 Cash Takers £60, 1 Laundry Attendant £30, 1 Towel Washer £25 ,

1905 The three historic Jacobs Wells Springs, at the bottom of Constitution Hill and Gorse Lane, were diverted into the baths adding to the original supply. (See above).

1912, 4th April. Contract with Mereweather and Sons of Bedminster to supply and install a new 3 inch diameter cast iron water pipe down Jacob Wells Road for £144 15s. It was to replace a pre-existing pipe running from the 'conduit chamber' down to an unspecified point where it was to be connected to an existing pipe. The agreement and specification may be found in Bristol Record Office under BA/03977.

1921 Coal strikes meant consumption halved and stocks were down to 4 weeks supply. Electric lighting was installed in the 1920's, and a hot shower in 1927.

1929. Cornish boilers replaced with two coal-fired Lancashire boilers, which were scrapped when the baths closed. The boilers are described by Judy Goldsmith as 'circulation type'.

1933-4 A Paterson water purification plant was installed to circulate and purify all the water every 4 hours. Please see **Section 5.0** and the Appendix of this report for drawings of a 'typical' plant, although this doesn't represent the actual Baths installation accurately..

1933 Bristol Corporation Baths Brochure (held at Bristol Archives) still stated:

"The outstanding attraction of Jacob's Wells Baths is that the physical benefits of swimming as an exercise are enhanced by the fact that the greater quantity of water used is obtained from two natural springs, rising on Brandon Hill, known as Jacob's Wells Springs, the tonic and medicinal properties of which have long been recognised. This water, which is of a consistent quality and clarity, is conveyed to the Baths and stored in large-capacity tanks. Bathers at Jacob's Wells, therefore, obtain the benefits usually associated with expensive treatments at English and Continental Spas."

WW2. Bristol Waterworks Company made arrangements for emergency drinking water supplies with a temporary connection with the spring water supply to the baths.

1959. A hydrotherapy unit, called a "Mini Turkish Suite" was built, replacing 1st class hot baths with Aerotone, steam cabinets, showers and Zotofoam. This was a foam created by bubbles blown up through the base of a hot-water bath causing the occupant to perspire. One or more compressors would have been required to provide compressed air.

1960. An ambitious and modernising young Assistant, Thomas Mogg, a former marine engineer, was employed, and took over as Baths Superintendent two years later. Thomas Mogg supervised repairs to the spring water supply and settling tank chamber at the bottom of Constitution Hill in 1963 and 1973 to keep supplies clean and flowing.

1967. Thomas Mogg produced a report on the costs of hand and mechanical stoking of coal, compared with oil and gas firing of the boilers. He recommended converting the boilers to oil firing.

1977. The building was closed and Listed Grade 2 by English Heritage, (now Historic England). The 1929 boilers and 1932-3 filter plant were sold for £600 scrap.

1981 The Bristol Dance Centre Project was granted a 30 year lease, and despite Grade 2 Listing got rid of the slipper baths. They re-used a pre-existing sprung hardwood floor from Bristol South Baths.

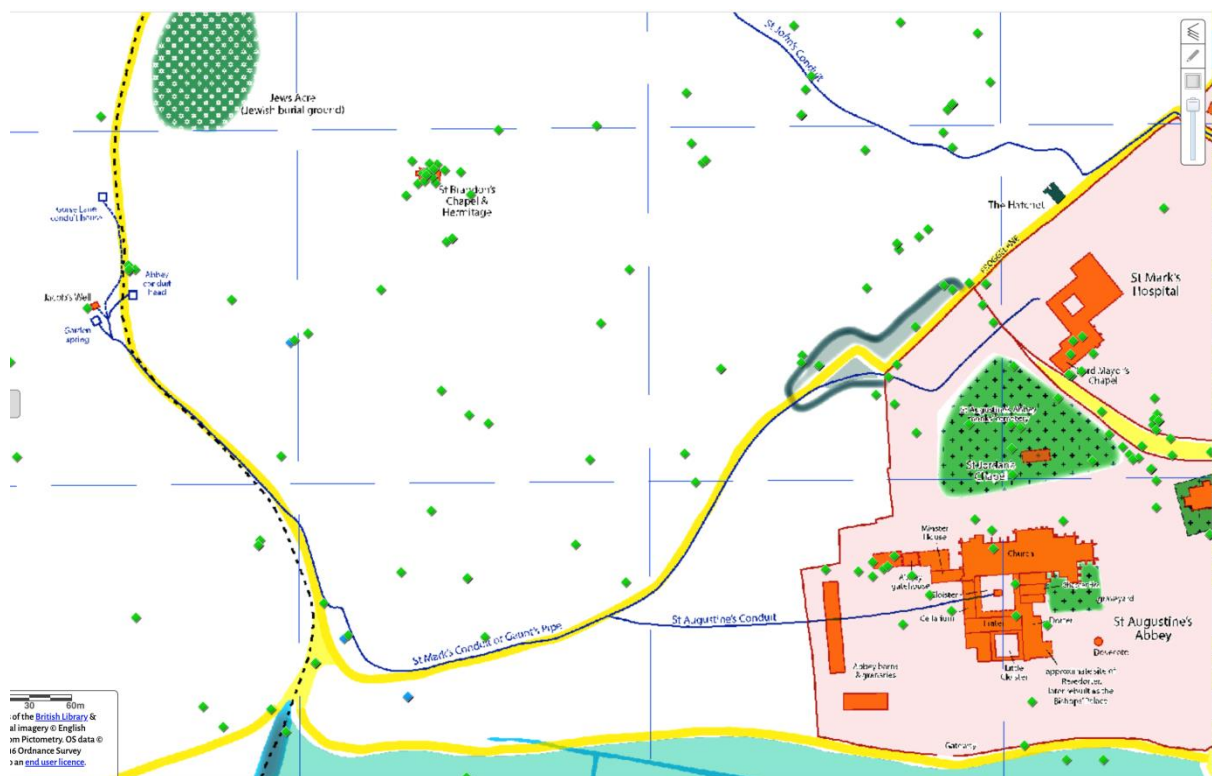
1984-6. A major refurbishment by architect Peter Ware 1984-6 provided showers, a heating system, changing rooms and a café in the North wing, while preserving most architectural features that were still left.

