

The Shot Tower

Richard Lord

The Shot Tower, which is on the Classified List of the National Trust of Australia (Tasmania), is situated on the Channel Highway seven miles from Hobart. It was the first to be built in Australia and is the only round Shot Tower made of sandstone blocks in the Southern Hemisphere. It was finished by its builder, Joseph Moir (c.1809-1874), in the year 1870 for the production of lead shot used for sporting purposes in the smooth-bore muzzle loaders of the day.

Joseph Moir and his brother John left their home-town of Kelso in Scotland on the 2nd April 1829 and sailed from Leith in the ship "North Briton" of 462 tons, with a crew of 24 and a general cargo, along with 12 other passengers on the 24th May. They touched at the Cape of Good Hope on the 5th August and sailed again on the 10th, arriving at Hobart Town on the 20th September the same year. That he prospered in the colony from the outset is amply shown by the fact that in the space of just over four years he had acquired at least three town allotments.

In 1843 Joseph Moir revisited Kelso in Scotland and on the 29th September of that year he married Elizabeth Frisken Paxton, who was the second daughter of Jane and John Paxton, a watch and clock maker of Kelso.

Mr and Mrs Joseph Moir sailed from London on the 26th January 1844 in the brig "Gazelle", 242 tons, Captain Ramsay Master, with a general cargo and 100 tons of Government stores, arriving in Hobart Town on the 30th May 1844.

He again visited England and Scotland from May 1849 to April 1850 and whilst there he acquainted himself with all the facts required for the making of lead shot. On his return home he set about locating a site for his undertaking and the purchasing of it. The site he chose was 100 acres granted on the 1st day of January 1817 by Governor Lachlan Macquarie.

Unto John Williamson his Heirs and Assigns to have and to hold for ever, One Hundred Acres of Land lying and Situate in the District of Queenboro' Van Diemens Land — Bounded on the South West side by a line bearing West fifteen degrees North fifty chains Commencing at the entrance of a dry creek — On the North

West by a line bearing North fifteen degrees East twenty chains — On the North East side by a line bearing East fifteen degrees South fifty two chains to the Derwent River — And on the South east side by that River — Conditioned — Not to sell or alienate the same for the space of Five years from the date hereof. And to cultivate Twenty Acres within the said Period, And reserving to Government the right of making a Public Road through the same, And also Reserving for the use of the Crown such timber as may be deemed fit for Naval Purposes — Quit Rent — Two Shillings.

In Testimony this 1st day of January 1817.

'Signed' L. Macquarie

Witnessed by H.C. Antill and Joseph Cowgill¹.

Evidently John Williamson never took up his land "but conveyed it to one Richard Naylor, who conveyed it to John Elder, who conveyed it to W.T. Stoker, but was conveyed by the Sherriff to Henry Bilton" who applied to the Caveat Board for a grant on the 16th May 1840 in place of Governor Macquarie's Location Order. This claim was published, along with those of other people in the *Hobart Town Gazette* of Friday the 5th June 1840.

