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# THE GROUNDS OF THE THAMES SCHOOL OF MINES

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Thames School of Mines and  
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The Thames School of Mines, located on the town's waterfront, is a Category 1 registered historic place. It consists of assay rooms, a balance-room, laboratories, store rooms, classrooms, an experimental metallurgical works (henceforth "EMW"), an electrical power-house, magazine stack room, library, director's office and a staff room/reception. A mineralogical museum occupies a separate building (Figs. 1 and 2). The grounds of the School of Mines act as another record of past events on the site to complement the buildings, their interiors and fittings, and the archives, artefacts and other memorabilia connected with the school.

## Historical Context

### *Urupa*

The School of Mines is situated on an urupa known as Tarakonaiti (McEnteer and Turoa 1993: 23,25). McEnteer and Turoa state that this urupa was the burial-ground for an adjacent nohanga pa called Tarakonaiti. With the establishment of Grahamstown in 1868, the urupa was surveyed off as tapu ground and separated into two blocks designated Kauaeranga 12A and Kauaeranga 13A (MLs 995, 1017 and 1018).

### *Wesleyan-Methodist Church*

Kauaeranga 12A was gifted by Hohepa Paraone and Hone Huiraukura in 1868 (Deeds 550 and 1209) to the Wesleyan-Methodist Church for a church site. The church, with a Sunday School built on, was opened in November 1869 (Methodist Church Archives, Thames Circuit - 3010/965:1 and Plan 991A). A year later the church was enlarged with the additions of a transept, chancel and vestry. The Sunday School classroom was detached and placed next to and east of the church, and also made larger.



*Figure 1. A northwest view of the Thames School of Mines. Cochrane St. is in the foreground intersected by Davy St. to the right and Brown St. to the left. The Firth of Thames is beyond the Cochrane-Brown Streets intersection.*

#### *The School of Mines Movement*

The School of Mines Movement was initiated in 1884 when Professor James Black of the University of Otago School of Mines gave three lectures on the chemistry of minerals to miners at the Lawrence Athenaeum and Mining Institute (Appendix, School of Mines, *Handbook of New Zealand Mines 1887:1*). As an outcome of the interest and enthusiasm generated by these lectures, Professor Black, with the support of the Minister of Mines, toured the mining districts in 1885 and 1886 lecturing and conducting experimental sessions. Miners keen to establish mining education and to take advantage of the facilities made available formed and subscribed to associations, schools, institutes and chemistry, testing and metallurgy clubs generically known as schools (*ibid.* 13-22). At least 36 schools and school branches were formed up to 1907 in Otago, Westland, Nelson and Hauraki, although by the 1900s the majority of the schools had disappeared (Broad 1984: 1-2). The Thames School of Mines Association was launched in November 1885, during a tour

to Thames, Karangahake, Te Aroha and Coromandel by Professor Black. Classes began in January 1886 at Gresham Hall in Thames under Professor Black's assistant, Alexander Montgomery, who remained in Thames.

The main objective of the Movement was to progress the gold-mining industry through education. The industry was experiencing a decline in production during the mid-1880s, and the education of miners was seen as one way of reviving goldmining. Professor Black's *Chemistry for the Gold Fields*, hurriedly published in 1885, embodied the Movement. It served as a field guide for miners and prospectors, a working manual for the new Schools of Mines and an introductory text-book for the students of the University of Otago School of Mines (Black 1885: Preface).

The schools, with government assistance, were to provide "technical instruction in subjects relating to minerals, mines and mining" (Appendix, School of Mines, *Handbook of New Zealand Mines 1887:1-2*). The aim was to give "the miners an elementary but, at the same time, practical acquaintance with a few of the branches of science relating to minerals, such as will be of the most advantage to them in their daily work, and through them to the colony at large". Geology, mineralogy, chemistry, assaying, metallurgy of gold and silver and how to use a blowpipe for mineral and ore determinations were taught at first. The curriculum was later broadened, in response to mining legislation and developing technology, to include mining engineering, mechanical drawing, land and mine surveying, mathematics, physics, electricity and petrology.