1987, 24th April. The Bristol Evening Post reports on a test to trace drains. *'In the middle of the road, midway between Brandon Hill Steps and the corner of Constitution Hill lies a manhole cover which leads to a 45ft long settling tank to which all the springs on Brandon Hill are fed. From here a cast iron pipe runs down hill to Jacob's Wells Baths.'* The report goes on to record how a dye test was carried out in the 1950's.

2016. The Dance Centre's lease was not renewed, and Artspace Lifespace took over as temporary tenants and continued to encourage regular dance use. On 15th October Jacobs Wells Community Hub opened up the building to immediate neighbours and the people of Bristol. They offered guided tours, a memory swap, a small heritage display and chance to comment on the future of the building.

3.0 SOURCES OF WATER FOR THE BATHS

This sketch from the British Library shows the conduits in the Brandon Hill area in the 1480's



Julian Lea-Jones in his *Historical Study of the area known as 'Jacobs Wells'* (1998) mentions:

There still remains today a short sealed-off section of tunnel near the junction of Jacob's Well Road and Gorse Lane beneath where a tunnel was driven into the hillside to tap pure water (which still flows today), and keep safe ownership of the source.

Freestone arched entrance to one length of tunnel with iron lugs on one of the jambs presumably at one time to take a door or grille for security. (Pages 9-10)

Subsequent pages describe chambers and tunnels discovered. On page 16 Lea-Jones states:

'With the provision of a municipal water system in the latter half of the nineteenth century, the system was given to the City and the lead pipes replaced by iron, and further chambers, settling tanks to remove the silt of sand, were installed or enlarged. A system of valves, taps and additional pipes were also added to lead water to the Bristol City Corporation's new public baths.

The Transactions of the Bristol and Gloucestershire Archaeological Society Volume 122 reproduces a plan of 1742 on page 144. It shows three springs and several cisterns supplying a main running southwards along Jacobs Wells Road. The 'reservoirin the

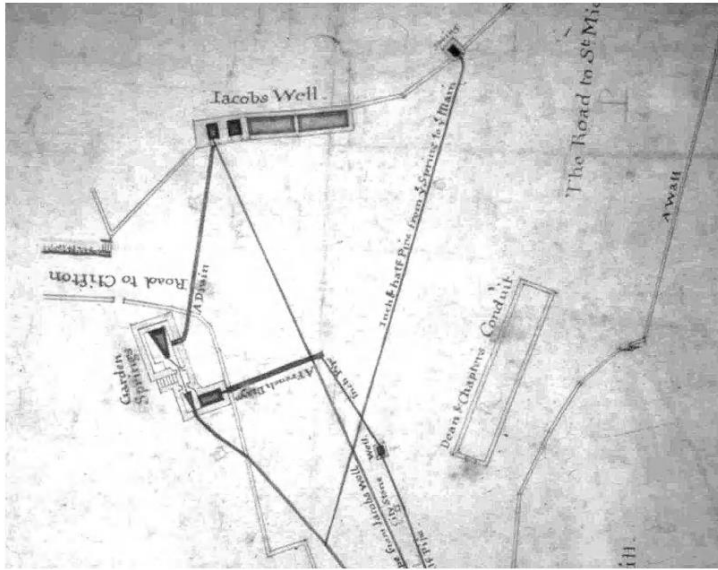


Fig. 8. William Halfpenny's plan of 1742 showing Jacob's Well and the dean and chapter's conduit (by courtesy of Bristol Record Office).

*middle of the road between Constitution Hill and the Clifton Police Station' mentioned by John Parke in *Jacob Wells Springs* (page 25) is also shown.*

John Parke continues:

'.....when the Corporation of Bristol built the public swimming baths at Jacob's Well, the Dean and Chapter of Bristol Cathedral freely granted the water of the spring for the use of the same. This gift, which by the way, is of considerable advantage to the civic purse, is thus commemorated on a tablet affixed to the wall of the swimming bath:

The use of the water of Jacob's Well was given by the Dean and Chapter for the part supply of these baths as long as it may be required for the purpose. 1888 '



This plan, said to date from 1887, shows different routes for pipes from those on the eighteenth century plan above, connecting to the old Dean and Chapter's Conduit.

The marking up may date from Thomas Mogg's tenure as Superintendent in the 1960's. The red ballpoint pen and paper additions indicate settling tanks or chambers and a spring-water supply at the bottom of Constitution Hill and Gorse Lane.

