

The Advent of Tin Dredges in Eastern Australia

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Peter Bell's illuminating review of Helen Brown's book, Tin at Tingha, in the Australian Journal of Historical Archaeology, Volume 5, highlights her assertion that 'the first tin dredge ever to be used in Australia started operating along Cope's Creek' near Tingha on 4 March 1901.¹ This statement by Helen Brown, without identifying the source of the information, raises questions of comparisons of technological development in both the tin and gold mining industries between Victoria, Tasmania and Queensland. Both industries were booming in Australia in 1900. However, New Zealand mining engineers already had perfected gold and tin dredges. They brought this technology to Australia to capitalise on the opportunities of large-scale alluvial workings which had ample water supplies but had long been abandoned by the Chinese.

At Cope's Creek, near Tingha in New South Wales, former Victorian gold miners formed the Cope's Creek Dredging (No Liability) Company, with a capital of 36 000 ten-shilling shares in 1900, and designed the tin dredge along the same lines as the gold dredges in Victoria. On a 121 hectare (300-acre) lease at Cope's Creek, 3.2 km outside Tingha town, the company spent £8,000 in its trials of the dredge, incorporating a hydraulic sluicing plant with Kershaw gravel pumps. It spent more on the machinery in 1901 to improve the tin-saving devices and to increase the capacity to an acre of wash-dirt per month.²

Much experimentation was done on the dredge in the face of local miners' scepticism. The company's adaption was the saving of the tin in sluice boxes, 30.5 m (100 feet) long and covered with perforated plates, through which gravel was pumped at the rate of 27 300 litres (6,000 gallons) per minute.³ It had commenced on mullock, and under manager Molyneaux the dredge was able to extract 50.8 kg (1 hundredweight) of tin in the first 1.5 m (5 feet) of boxes, without any sand adhering.⁴ The dredge then moved on to solid earth which the nozzle could excavate at a rate of 3.6 by 0.9 by 2.1 m (12 by 3 by 7 feet) in ten minutes. It was so efficient that it unearthed a long-buried boiler which exploded 27 years earlier, and revealed sapphires and a moderately sized diamond among the pebbles.⁵

Cope's Creek dredge was officially opened with a luncheon on Thursday 14 March 1901. The Under Secretary for Mines, C.H. McLachlan, the Chief Mining Surveyor, Mackay, Mining Warden, Marriott, contractor for the dredge, Davis, and the Inverell Mayor were in attendance and spoke glowingly of the dredge's capabilities. To the 70 invited guests manager Molyneaux claimed his dredge had established a record 'inasmuch as it was paying for development work'.⁶

A detailed technical description of tin dredging methods used at Tingha in 1907 appears in the book, *Metallurgy of Tin*, by P.J. Thibault. The hydraulicing plant which the Cope's Creek Company was using was not strictly speaking a dredge. In a hydraulicing plant the stanniferous wash-dirt was disintegrated by a strong jet of water, and the wash and water were conveyed through sluices; the tailings were washed away and the water was reused. In the Tingha

hydraulicing plants the 30-cm (12-inch) nozzle, also known as 'Monitor', 'Giant' or 'Long Tom', was mounted on a barge in the creek or dam created for the purpose, at a sufficient height to obtain a good grade and enough room for the tailings to drop. The barge, 13 by 12 by 1.2 m (43 by 40 by 4 feet), was built to float in 1.05 m (3.5 feet) of water. Two 45 kw (60 hp) marine boilers generated the steam which was condensed for reuse.

The nozzle operating on the face of ground was connected with nozzle pumps by steel pipes through which water flowed at 8440 kpa (35 pounds per square inch) pressure. The disintegrated material was carried through a race to the well-hole from where it was drawn by gravel pump to the sluice boxes above the roof of the barge. The total length of the sluice boxes was 45 m (150 feet), 33 m (110 feet) of it suspended on upright poles with a fall of 140 mm (5.5 inches) in 3.6 m (12 feet). A heavy steel plate, called a riffle, was placed at a distance of 6 m (20 feet) from the head of the sluice, and another about every succeeding 4.9 m (16 feet). In operating the sluice, riffles 50 mm (2 inches) high were put in, and as the tin crept towards it, another 25 mm (one inch) riffle was put in. Riffles were added until 600 mm (2 feet) high. The running down was then commenced. Over the next three hours water was run through the sluice boxes and the riffles were removed, starting at the tail end of the box. At the same time the sluice man and his assistants shovelled back the material in the sluice so that the heavy tin oxide settled in the bottom of the sluice. The water carried off the lighter siliceous material. The tin then was drawn down a shoot into a small wooden sluice box to remove the white sand. The tailings were retreated if necessary. A Willoughby machine then removed black sand which was retreated to extract tin. The Willoughby machine consisted of an outer tank with hand pump and pressure box and separating box with a perforated copper-plate false bottom. A stream of water under a head of 300-900 mm (one to three feet) rose through the concentrates causing lighter impurities to ascend, and light sand overflowed with the water. The excess water drained off. The Willoughby machine did the final treatment before the dressed tin was ready for market. Although the manager boasted little loss of tin he was

aware of the need for further technological improvement. Within a short time tributaries were working their tailings.⁷