In February 1886 the Thames School of Mines Association Committee decided to advertise for freehold "premises of its own so that a furnace and the necessary appliances for the proper conducting of the School" could be permanently installed (*Thames School of Mines Committee Minutes, Book 1, 1886: 23*). An offer of the former Wesleyan-Methodist church site was received (the church had been resited in 1885 to the corner of Pollen and Mary Streets), and a tender for the Sunday School building and accompanying land made by the association was accepted by the Wesleyan-Methodist Church (*ibid.* 34). The Sunday School was modified into a laboratory, assay room, balance-room and a director's office, and a new corrugated iron roof was placed over the original kauri shingles. Classes began in the converted Sunday School in August 1886, under the auspices of the Mines Department. The Thames School of Mines was to become the largest, one of the longest-running (McLean 1993:5) and the most important

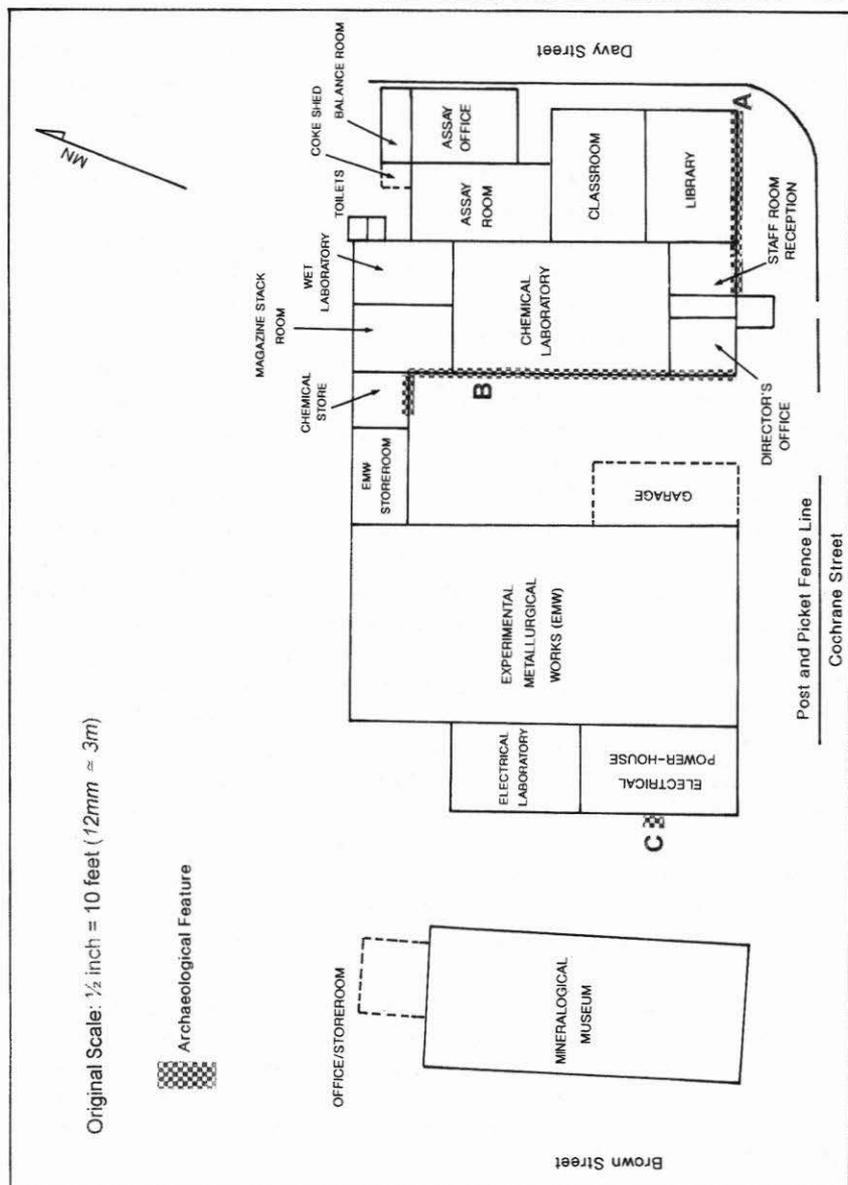


Figure 2. A plan of the Thames School of Mines (based on Broad 1984), as it was in 1954 as described by Alistair Isdale (pers. comm.). Broken line on the plan denotes demolished buildings.

of the schools of mines. The Thames School would be referred to as the Government School of Mines (Rickard 1906: 183) and its EMW would also be known as the New Zealand Government Metallurgical Works (Park 1913).