Commissioners Office

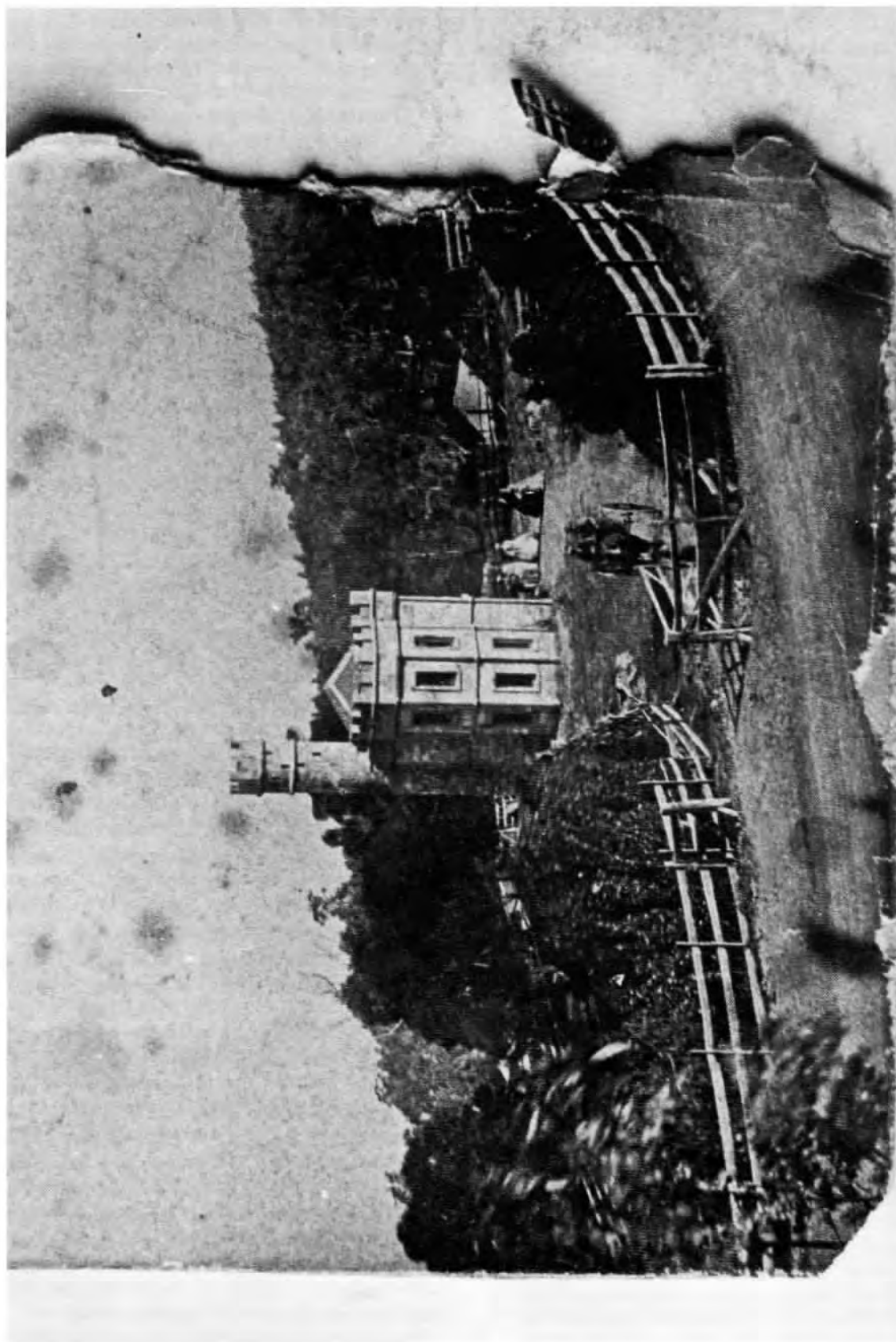
Notice is hereby given, that the following claims for grants will be ready for examination, by the Commissioners appointed for that purpose, upon or immediately after the 5th day of August next, on or before which day any Caveat or Counter Claim must be entered.

As there was evidently no counter claim to his title Henry Bilton was able to take possession on the 16th September of the same year.

It then passed through one other person's hands before being sold to William Proctor on the 17th March 1854 and then on the 1st May 1855 William and Sarah Proctor sold it to Joseph Moir.

Joseph Moir called his new property "Queenboro' Glens" and according to his descendants he built the house and incorporated into its design the battlemented tower which contains the six chimney flues from the fireplaces in the various rooms. He did this for the purpose of giving himself practical experience in the erection of a round stone tower as a prototype before embarking on the construction of the Shot Tower.