Further research of the City Council's archives, and other sources, may reveal the course of the cast iron main feeding the tank, and the culvert or drain that must still exist to carry the flow of the springs down Jacob's

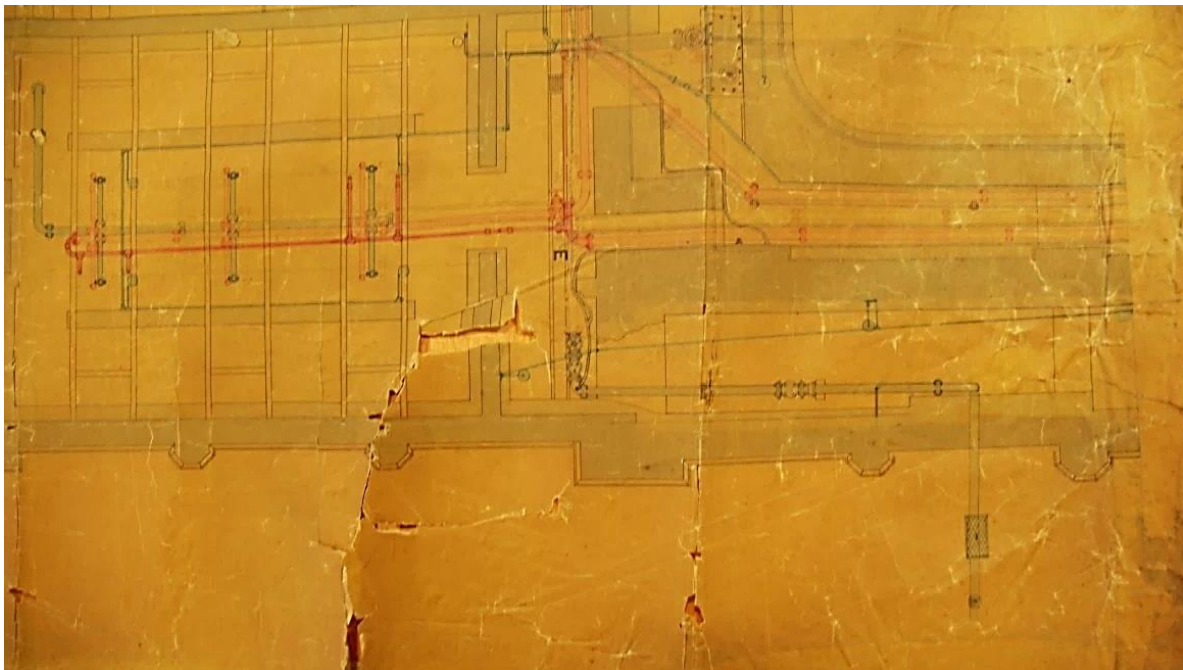
Well road to the Harbour.

The drawing below appears to show a pipe entering the building to the south of the main entrance via a chamber in the pavement on Jacob's Well Road which may have contained an isolation valve. There is still a manhole cover around this location, which should be lifted.

Immediately inside the building the pipe appears to rise and turn southwards to a fitting which may be a filter before continuing to the southern corridor where it turns westwards. Here another unidentified fitting is shown, adjacent to an isolating valve. The pipe's route thereafter is not illustrated but it probably ran to the header tank.

Inspection on site failed to find any trace of the original pipe which may have been removed when the floor in the corridor was lowered. However, spring water still flows to the header tank, but the route of the supply pipe is currently unknown.

The Baths are now connected to the mains water supply, which is believed to enter the building from Jacobs Well Road near the south east corner of the pool. This supply was probably considered necessary to assure the quality of the water, there probably being no control on the quality of the spring water.



4.0 THE TANKS



In 1888 Sampsons quoted for a tank to store the spring water. It is made of three individual tanks constructed of sections of grey cast iron bolted together. Plates are approximately 5/8 inch thick. No founder's name has been seen on the castings.

The three tanks are located above the boiler room, supported on 4 large cast iron columns 21' high , They stored spring water and were probably intended to settle out silt and sand, as well as providing bulk storage for filling the pool.

The tank is 48 feet overall by 30 feet, 6 feet deep. *"one of the largest tanks ever constructed, holding 60,000 gallons"* (Western Daily Press 26th April 1889).

The total calculated volume of a tank of these dimensions is in fact less than 60,000 gallons, and the pool held approximately 80,000 gallons of water so the tanks as installed would not have been capable of filling the pool from empty.

The tanks are roofed by corrugated sheeting nailed to simple timber trusses. Sheeting is in poor condition and has failed over about 10% of the eastern tank, 5-10% over the central tank and at least 60% over the western tank. Here the roof is covered by trees and established vegetation.

The tanks were inspected as far as access from a MEWP would allow. No vegetation or roofing sheets were removed, so the extent of the survey was limited, and the report on the tanks is preliminary. Further inspection is recommended when scaffolding is in place.



The three tanks are believed to be separated by a small gap, probably around 4 inches wide. Each gap is spanned by a cast iron gutter 18 inches wide into which the roofs drain. Both gutters are full of grass and it is not currently known how or where they drain.

All three tanks are full of relatively clear water. Rough measurement suggests that the westernmost tank contains 1.4 m depth of water, whilst that on the east is 1.2m deep. During the current survey it was not possible to establish how the three tanks interconnect or why the depth of water in them is different. It is probable that the surface of the water in the eastern tank now stands lower than its original level.



A live supply of spring water still enters the eastern tank. Its entry point was beyond the reach of the MEWP, but the arched cast iron pipe illustrated is believed to be the supply.

A steel pipe running horizontally from nearby is believed to be over-flow, but it is not known whether this is currently active.

Water in the eastern tank was found to be clear, and its bottom was virtually free of silt where dipped in four places. The western tank was dipped at two points and found to contain 50-100mm of sludge. The central tank was not dipped but is expected to contain some sludge.



In recent years the overflow pipe at the south eastern corner of the tank rusted through, and water overflowed into the masonry and thence to the adjoining car-park. In response to complaints from the neighbours, Bristol City Council appointed contractors who used an angle grinder to cut a rectangular drainage hole through the historic side plate and 'G' clamped on a steel chute at a level lower than the original overflow, about 7 m above



ground level. This delivers a continuous flow into a PVC hopper-head which is run via a rainwater pipe into the drains below ground.