The 1890s were the Thames School of Mines' halcyon years. They were based on a revival in goldmining brought about by the McArthur-Forrest cyanide extraction process and an associated investment boom in mining. Under James Park, director between 1889 and 1896, the school was active in promoting the cyanide process by conducting "careful investigation of constituents of the ore, and repeated trials on a working scale" (Park 1913: 226) and developing the process further in the EMW (Broad 1984: 4-5). Parcels of ore and tailings from both New Zealand and Australia were tested at the Thames School of Mines. In 1894 Park published *Laboratory Instructions in Assaying and Practical Chemistry* based on his lecture notes and work at the school. The school grew to meet increased student numbers (the highest enrolment was reached in the second term of 1898 when 156 students were registered) and an expanded curriculum. In recording Park's tenure at the Thames School of Mines, the *Cyclopedia of New Zealand* extolled (1902: Vol. 2: 468): "From the status of a village school, he claims to have raised it to the proud position of the leading mining school in the Australasian colonies, and it is well known to mining men throughout the world". Held in high esteem, the school drew prominent visitors such as Richard Seddon, Minister of Mines, in 1891, and Professor Black, who lectured and carried out experiments during the 1890s. In 1898 and 1899 school mineral specimens and models made by students were displayed in the Industrial and Mining Exhibition in Auckland. A wooden mineralogical museum was built in 1899 to house and exhibit the school's extensive mineral collection. The museum's frontage had Classical architectural features which contrasted it with the utilitarian appearance of the other buildings.

Over the following decades, as mining lost importance, the school drifted into decline. The stamper battery in the EMW was fully used during the Great Depression by the Unemployment Board's subsidised prospecting schemes. However, changing circumstances, including the pending retirement of Hugh Crawford (McLean 1993: 6), director since 1923, the closure of the Martha Mine at Waihi in 1952 and a decision to have a proposed engineering school at the Thames High School instead of the School of Mines saw the Thames School of Mines close in 1954.

### *Post-closure*

After the Thames Borough Council took over the property, the buildings were put to different uses between the mid-1950s and the early 1970s. While the Mineralogical Museum continued as a public museum, South Pacific Mines, Norpac Mines and Central Pacific Minerals (mining companies which were prospecting on the Coromandel Peninsula) consecutively used the assaying and metallurgical facilities and converted rooms for offices, draughting and storage. The Thames Civil Defence had a Warden's Post in the balance-room at one stage, while the Thames Community Arts Service and Thames Little Theatre stored equipment and props in the EMW and power-house. The New Zealand Historic Places Trust (hereafter "NZHPT") acquired the School of Mines in 1979, and manages it as a historic property. The property was under the care of the Hauraki Regional Committee of the NZHPT from 1985 until 1991, when a curator was appointed by the Trust.

### **Past and Present Land Use**

The Thames School of Mines property is on a sandy alluvial fan formed by the once meandering Karaka stream (Isdale 1992: 1). The alluvial fan is one of a number which have created the Thames flat by advancing the shoreline.

A map of the Thames Goldfield drawn by Charles Heaphy in 1867 has the notation "Te Rakonaite Old Pa" slightly inland from the mouth of the Karaka Stream and behind a lagoon described as a "pool". Photographs of the burgeoning Grahamstown townscape taken from the hills above the Thames flat include views of the Tarakonaiti wahi tapu. The tapu ground is vacant, while surrounded on one side by Holdship's sawmill edging Cochrane Street, on the other by some buildings and tents placed along nascent Davy Street, and buildings closely grouped along the foreshore from Albert Street (the commercial centre of Grahamstown) up to the boundary of Kauaeranga 13A. Trees on the shoreline are visible in the Tarakonaiti wahi tapu, with dark tones in the images landward from the trees suggesting verdure.