The exact date when the main section of the



“Queenboro’ Glens” (The Shot Tower house) taken in the year it was completed 1862.

house was built is not known but it must have been after the 1st May 1855 when he purchased his 100 acres from William and Sarah Proctor, and before 1862, for in the obituary of his son Joseph Paxton Moir in the *Mercury* of the 19th September 1933 mention is made that "the Moir family lived at the 'Queenborough (sic) Glens' Estate (the site of the Shot Tower) in 1862 eight years before the erection of the Tower".

Joseph Moir died on the 10th March 1874 and by his will he gave to his widow, as long as she remained so, the use of the Shot Tower house with right of way past the Tower from the house to the Highroad between Hobart Town and Brown's River.

He also gave and devised to William Henry Burgess the younger and Thomas Robertson (his trustees) to hold the real estate of the Shot Tower until his son James George Wood Moir attained the age of 21 years, which he did on the 9th September 1876, when the property was conveyed to him by his late Father's trustees.

That he had learnt the art of shot making from his father and learnt it well, is shown by the fact that in the year 1879, James G. Moir exhibited a sample of his shot at the Sydney International Exhibition and was awarded a First Degree of Merit Certificate. Following this success, in 1880-81 he sent some of his shot to the Melbourne International Exhibition and was awarded First Order of Merit with a silver medal. Copies of the two large certificates commemorating these events can be seen hanging in the Factory of the Tower.

James continued to operate the Tower until 1887 when on the 18th July of that year there appeared in the *Mercury* the following advertisement:

Judicial and Law Notices.

Pursuant to a provision contained in a certain Indenture of Mortgage dated the thirty first day of May one thousand eight hundred and eighty four and made between James George Wood Moir of Queenborough (sic) in Tasmania Shot Manufacturer of the one part and John Thomas Denne of Woodlands Bruni Island Esquire Edward Collicott Denne of the same place Esquire and William Robert Lucas of Victoria Huon in Tasmania Licensed victualler of the other part. Notice is hereby given that default having been made in payment of the interest

moneys secured to be paid by the said Indenture it is the intention of the Mortgagees to cause the freehold land messuage Shot Tower and other premises situated in the Parish of Queenborough County of Buckingham in Tasmania mortgaged by the said Indenture to be exposed for sale by Public Auction and that such sale will be effected by Burn and Son at their mart Elizabeth Street Hobart on Tuesday the twenty third day of August next at twelve o'clock at noon. Dated this sixteenth day of July one thousand eight hundred and eighty seven. R.J. Lucas, Attorney for the Mortgagees.

And then on the morning of the sale which was held on the 23rd August 1887, the *Mercury* carried the following description of the property:

Sales by Auction
THIS Day, August 23
Unique Property on the Brown's River-road
known as
"QUEENBORO' GLENS"
BURN & SON

Are instructed to sell by public auction, at their mart, Elizabeth Steet THIS DAY, August 23, at 12 o'clock, pursuant to mortgagee's notice published in the Hobart Mercury, July 18, THAT MAGNIFICENT PROPERTY, situate on the Brown's River-road, known as

"QUEENBORO' GLENS"
comprising

The large cut stone Shot Tower (the only one in Tasmania), in full working order, and fitted with all the latest improvements.

Handsome cut stone Elizabethan (sic) dwelling house of 7 rooms, with every convenience.

Two weatherboard cottages.

Stables, cow houses, outbuildings, etc.

The grounds, comprising 30 acres (more or less), are well watered by several creeks, and have pipes from a reservoir capable of holding 100,000 gal., laid in all directions.

They are laid out as —

Splendid apricot orchard of 300 trees, in full bearing.

Apple orchard, in full bearing.

Large orchard of mixed trees.

Beautiful Flower garden, with hot-house, summer-house, conservatories, etc.

Large kitchen garden. Boathouse and jetty.