The route of the drain is currently unknown but outside the boiler house entrance door spring-water in a brick-lined chamber runs continuously north to south through drains. A flanged cast iron elbow entering from the north west corner appears to have been a drain, but it is not known where any of these pipes run from or to.

The route of all drains should be traced before an attempt to drain the tanks is made.



Each tank was drained by opening a gate-valve which feeds into a cast iron hopper-head and downpipe attached to the south wall of the boiler house.

These connect to a horizontal iron & steel pipe which runs eastwards and down to a drain adjacent to the entrance door.

The east end of this pipework has been replaced in steel as

illustrated below, but the original cast iron drain pipe is still in place and probably connects



to a drain. Its route and the condition of the drain should be established before the tanks are emptied through these pipes.

It is possible that one or more of the existing gate-valves can be opened but this will require the services of a specialist metalworker and a scaffolding to each valve.



The condition of the tank's castings and cast iron pillars are good where visible, but the material is brittle and may contain unseen cracks.

The steel beams that support the tanks have corroded, but the extent is currently unknown.

Small areas of calcification provide evidence of past minor leakage, which may still persist.

5.0 HEATING PIPEWORK in the BOILER HOUSE

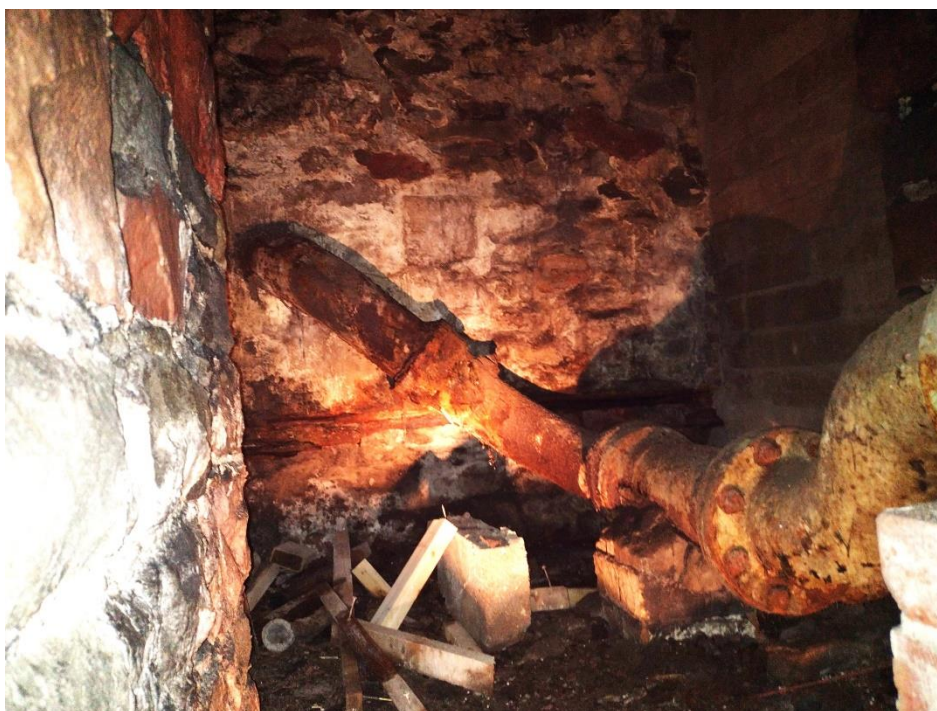
Common practise in the Victorian era was to use cast iron for large pipes and lead for the smaller ones. Cast iron pipes would be flanged and bolted together, or socketed and sealed with some form of rusting compound packed around the pipe inside the socket.

Lead pipes would be soldered together, usually with a build-up of solder applied semi molten and wiped into shape using a mole-skin.

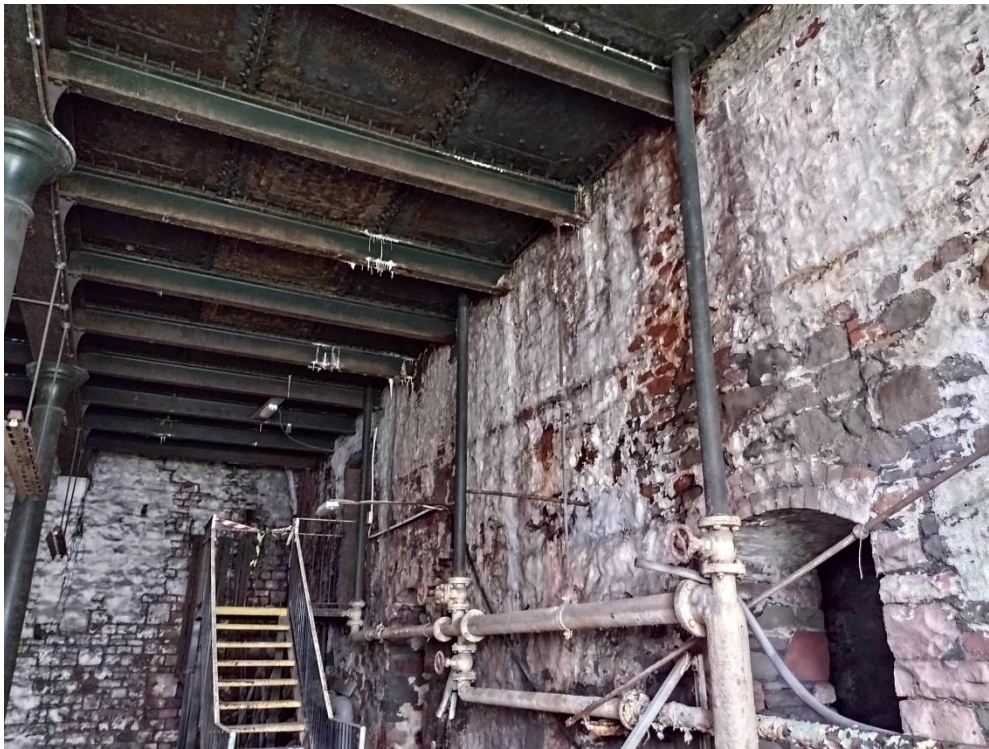
The Baths almost certainly originally contained both types of pipe, but lead being valuable and easily cut was often stolen when it became redundant.