An A.H. Frith photograph (Fig. 3) shows the Wesleyan-Methodist church in 1869 or 1870 built on high piles on the edge of a waterlogged shoreline in Kauaeranga 12A. Fences around the church at that time may have demarcated the adjoining lots surveyed from the original tapu area, of which the church took approximately a third.



*Figure 3. A photograph by H.A. Frith showing an area of Grahamstown in 1869 or 1870. The Wesleyan-Methodist church and Sunday School are in the top right hand corner. The Karaka Stream, meandering to the Firth of Thames, is at the left rear. :Photo courtesy of Ken Wood.*



The School of Mines was an industrial site. Besides teaching, the school provided public services in assaying and metallurgy. The school's EMW was built in 1887-1888 "for experimenting on a working scale on the best methods of extracting bullion from the complex ores so plentiful on this peninsula" (*Thames School of Mines Committee Minutes, Book 1, 1887*: 65). A scene comes to mind of the EMW when it was in operation surrounded by stockpiled "dirt", gold and silver bearing ores and concentrates to be tested, and heaps of discarded clayey "slimes" and coarse tailings which had been processed with mercury, roasting, chlorination, cyanide and flotation. The preferred size of parcels to be treated in the Experimental Plant was one to three tons (*Thames School of Mines Syllabus 1895*: 15 and *Thames School of Mines Syllabus 1901*: 24), for testing tonnage in bulk. Students were also able to do experiments in the EMW when it was not in use so that they could "obtain a practical knowledge of machinery, and the treatment of all classes of ores by the various processes" (*Thames School of Mines Syllabus 1901*: 5). Similarly, heaps of waste material from assay analyses can be visualised outside the Assay Office and assay teaching room. Gavin McLean, NZHPT historian, noted from his research in the Thames School of Mines records (Thames School of Mines property file HRM 005:1992): "From 1904 onwards there are occasional references to the need to hire someone for a day to tidy up the grounds (which were often littered with rock from the battery); in March 1916, fifty loads of tailings were carted away."

On 11 January 1911 the *Thames Star* reported:

"The Government grant for improvements to the grounds and painting of the buildings at the School of Mines is being expended judiciously, and already the whole place presents a wonderfully improved appearance. The grounds, formerly rough and uneven with rank grass everywhere, have been levelled and tarred and sanded ... Mr W. Verran was the successful tenderer for the ground improvements. When the various contracts are completed, the exterior of the School of Mines will be far from the eyesore it has been to the residents."

The school grounds had an open aspect. Vernal Dally, who used to bike from Matatoki to attend electricity classes at the school in 1918, remembers the property as only in grass (pers. comm.). McLean (HRM 005:1992) found that:

"There is very little archival reference to plants and gardens. Surviving photographic evidence (principally the 1901 ones from the printed syllabus) shows that the school grounds did not include large trees or tall shrubs. Grass predominated where bitumen did not.

At a special meeting on 24 June 1886 the Thames School of Mines Council accepted a report from a sub-committee that 'advantage should be taken of the present planting season and that a number of evergreen trees be planted about the grounds'. The August meeting passed an account from a 'Mr Smith' for trees and planting.

Paths - There is only limited documentary reference to paths. In June 1909 the Thames School of Mines Council instructed that 'concrete blocks be laid across the footpath at the front entrance to the Plant'. Paths appear to have been bitumen ... Crawford's report of 29 April 1940 also noted that 'the School grounds have been cleaned up ready for taring [sic] and sanding'."

The grounds have virtually remained unmodified since the prospecting gold-mining companies left.

The present appearance of the grounds is made up of different elements. The property is maintained in lawn. A single pohutukawa tree, planted in 1994 to replace another on the same site, grows outside the entrance to the powerhouse. A shallow depression in the front lawn of the Mineralogical Museum marks where a cypress was growing before it was taken out after 1979.