This Charming property, seven miles from Hobart, is one of the most beautifully situated in Southern Tasmania, having an extensive frontage on one side on the main road, from which it is separated by a beautiful hawthorn



The Shot Tower in the year it was completed, 1870, with "Queenboro' Glens"; 1862 (the Shot Tower house to the left)

hedge, lined with English trees, and bounded on the other by the River Derwent. The view to be obtained from all parts of the property is unrivalled, commanding an uninterrupted sweep of the delightful river scenery, and an unbroken panorama of the Peninsula, Lighthouse, Storm Bay, Bruny Island, etc.

As a residence for a private gentleman or anyone desirous of conducting a profitable business in conjunction with a beautiful home, it offers attractions which should command the attention of capitalists and investors.

Terms — Easy

Reference — R.J. Lucas, Esq.

The property was duly put up for auction but failed to attract a buyer, for on the 30th September 1887 James George Wood Moir conveyed it to his mortgagees. His brother, Joseph Paxton Moir, then leased back the property from the new owners, moved into the Shot Tower house and carried on the family business.

Until 1901 the Tasmanian shotmaking industry was protected by a duty of £7 0s 0d a ton and the output of 80 tons a year was absorbed, but with the advent of Federation, the duty was removed and the Tasmanian industry had to compete with the output of three other shot towers in Australia. As the Tasmanian manufacturer was handicapped by the higher cost of raw material and the expense involved in cartage over the distance of seven miles to Hobart, he found that the industry could not be continued on a profitable basis and so he relinquished it along with the tenancy of the house in that year. The lease of the property was then taken over by his brother-in-law, William Thomas Baynton, who was evidently prepared, along with the help of his two sons, William and Keith, aged 15, to give it one last try, whilst his wife, Florence, operated a tea house from the main residence.

But once again the old trouble of rising costs could not be overcome for in the month of May 1902, according to an old invoice from Charles Davis of 42-44 Elizabeth Street, Hobart, Wholesale and Retail Ironmongers, they were paying £13 13s 9d per ton for lead and receiving £21 0s 0d per ton for shot, when in 1884 shot was selling for £32 0s 0d per ton. This gave them a return of £7 6s 3d per ton to cover wages, rent, fuel, supplies of bags, arsenic, antimony, to say nothing of the

cost of cartage to and from Hobart. Then in the Post Office Directory for 1905 the name of William Baynton, Shot Manufacturer, Kingston appeared for the last time. And so the making of lead shot which had been in operation for only 35 years on this site, finally came to a close.

On the 5th July 1911 the property was sold by John Thomas Denne, Edward Collicott Denne and William Thomas Lucas and during the next forty five years it changed hands eight times, with subsequent owners charging a small fee to go up the Tower. Then on the 8th August 1956 the Tower, Tower house and just over 8 acres of land were acquired by the Crown, gazetted as a historical site and placed under the control of the Scenery Preservation Board whose function is now incorporated in The Lands, Parks and Wildlife Department. The Department now leases it out as a tourist attraction so that present and future generations can inspect and appreciate one of the State's most enterprising industrial features.

Description of the Tower

One of the most frequently asked questions is why did Joseph Moir build his Tower where he did and not closer to Hobart Town?

This we do not know, but when all the available facts are put together, the answer seems to present itself. His first consideration would be a secure foundation to carry such a tall structure, and what better place than where he built, on solid dolerite on the valley floor 30 feet below road level. By doing this, he was able to have his factory floor at ground level with easy access for his materials, thus saving a lot of extra lifting within the Tower, as from this height a large proportion of his shot was poured.

But what to build it of? The bricks of the period were not of sufficient strength for such a tall structure and sandstone of proven quality was available approximately one mile to the south and across the valley from his proposed site at what had been the Brown's River Probation Station for convicts from July 1841 to 1848. This is the only known source of sandstone between the Waterworks in Hobart, where some of the stone for St. David's Cathedral was obtained, and Coningham south of Snug.