In the early 20th century steel or ductile cast iron pipes with flanged or threaded joints came into use for large pipes, and copper with soldered or compression-fitting joints for smaller ones took over from lead. Later in the century PVC with glued socket joints became common.

At JWB all these materials survive, although few lead pipes have been found so far. The material and jointing techniques are fairly reliable indicators of Victorian plumbing, but can be unreliable when used to date 20th century pipework.



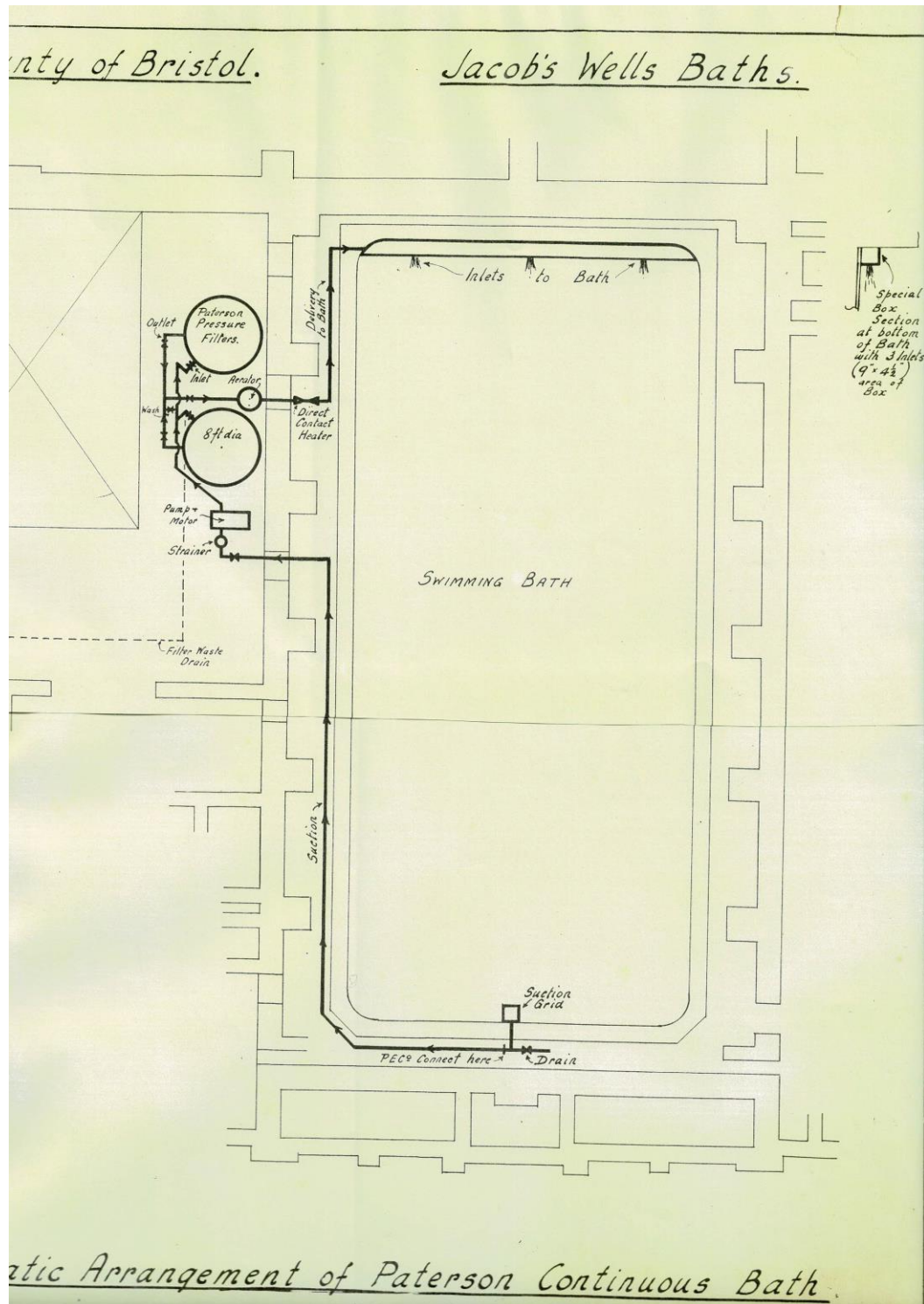
The photograph above shows the original cast iron pipe that supplied warmed water to the pool. A cast iron elbow turns the pipe horizontal to a point where a later steel or ductile iron pipe has been bolted on, now connected to the outflow of the calorifier, see photograph below. The large steel pipes in this area may date from Paterson's installation of 1933-4, see pages 22 ff.



