

Although it was not possible to visit the site of the Kent battery, an examination of photographs of this machinery in the possession of Anne McConnell indicates that:

it was made by Vivian and Company of Castlemaine,
it has iron frames and revolving tappets, and
it is in a remarkably complete condition.

The incidence of nineteenth century mining machinery in such a complete form on site is now extremely rare. Although the development of the revolving tappet has usually been attributed to the Californians, both this and other features of stamp batteries were developed by local Victorian foundries, notably by Hunt and Opie at Ballarat and Vivian and Company at Castlemaine, in the period from about 1858 to 1866. These features included iron mortar boxes, iron frames, iron guides and detachable shoes and dies. Several of these features are already evident in Vivian's patent of 1859.

Hunt and Opie were in business between 1856 and about 1873 and Vivian and Company between 1859 and 1879. An iron-framed Hunt and Opie battery survived in Victoria until about 1984, when it was photographed. No Vivian battery appears to have survived in Victoria. It seems likely, therefore, that the Kent battery is the sole surviving battery from this manufacturer, and possibly the oldest extant locally-made battery in Australia. As Vivian and Company went out of business in 1879 it must be as old as this, and may be older. If the Hunt and Opie battery can be found then this would be at least as old as 1873, when that company also went out of business.

In the absence of the Hunt and Opie battery, the Kent battery is of national significance, and sufficiently important to want to preserve it intact. Whether the battery should remain in situ will depend upon the importance of the site within the context of mining in Tasmania. Whilst its remote location makes it difficult to gain access to the site, it also makes it difficult to manage. These issues should be examined by somebody who is professionally qualified to do so. If the battery remains on site then the mine should be placed on the National Estate Register, and the site should be properly managed in order to prevent both the machinery and the site from being destroyed/vandalized. Otherwise, it would be necessary to professionally record the battery in situ, and then move it to a local museum for safe keeping. As the machinery is so important, it is desirable that such a museum should be well-founded; and for this reason the museum at Launceston is preferable to the ones at Beaconsfield or Derby.

Information on Vivian and Company, which is currently available from the files on Victoria's historic engineering manufacturers, is annexed.

VIVIAN, GEORGE RICHARD HOWE

PROPRIETOR: George Richard Howe Vivian (by 1859 - [1866]) [8];
W. Middleton [2]

BUSINESS NAME: Vivian Foundry [8],
George Richard Howe Vivian and Company (by 1859 - [1866]) [8];
Vivian and Company (by 1859 - [1867]) [1,2,4];
Castlemaine Foundry [2]

LOCATION: Castlemaine;[1]
Mostyn Street, Castlemaine (by April 1862 - 1863).[9]

PERIOD OF OPERATION: by May 1857 - [1879] [1,?]

PRODUCTS:

PLANT:

EXISTING RECORDS: photographs of the exterior of the works during the periods when they were operated by Vivian and Middleton respectively, published in [2].

Patent 171/202 03.03.1859 An improvement in working stamps used for crushing minerals.

Patent 367/342 07.06.1860 Improvements in the construction of the ordinary puddling machines.

Patent 450/475 04.07.1861 An improved crushing and amalgamating mill.

Patent 901/880 17.01.1866 Improvements in machinery for grinding quartz and other auriferous ores, and for extracting the metals contained therein.

ACTIVITIES: iron and brass founders, engineers [1,2]
engineers, iron founders [9]

NOTES: At the time when the foundry was established in 1857, the Argus reported that:

"Messrs. Vivian and Co. ... have just completed the erection of a foundry, where all kinds of brass and iron founding may be executed speedily. This establishment will prove an immense convenience to the machine proprietors in Castlemaine, Tarrangower, Fryer's Creek, and adjacent localities. Hitherto damages to machinery had frequently to be repaired in Melbourne, causing great loss by delay. In two cases which occurred lately, the working of machines were suspended for up to six weeks, owing to the necessity for sending to town for repairs of injuries and not a week passes without the occurrence of a similar instance." [1]

In 1862 the foundry advertised in these terms:

"All kinds of machinery, agricultural, mining etc., made or repaired with despatch. Boilers made and repaired. Plans, specifications,

estimates furnished for supply and erection of engines, crushing machines etc. Vivian and Co.'s patent amalgamating mills supplied on short notice." [9]