Then a good water supply would be required. This was obtained from the creek



The Shot Tower Property showing the building for melting arsenic, lead and antimony, with its tall chimney in the middle background and the Conservatory to its right. Taken between 1880 and 1902

which runs past the base of the Tower and was raised by means of a windmill and stored in a stone cistern or dam where the present overflow car park is situated. This cistern was also fed by the runoff from a culvert in the road.

In order to melt the lead vast quantities of firewood would be needed and this would be available from the surrounding hills whilst people living in Hobart Town at this time had to rely on sailing barges to bring it to town from down the river at great expense.

Finally, he was obviously very concerned for the health of not only his family, but people in general, for part of the process of making shot entailed the addition of arsenic and antimony.

In the *Mercury* of Friday the 5th August 1966 Mr Keith Baynton, then 79, recalled that as a lad of 15 in 1902, he worked at the making of shot and that to every 100 pounds of lead was added 20 pounds [more likely 2 pounds] of arsenic to lower the surface tension of the lead and help it to break up into spheres when poured through the colander within the Tower, and 14 pounds of antimony to make it harder when fired at game. As can be seen in old photographs, a large building for the purpose of adding these two elements to the lead was built on the cliff top below the Tower, complete with a tall chimney so that the poisonous fumes would be swept away out over the sea or unoccupied country side. The height of the Shot Tower is 157 feet 6 inches, measuring from the top course of stone straight down the centre to ground level. The bottom course of sandstone is 1 foot 6 inches high, the next is 8 inches high and then the rest of the walls right up to the top are constructed of 141 courses of stone each 1 foot high. Spaced at intervals in the walls are 30 openings, 2 feet 2 inches high and 9 inches across, to give natural lighting to the stairways. The glass in these windows has long since been broken but one can still see how they were fastened with mortar, directly into the sandstone. One of these openings at the base of the Tower is not visible from outside because over the years it had become covered by soil building up against the walls of the Tower.

The base of the Tower is 20 feet 11 inches in diameter and the walls are 2 feet 10 inches thick leaving an internal diameter of 15 feet 3 inches.

The taper of the Tower finishes at the 149 foot level and then the walls rise vertically for a further 8 feet 6 inches, with an average thickness of 1 foot 8½ inches, giving a 9 foot diameter on the inside and an outside diameter of 12 feet 6 inches. Within this circular chamber, whose floor is 149 feet above ground level, is situated one of the lead melting cauldrons, and the colander for making the larger sized shot was placed 3 feet above floor level giving a drop of 152 feet to the water tub below. Built into the walls of this circular chamber is a window opening 3 feet 3 inches high and 1 foot 9 inches wide and early photographs show it fully glazed. There are also two doorways 6 feet 5 inches high and 1 foot 8 inches wide which were once fitted with doors. These were used to gain access to the 2 foot wide outside platform which goes right around the Tower and which would have been used for storing of the firewood needed to heat the lead in the cauldron which is still at the top of the Tower today as is its small stone chimney showing through the roof.

The Spiral Staircase

As the stonework rose course by course, so another 3 foot wide section of wooden stairs and landings were added within the Tower, thus providing the workmen with a safe and secure scaffold. From the Tower door going up there are 26 landings and 26 flights of stairs made up of 1 flight of 17 steps, 14 flights of 8 steps, 10 flights of 9 steps and the final flight is 14 steps making 233 steps.

Then going down, there are 5 landings and 5 flights of steps made up of 1 flight of 21 steps, 1 flight of 9 steps and 3 flights of 8 steps, totalling 54 steps, giving 31 landings and 287 steps in all.

This wooden framework built within the walls of the Tower is 2 feet 8 inches square at the top and it was on this that the colander support was fitted for the pouring of large shot. It then opens out to 8 feet 6 inches across at the base of the Tower, thus allowing room for the 6 foot 3 inches diameter wooden tub filled with water into which the newly formed shot fell.

Today as one climbs the steps from the base of the Tower, where the water tub was situated, to the very top, one cannot but be impressed by the simplicity but great strength

Nineteenth Century



The store for arsenic, antimony, sporting and blasting powder, 1930.