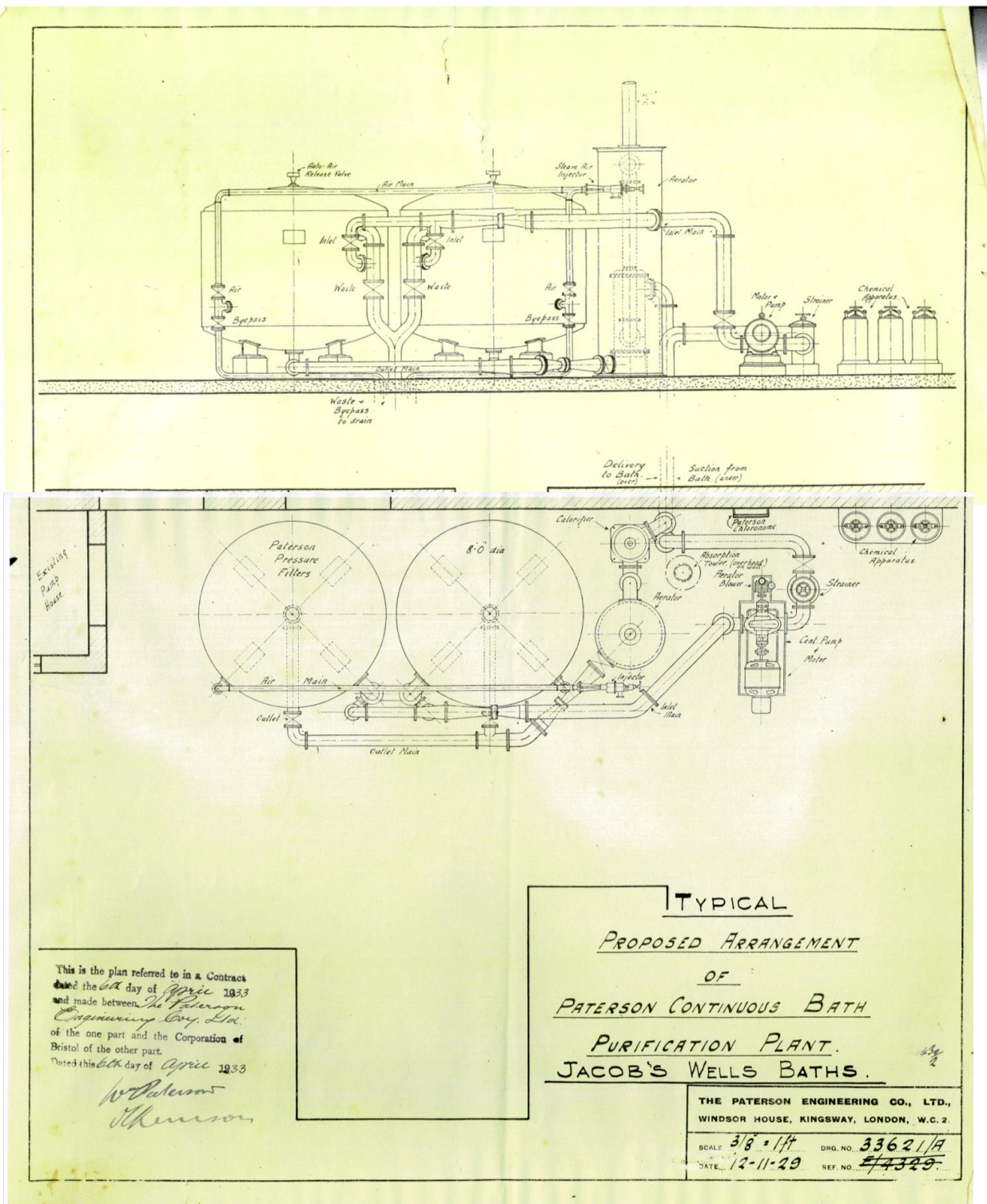
In the upper photograph the three vertical cast iron pipes carry water from each tank down to a common horizontal main via stop valves. From the centre of this main a smaller pipe runs eastwards, either to drain or to a currently-unknown destination.

The large vertical pipe running down from the east end of the main may have supplied Paterson's System, as described below. Nothing of Paterson's installation now survives.

General Arrangement of the **Paterson Continuous Bath Purification Plant**. The following drawings from Bristol Record Office are dated 1929 and 1933. An impressed stamp refers to a contract dated April 1933.



The drawing below is marked 'Typical' and shows Paterson's standard arrangement. At Jacobs Well Baths the connecting pipework appears to differ from the drawing, but it may be assumed that the equipment installed in 1933-4 was more or less as illustrated.



The Paterson Engineering Co Ltd of Windsor House, Kingsway, London, WC2, appears to have been founded in 1902 by William Paterson, and according to Graces Guides (www.gracesguide.co.uk) was at their Kingsway address by 1917.

They were also recorded as having an office at Temple Chambers, Calcutta, India.

Graces Guides offers the following timeline for Paterson Engineering Co. Ltd.:

1917 Advert for water purification filters, softeners etc

1955 Death of Sir William Paterson, founder of the company

By 1956 was a subsidiary of Portals Ltd

1956 Acquired Metafiltration Co Ltd from Vokes

1957 Acquired Houseman and Thompson and also Vacuumatic Ltd, maker of paper and bank-note counting machinery, from the parent company

1963 Merged its export interests with Candy Filter Co; new company formed to handle this business - **Paterson Candy International Ltd**

1966 the Stellar Filter Division was merged with Metafiltration Co in a new company Stella-Meta Filters