The property's ground surface is variable in appearance. The ground is slightly elevated on the periphery along the fence line between areas levelled out for pelton-wheel pipes, three permanent paths which provide access between buildings and Cochrane and Brown Streets, a "causeway" for vehicle access from Cochrane Street, and some landscaping around the Mineralogical Museum. Higher and rounded ground along the fence line in Cochrane and Davy Streets may be waste material from assaying and metallurgical tests which was dumped up to the fence line. The higher peripheral ground acted to some extent as a useful barrier against floods, although brick piles, concrete blocks and tanalised wooden piles, now projecting at varying heights above the property's uneven ground surface, suggest that buildings have been

raised to escape flooding as much as to replace rotten and sunken pilings. The Mineralogical Museum was built on a raised earthen platform. The *Thames Star* detailed on 3 August 1899: "The floor and walls have been placed on a concrete foundation, two feet six inches above the street level, which should tend to preserve the building from the effects of damp."

Surface concrete reflects previous activities in the vicinity of the Mineralogical Museum. An 0.13 metre high concrete footing which lies on the north and west (front) sides of the Mineralogical Museum, and which separates the public footpath from the museum lawn, is a remnant of a fence built in 1910-1911. Between the museum and north boundary fence a strip of concrete 12.8 metres long by 0.9 metres wide connects two square-shaped concrete pads. The strip was laid in the 1960s for a base for a waka which had been found along the Waihou River and placed on outside display (Alistair Isdale, pers. comm.). One concrete pad is the footing for an office/storeroom built in 1899 after the museum was completed, and the other is to give support to a framework holding a 1902 firebell.

An open, brick-lined pelton-wheel inlet-outlet, 0.8 metres wide by a maximum depth of 0.6 metres, extends from the front of the EMW for 1.5 metres out into the lawn.

The side and area behind the Assay Office, and where the outside entrance to the assay room and school toilets are located, were concreted in 1981 "to deal with the problem of mud" (Alistair Isdale, pers. comm.).

### **Archaeological Features**

The archaeology of the property came under consideration in 1992 by the NZHPT (Thames School of Mines property file TSM 000). For the purpose of property interpretation, the locations of several outbuildings, paths and an indication of the past ground surface in the yard outside the EMW (whether it was in grass or bitumen) were suggested as needing further investigation. However, no excavations have been carried out on the property and any future possibility is precluded by Ngati-Maru kaitiakitanga and the NZHPT's commitment to its *Properties Policy* (1998) in giving effect to the principles of the Treaty of Waitangi. During repiling in 1993 an assortment of objects found lying on the ground surface under part of the school buildings and storerooms were retrieved (Graham Ball, pers. comm.). The objects included crucibles, crucible lids, cupels, scorifying dishes, a small muffle, a glass stirring rod, test-tubes, laboratory bell jars, laboratory bench bases, glass

bottles (among which were Hancock's Imperial Ale, Red Seal Beer, T & C Dunedin, Udolpho Wolfe's Aromatic Schnapps and a soft drink or small beer crown top), a ceramic basin, ceramic knob (from a drawer), glass, stoneware and ceramic fragments, a brass door handle, metal sink plug and other corroded metal.

The School of Mines' past may be reconstructed further by examining artefacts and land use revealed in three exposed surfaces beside the school buildings and the electrical rooms lean-to.

(i) *An area in front of the library and staff room/reception* (Figs. 1 [shown as "A"] and 4).

Shells, three crucible sherds, dross, slag, burnt coke, pebbles and stones (sometimes burnt), quartz, copper carbonate, slate (used for damp proofing the brick piles), red brick fragments, animal bone, mortar, a small lump of concrete, a glass tube, clear and coloured glass fragments, nails, a piece of transfer-printed ceramic and part of a porcelain evaporating dish are exposed on the surface of a bare area of ground in front of the library and staff room/reception.



*Figure 4. Looking north from Cochrane St. A view of Area "A" at the foot of the weatherboards. The door is the entrance to the library. The gravel path was laid down in 1990.*