LORD AND BOWLER COLLECTI



The store for arsenic, antimony, sporting and blasting powder, 1930.

LORD AND BOWLER COLLECTION.

of the timbering which has stood for over a hundred years.

The Windlass

Just inside the Tower door which is at the 30 foot level above the water tub can still be seen the remains of the base of the windlass which was used to haul the lead and firewood to the top of the Tower and to bring the newly formed shot back up to the factory floor. This in later years was driven by a steam donkey engine situated on the left hand side of the factory floor, and a hole 8 inches high by 6 inches wide was cut in the Tower wall to allow the driving shaft to pass through. The date of installation of the donkey engine is not known, but it is unlikely that it was installed when the Tower was built as no provision was made on that side of the factory for a chimney. It would appear that a metal flue was used to carry the smoke across the room to the chimney on the right hand side.

The Inscription over the Tower Door

THIS SHOT TOWER WAS BUILT BY THE PROPRIETOR, JOSEPH MOIR IN THE YEAR 1870. IN ITS ERECTION HE ACTED AS ENGINEER, ARCHITECT, CARPENTER AND OVERSEER. WITH MERELY THE ASSISTANCE OF TWO MASONS IT WAS COMPLETED IN 8 MONTHS, WHEN THE SECRETS OF SHOT MAKING HAD TO BE DISCOVERED. AFTER MANY PERSEVERING EFFORTS THE FIRST SHOT WAS DROPPED 8TH SEPTEMBER 1870.

This inscription carved by Joseph Moir[?] into the lintel above the only door which gives access to the Tower and opens off the factory floor 30 feet above the base of the Tower, tells its own story of the labour that was used in its construction. But perhaps "built" should read "completed" and "eight months" should read "eight years", for it was seven years from the 1st May 1855 when he purchased his 100 acres on which to build the Tower complex, to when he first occupied the Tower House in c.1862, with a further eight years to the completion of the Tower in 1870. In view of this the following facts are worth noting carefully.

On the outside of the Tower alone there are 141 courses of stone, all cut with curved faces and tapered sides so that they would fit together, and estimated by calculation to

number more than 4,000 blocks. The inside courses of stone would more than double this number. The volume of the Tower is estimated to be more than 16,000 cubic feet of stone and mortar, with a dry weight of 1,100 tons.