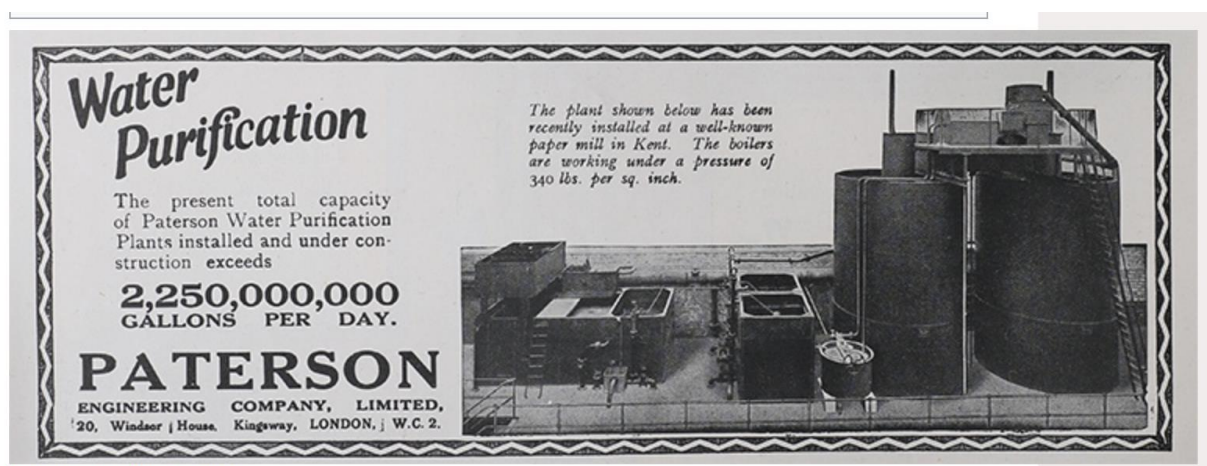
1974 **Paterson Candy International** was one of four British water treatment companies that had close research contacts with the Atomic Energy Authority at Harwell in relation to the physical properties of semi-permeable membranes for the osmosis process.

1981 **Paterson Engineering Co** was voluntarily wound up.

The Company's literature advertises filters, softeners, heaters, oil and grease-eliminators used in steam-raising and industrial applications.

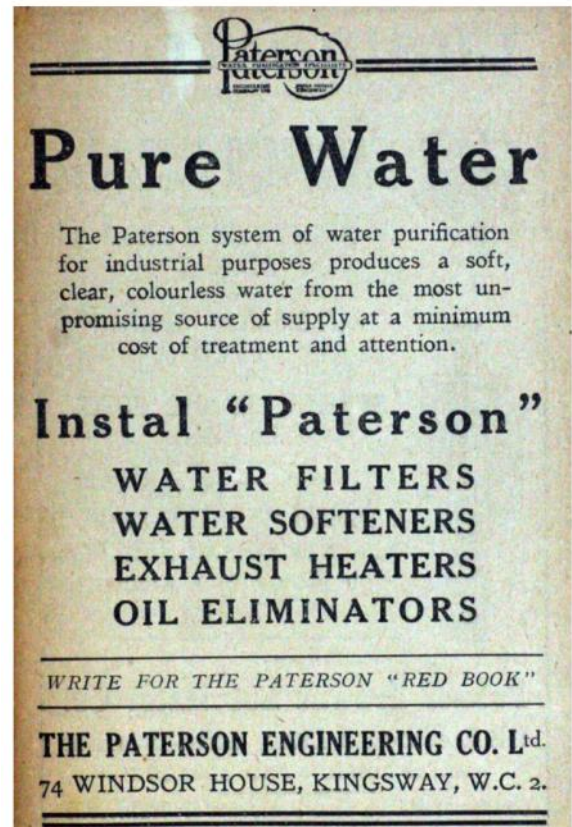
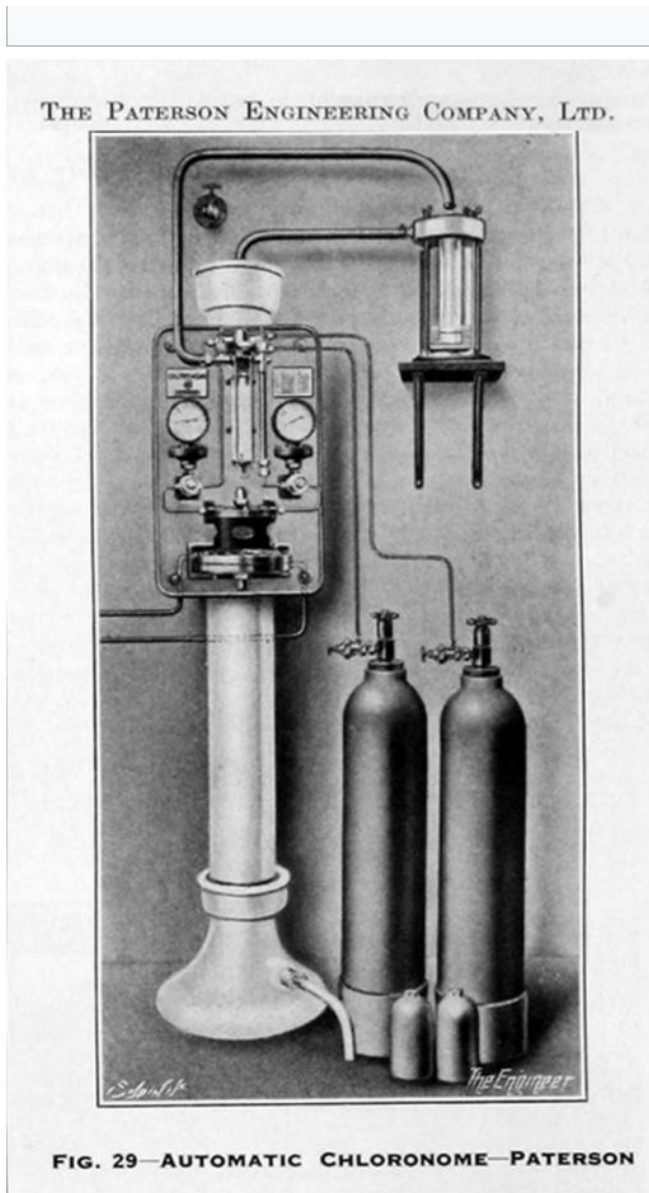
In 1927 an advert refers to 'Swimming Bath Water fit to drink' using the 'Paterson System'.