John Delbridge served his apprenticeship with Vivian and Company and later managed the foundry before moving to Sandhurst (Bendigo) in 1873 where he became a well known and highly regarded consulting engineer designing and superintending the erection of crushing, winding and pumping machinery for many of Bendigo's major mines. [3]

CHRONOLOGY:

- 1860 Erecting 20 head stamp battery for the Eaglehawk Union Company, Maldon. [7.981]
- 1861 Supplied a patent puddling machine for the Wattle Gully Company, Castlemaine. [5.49]
- 1862 Manufactured patent revolving basin amalgamators for the Eaglehawk Union Quartz Mining Company, Maldon [4.7]; battery tailings plunger pump for Hammond and Company, Tarnagulla [4.17]; 2 x 4 head battery for A. H. Heron, Tarnagulla [4.7]; 24 head battery for the New Chum Company, Pleasant Creek [4.3]; 16 head battery for the North and South Wales Company, Pleasant Creek [4.3]; a 6 horsepower steam engine for the Old Specimen Hill Gully Quartz Mining Association, Castlemaine [4.6]; a 24 head battery and steam engine for the Pleasant Creek Quartz Mining Company [4.3]; and a Laidlaw patent tailings plunger pump for G. E. Wright, Castlemaine. [4.4]
- 1864 Tailings pump for the Llanberis Quartz Mining Company, Ballarat. [4.9]
- 1865 Erection of machinery for the Castlemaine Deep Lead Gold Mining Company [4.47]; 12 head battery, 14 inch by 33 inch horizontal steam engine and boiler, 25 feet 6 inches by 6 feet for the General Windham Quartz Mining Company, Lauriston [4.328]; castings for the Hustler's Reef Quartz Crushing, Mining and Drainage Company [4.256]; patent friction winding gear for the Nuggetty Quartz Mining Company, Daylesford [4.128]; spare battery components and an iron amalgamation barrel for the Prince of Wales Gold Mining Company, Ballarat [4.186]; friction winding gear for the Victoria Company, Tarnagulla [4.243]; and a 2 x 6 head battery for the Adelaide Gully Gold Mining Company, Bendigo. [4.187]
- 1866 Patent tailings crushing machine for John Caldwell [4.23]; 16 inch by 36 inch horizontal steam engine for the Great Extended Eagle's Reef Gold Mining Company, Bendigo [4.118]; 25 horsepower steam engine for the Great Extended Hustler's Reef Quartz Mining Company [4.321]; crushing plant erected for the Hustler's Reef Quartz Crushing, Mining and Drainage Company, Sandhurst [4.216]; erection of pump, winding gear and steam engine for the Inglewood Alluvial Gold Mining Company [4.87]; erection of crushing machinery for the Star Reef Gold Mining Company, Eaglehawk [4.58-59]; and erection of crushing plant for the Unity Gold Mining Company, Inglewood. [4.87]
- 1867 Winding engine and winding gear for the Sparrowhawk Quartz Mining Company, Eaglehawk. [4.43]
- 1891 2 x 30 foot by 6 foot Cornish flue boilers still in operation at the New Red White and Blue Company, Sandhurst. [6.21]

- REFERENCES:
1. The Argus, 09.05.1857, p.5, col.4.
 2. R. A. Bradfield, "Flour Mill, Railway Foundry, Cobb and Co.", Castlemaine Mail Print, 1985.
 3. A. Sutherland, "Victoria and Its Metropolis: Past and Present", Melbourne, McCarron-Bird, 1888, vol.2, p.269.
 4. Dicker's Mining Record.
 5. Victoria, Department of Mines, Reports of the Mining Registrars and Surveyors, Castlemaine division.
 6. Victoria, Department of Mines, Reports of the Mining Registrars and Surveyors, Sandhurst division.
 7. Victoria, Department of Mines, Reports of the Mining Registrars and Surveyors, Maldon division.
 8. Victoria, Patent Office, "Patents and patentees." Melbourne, Government Printer, 28 volumes, 1854/66 - 1893.
 9. Dickers Mining Record, 25.04.1862, p.20 (advertisement)