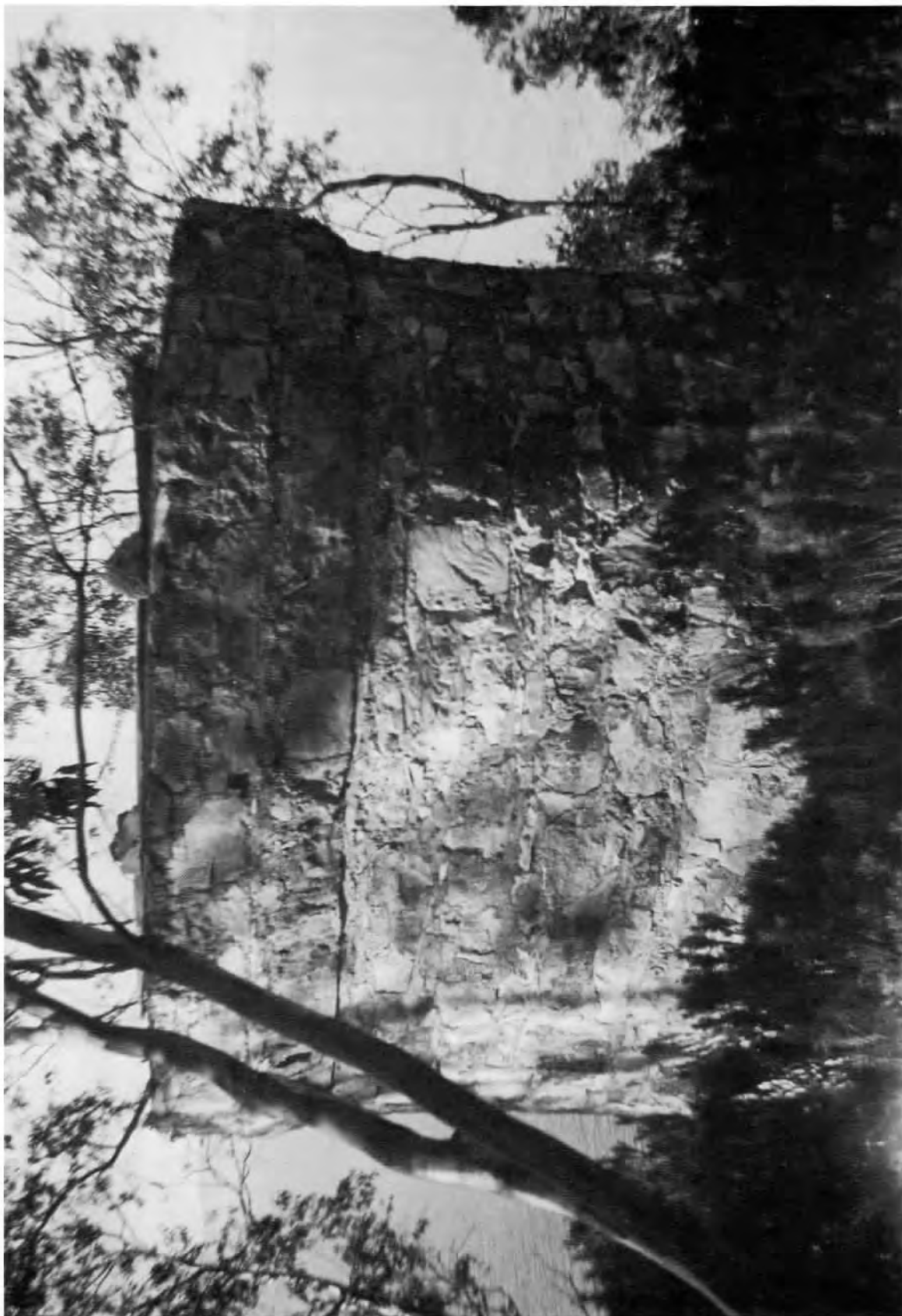
If, as is supposed, Joseph Moir and his two stonemasons carried out the construction in the eight months from January to the end of August 1870 and the work was carried out in all weathers 6 days a week with only a break for Easter, they would have had a total of only 206 working days to complete the Tower. Taking 8 hours as a working day they would have to lay 40 stones per day, 5 stones per hour or 1 stone every 12 minutes of every working day. Added to this the stone first had to be cut and carted from the quarry and then hauled into place along with vast quantities of mortar. Whilst all this was being done they would also have to press on with the carpentry work involved in building the spiral staircase. In the light of the above, the stated eight months building time becomes totally inadequate.

The Factory Building

After the completion of the Tower in 1870 Joseph Moir erected a small, temporary wooden building which was supported on stilts outside the door leading into the Tower. The building was connected to the driveway into the property by a wooden causeway also supported on stilts. This building was later replaced by the present three-storey stone Factory which measures 34 feet by 18 feet 7 inches wide. He constructed the Factory out of sandstone blocks taken from the abandoned buildings of the Brown's River Probation Station which had closed in 1848.

On the first floor, which is level with the driveway into the property and 30 feet above the base of the Tower, was a cauldron. It was used for melting the lead to make the smaller sizes of shot at this level within the Tower. Here also was the donkey engine used to drive the windlass within the Tower. On this floor also was Joseph Moir's "office" desk with its 7¼ inch circular peephole so that he could keep his eye on the front door, along with the steel tray used to dry the shot, and the glass sorting tables. These separated the perfectly round shot from that which was malformed.