This illustration of large industrial purification equipment dated 1929 installed in a paper mill may give an impression of the type of equipment probably used at Jacob's Well Baths.



No higher resolution available

The drawings refer to a 'Paterson Chloronome' which is illustrated (right) below, dated 1933. One was probably installed at Jacob's Well Baths.



Size of this preview: 404 x 599 pixels. Other resolutions: 162 x 240 pixels | 760 x

Advert dated 1918.

The Bath's Paterson purification system was sold for scrap in 1977 and at a later date a drum calorifier (heat exchanger) was installed, apparently to heat the pool water, although the destination of the delivery pipe has not been verified.

Bristol Record office has a roll of drawings dated 1966 detailing a drum calorifier made by Royle of Manchester, (BRO Yellow Label 36-1) However, this is not the drum calorifier now extant, and it is not known whether a Royle unit was ever installed.



The current calorifier is a steel drum 6 ft long , 16 ins diameter, flanged at one end. To this is bolted a cover into which are threaded a pair of $\frac{3}{4}$ inch diameter brass pipes which are believed to be the flow and returns for copper heating coils inside.

This circuit was probably heated by a modest-sized boiler below, but the output of this system must have been too small to have much effect on the temperature of the pool, if full of water.



The calorifier is connected between large steel supply and return pipes that probably date from the Paterson installation. The photograph to the left shows the return pipe bringing cool water from the pool. Branched from it is a grey plastic PVC pipe which is believed to be a later bypass.

A modern natural gas boiler lays derelict in the boiler house (below) but it is not known where this was installed



6.0 OTHER METAL FEATURES in the BOILER HOUSE

The cast Iron staircase up to the former blacksmith's shop appears almost complete and amenable to restoration and strengthening for re-use.



On the east wall three slide-gauges once indicated the level in each storage tank. A float in the tank above was connected to a pointer by means of a wire rope running over pulleys. As the water level changed the pointer ran up or down the graduated scale indicating the level in the tank.

Whilst currently in poor condition, these gauges can be restored, probably to working order and would make interesting features.

If one or more tank is to be filled with water in the future, the gauges will again be needed to indicate level.



This steel ladder that gave access to the tanks appears complete but would need to be tested and equipped with a fall-arrest system if used in the future.

BELOW:

One of the original forged entrance door hinges survives and could be replicated for new doors of period design.



BELOW: This rack once suspended the boiler-man's fire irons. The fires inside traditional horizontal boilers are long and require log-handled tools, so the bracket on which to hang the tools is mounted high on the wall.





This late 20th century steel staircase is understood to have been made and installed by Scotties Gates Ltd of Bristol. It has no historic value and may be cheaper to renew than to restore and paint.

6.0 NEXT STEPS

- **Clear the Boiler House.** Most of the debris in the boiler house is of little historic interest but probably contains pipes, fittings and other items that are of historically important and can inform and help the interpretation of the site's history. Clearance must therefore be an archaeological exercise closely supervised by an industrial conservator. Each item of interest (including the modern gas boiler) should be photographed, details noted, and after clearance of rubbish, returned to the exact point at which it was found, which may provide clues as to its former purpose.
- **Boiler Footings.** On or under the boiler-house floor footings, mountings or plinths may exist that can provide information about the two boilers and their (probably brick) flues. An archaeological investigation should take place before the floor is otherwise disturbed.
- **Spring Water Supply.** Trace and investigate the spring sources, collection chamber(s) and supply pipe(s). Locate the route of the supply pipe under the Baths, and into the easternmost storage tank..
- **Drains.** Trace and test drains below ground. Establish a method of diverting the incoming water supply directly into a drain to allow draining of the tanks.
- **Plumbing under the Mens' Baths.** The basement below the suspended floor of the mens' facilities is believed to contain historic pipework, possibly dating back to the original construction. Floors should be lifted in a few locations and any pipework recorded, conserved as necessary and left in situ. Asbestos-containing materials have been identified in this area, requiring appropriate precautions.
- **Access.** Scaffolding will be required in phases to give access to the storage tanks from below and above. Once scaffold access is available, clear vegetation from the tanks, record and remove defective roof sheets and trusses where necessary.
- **Draining the Tanks.** Dip the three tanks all over to determine the depth of silt and debris present. Inspect the tanks to determine how they were inter-connected, and their general condition. Inspect the support structure.
Details of the water supply to and drainage from the tanks must again be reviewed and plans made to divert the incoming water and drain the tanks. The tank drain-valves will need to be inspected and operation trialled. Plans to remove and dispose of silt will be required. Methodology to be approved by the conservation architect and by Wessex Water. After draining the tanks, gutters, support structure and pipework should be inspected.
- **Historic Pipework.** Further research should be carried out on the history, nature and significance of the extant pipework and conservation carried out.
- **Boiler Flue and Chimney.** These should be opened up and inspected as part of the building survey.
- **Further research** is needed into the location and history of the springs, supply pipes, drains and the mechanical installations