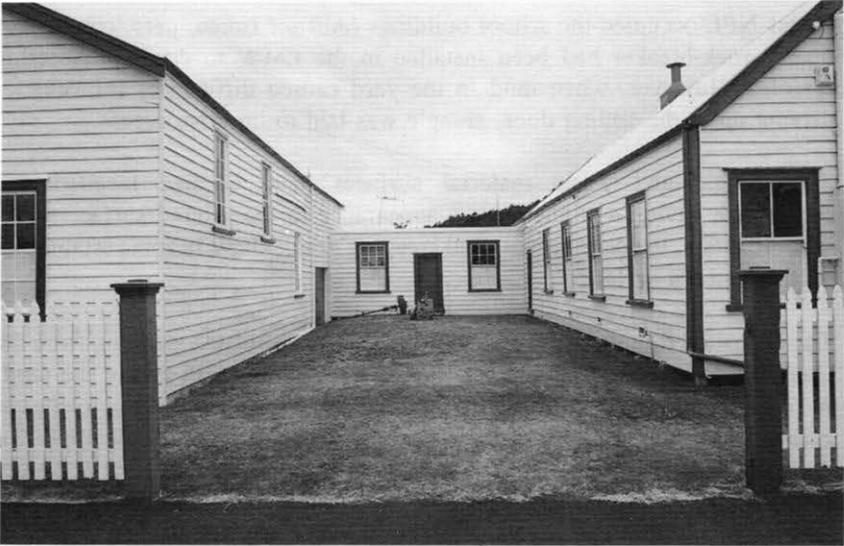
The library is a plain weatherboard building moved to the site in 1895 (the building may have been the Wesleyan-Methodist Sunday School in Willoughby Street). Six brick piles protrude from the present ground surface, giving an approximate height of 0.16 metres from the surface to the bearer and providing an easy visibility of 0.2 metres between the lawn to under the library's floor boards. Further back under the floor boards, a banked-up layer of brown-coloured silt lies on the ground. The ground surface has been hollowed out to a depth of 30 millimetres more or less along a drip-line running parallel with the weatherboards. Shell is revealed along the drip-line in a displaced light-to-dark grey and light brown coloured matrix of mixed sand and silt. The shell and sand are remnants of a past beachline.

The staff room/reception is west of the library entrance door. Points of interest along this part are geraniums planted by Mrs Crawford, the last director's wife, a cluster of wild arum lilies and a plaque placed in the ground in 1985 to commemorate the urupa. Three brick piles and one tanalised wooden pile are set in dipping ground, where the height between the ground surface and the front bearer reaches a maximum of 0.23 metres. A drip-line along this length is shallower, and shells are less prevalent in the light-brown-grey-coloured ground. A glass ink bottle and test-tube were found when piles under the staff room were strengthened in 1998.

The artefacts are small and scattered on the ground surface, suggesting that most have been carried and deposited by flood waters. Many of the artefacts are associated with assaying. The Assay Office and an outside entrance to the assay room are situated on the east side of the school part, several metres behind where the convex-shaped side lawn is the same height as the adjacent classroom's bottom weatherboard. The ground is likely to be residue of waste material once piled along the narrow side between the Davy Street fence line and the classroom. Waste material which spilt beneath the floorboards will have been washed and redistributed by floods which have swept over the property.

(ii) *Yard* (Figs. 1 ["B"] and 5).

Coarse metal shingle has been spread over waste material (composed of a quartz and yellow-orange-coloured clay mix) from the southeast corner of the EMW building, along the centre and west parts of the yard to a sliding door on the east side of the EMW. The quartz-clay material probably dates from EMW operations (the last recorded treatment was in 1951). The shingle was put down by a tip-truck *circa* 1962 when Vancouver-registered South Pacific



*Figure 5. Looking north from Cochrane St. A view of the yard formed by the EMW (left), store rooms (centre) and (right) the chemical laboratory and director's office in the school buildings, formerly the Sunday School .*



*Figure 6. Looking north from Cochrane St. The electrical rooms are located in the lean-to (right). The trench runs alongside the lean-to. The Mineralogical Museum is to the left.*

Mines NPL occupied the school buildings (Alistair Isdale, pers. comm.). A quarry rock-breaker had been installed in the EMW to crush prospecting samples. However, when mud in the yard caused difficulties for vehicles driving up to the sliding door, shingle was laid to improve access.

The shingle and waste material surfaces have become levelled and compacted, giving a slight convex appearance to the ground surface in the yard. Plantain, dandelion, moss and creeping grasses have become established on these sterile surfaces.