From this level the perfect shot was lowered through a trap door in the floor to the second



The back of the Mausoleum with the sea far below, 1951.

LORD AND BOWLER COLLECTION.

floor. Here it was graded into sixteen known sizes, polished, weighed and sewn up into bags that were made and branded at this level. It was then lowered to the third floor where it was stored ready to be taken away, having reached ground level.

The Store for Arsenic, Antimony, Sporting and Blasting Powder

In 1980 all that remained of Joseph Moir's Tower in which he stored arsenic and antimony, as well as sporting and blasting powder were the foundations. However these foundations were built over in 1986 by a house, now 13 Wandella Avenue. The store was built in c.1867, four years before Moir finished the Shot Tower as at this time he was selling sporting and blasting powder from his hardware establishment, called "Economy House", in Murray Street and obviously did not want to hold large quantities of explosives in the centre of Hobart Town.

It was sited on an isolated spot on the cliff top overlooking the present suburb of Taroona and the pounding waves below, yet tucked away in the gully with a high rocky hill behind it to protect his shot making complex from possible explosion. As one stands on this site today it becomes evident that he was a man who took great care in what he did and where he put his buildings, and so chose this safe and secure spot to store his dangerous goods. The height of the tower was 10 feet 6 inches and it is assumed that the roof was of wood similar to that of the Shot Tower. Judging by the number of small globules of melted pitch which were found within the ruins it is also assumed that it was overlaid with this material to keep out every trace of water from the arsenic and antimony, because if they were added to the molten lead wet or damp, it would cause splashing of the molten lead.

The store was constructed in the main of uncut but very carefully laid stone and was slightly smaller than the Mausoleum. It had an external circumference of 37 feet 6 inches with an outside diameter of 11 feet 11 inches, and inside it was 8 feet 4 inches with the walls measuring 1 foot 9 inches thick. These measurements are as accurate as was possible on uncut stone. The door is described as being of heavy iron and by measuring the one existing stone door jamb in 1980, we could

ascertain that it was 4 feet high, and 2 feet 6 inches wide. Unlike the door of the Mausoleum which had vertical bars and faced the sea, its door faced up hill towards the Shot Tower. It was hung on iron gudgeons or pins which were anchored into the stone by lead. The door was locked by a chain passed through a ringbolt which was fastened into the other jamb in a similar manner.

The Mausoleum

This circular tower of uncut stone, with an external circumference of 38 feet 9 inches, was built by Joseph Moir to be his last resting place just back from the cliff top on the southern side of the spur of land that runs from the Shot Tower down to the River Derwent. It is now a total ruin with only the foundations showing. The original height was 10 feet 6 inches, the outside diameter is 12 feet 4 inches and the inside diameter is 9 feet, with the walls 1 foot 8 inches thick. This is slightly larger than the tower that Joseph Moir built for storing his arsenic, antimony, sporting and blasting powder.

The construction was identical to the store, except that the doorway was closed by a gate of steel slats and faced the sea, whereas the store door faced inland.

Within the Mausoleum could be seen the three lead-lined coffins of Joseph Moir c.1809-1874, his wife Elizabeth Frisken 1822-1875 and their daughter Mary Sophia Stanley 1846-1853, all laid upon benches of blackwood.

When Joseph Moir's son Joseph Paxton moved away from the property in 1901 the three coffins were removed and re-interred in the Queenborough Cemetery but no headstone was erected over the graves. As a result of this, when the cemetery was cleared by the Hobart City Council in May 1963 the site of the graves was not identifiable and so today the remains of Joseph Moir, his wife and daughter, still lie buried somewhere under the Hutchins School, along with others.

References

1. L.S.D. 354/3, p. 142, AOT.
Also, Lord, R. *The Shot Tower and its Builder Joseph Moir, Hobart 1870*, Richard Lord and Partners, Taroona, 1980.