The deposited shingle/waste material has a sloping profile extending from the Cochrane Street gate to below the store rooms at the north end of the yard. A "causeway" leads from the gate up to an area where Hugh Crawford's car garage was attached to the EMW from *circa* 1927 to 1979 (Isdale 1998: 3). A distinct 0.14 metre high edge runs along the front of the EMW's store room and the chemical store. The edge was formed in 1993 to enable repiling and to allow ventilation under the rooms' floors (Graham Ball, pers. comm.). At the north end of the yard the EMW floor is approximately 0.37 metres below the top of waste material and shingle, and from a distance gives the impression that the building has sunk. A low concrete retaining wall, used to contain dumped material and prevent it from blocking the EMWs' sliding door (also the plant's feed entrance), is evident in the side of the slope to the sliding door. A marble stopper has been set into the top surface of the retaining wall.

No artefacts are visible in the shingle surface. However, in the northeast corner of the yard and particularly along its broken-up, uneven east periphery, a number of objects are associated with the waste material. They include the neck of a wine bottle with an applied top, a crucible sherd, small pieces of dross and slag and corroding metal objects, which are presumably derived from the EMW or the chemical laboratory. Pockets of gravel and shells in the vicinity are associated with repiling, while pieces of slate originate from damaged brick piles.

(iii) *Trench* (Figs. 1 ["C"] and 6).

A trench was excavated in 1981 by Alistair Isdale, then curator of the property, to remove material lying against the lower weatherboards of the lean-to comprising the electrical rooms (Alistair Isdale, pers. comm.). The trench was later widened by Charles Potterton so that he could repile under the rooms. The wooden piles had rotted away to the point where the rooms'

floor boards were sitting on the ground. Mr Potterton repiled with concrete blocks and also replaced the two lower weatherboards along the lean-to.

The trench is 0.9 metres wide and has a depth of approximately 0.6 metres. Its west wall has a slight batter. The north end of the trench was extended more shallowly east-west for a short distance. Moss, fumitory, plantain, dandelion and other weeds now cover the surfaces along the west wall and the floor of the trench.

During repainting of the EMW building and lean-to in 1998, a small area of the trench wall was disturbed 6.3 metres from the south end. Disturbance revealed, over a distance of 0.8 metres and 0.4 metres below the top of the trench, six broken Battersea crucibles, a fragment of clear bottle glass and a distinct layer of coke in a homogeneous waste-material matrix. Shell and humus lie immediately below the ground surface along the top part of the section, with several shell fragments embedded above the crucibles. In 1981 the trench was excavated down to the surface of the beachline. Trench fill, including beachline material, was dumped beside the trench and later spread over the lawn.

The objects and coke concentrated in this exposed area suggest that they may have been thrown into a dump pit or a dump pile before the surrounding ground was built up (for example, there is a nearby door in the west elevation of the EMW which is located close to a small amalgam furnace). The archaeological material may also be from large dumps or fill used to build up the platform for the new Mineralogical Museum. The Mineralogical Museum is approximately 6 metres west of the trench. When the wooden back steps to the museum were reset into the ground in 1995, a cupel, a tobacco tin, fragments of thick aqua glass and a medicine bottle were found.

### **Conclusion**

The Thames School of Mines historic property belongs to the processing phase of the past gold-mining industry, where assaying, processing and experimentation were carried out by assayers, metallurgists and chemists. While the school grounds have an orderly appearance now, and have been landscaped to some extent around the Mineralogical Museum, the present-day grounds have come about from past industrial activity. It is apparent that the Museum grounds also contain considerable physical and artefactual evidence associated with the treatments and assays of complex ores.

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Alistair Isdale answered my many questions and provided discussion on the Thames School of Mines. Alistair's associations with the Thames School of Mines began in 1943. He was curator of the Mineralogical Museum from 1957 to 1985, and his links continue with the property as a volunteer. Thanks to Dr Neville Ritchie for reading and making suggestions to the draft. Thanks also to Reg McCarthy for identifying the bottles and bottle fragments; Gavin McLean for use of his Thames School of Mines research findings; Verna Mossong for assistance during research at the Methodist Church Archives; and Ken Wood for use of the H.A. Frith photograph.

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