Gold dredges had been in use in Victoria, however, since the 1880s. These had been used for extraction of tin as well as gold at Woolshed, Rowdy Flat and Staghorn Flat, but evidently the tin was not in marketable quantities. Stream tin was also located with the gold at Yackandandah in 1888.⁸

Several tin dredging claims were taken up at Weldborough in Tasmania in 1899–1900 to work the river beds for tin ore, and in the same year an 200-mm (8-inch) hydraulic elevator was erected by the South Esk Company at Avoca.⁹ In 1900 the best-equipped tin dredge in Tasmania was erected at the Pioneer Tin Mine where the pontoon, 13.7 by 12 m (45 by 40 feet) powered by two boilers, worked on tin ground using water supplied in races from the Weld, Frome and Wyniford Rivers. Three years earlier the Tasmanian Tin Dredging Company constructed a suction dredge which operated unsuccessfully on the Ringarooma River at Derby. Two other well designed tin dredges commenced operating in Tasmania in 1900. Ringadooma Tin Mines Ltd, a Scottish company floated in July 1900, commenced tin dredging on North Brothers' Home Lease, Triangle Company's lease and T. Beswick's deep lead at South Mount Cameron. In the Branxholm locality the Arba Company erected a suction dredge and hauling plant that year as well. At the same time, one of the best-designed gold dredges was installed at the Whyte River by Boyle and Clarkson of Launceston to a design by F.W. Payne of Dunedin, New Zealand.¹⁰ Near St Helens a steam-driven centrifugal gravel pump plant was being installed in 1900 beside a water race on Golden Fleece Rivulet by the Royal Ruby Tin Mining Company, No Liability. A feature of the plant was that it could reuse the water and work on the flat open ground where an artificial lake could be formed.¹¹

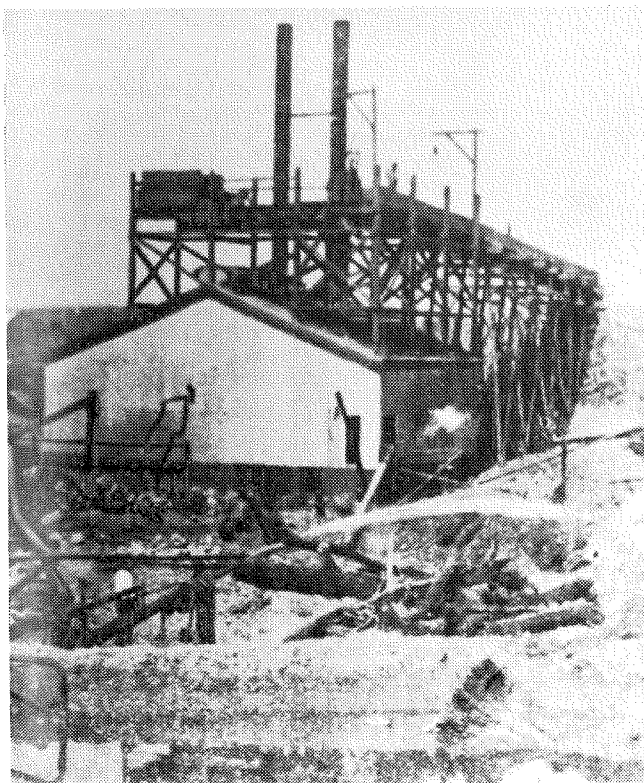


Fig 1: View of Tingha tin dredge in 1907 showing barge, sluice boxes and nozzle at work. (From Australian Mining Standard).

In Queensland efficient dredges were first introduced in 1900. G.C. Willcocks, an engineer,¹² introduced the first up-to-date gold dredge in 1900 at Cania in central Queensland. It was built by the engineering firm of Littler and Bruck in Rockhampton.¹³

Tin dredges were also introduced on the Stanthorpe tinfield in 1900. Two pontoons and machinery were constructed and installed on the Broadwater (old Brisbane claim) and the Stanthorpe proprietary Company's claim that year but did not commence operations until 1901 and 1902 respectively. They were ladder-bucket-type dredges.¹⁴ Both experienced operational difficulties on commencement.¹⁵

In north Queensland tin dredging was not introduced until the next tin boom in 1906 at the Annan River, south of Cooktown, and at Mount Garnet. The Mount Garnet Hydraulic Tin Sluicing Company of which G.C. Willcocks was a director and shareholder, was formed to extract tin from Glutton's Gully close to the Retuen Creek dam at Mount Garnet. This venture was co-ordinated by Thomas Welsby, a Brisbane accountant and co-trustee with Willcocks of the Mount Garnet Company, and was managed by R.F. Waller. They introduced hydraulic sluicing with centrifugal pump and revolving screens to sluice the tin. The advantages of sluicing were bulk treatment and portability of machinery from creek to creek. This company was endeavouring to make a bulk low-assay ore payable by supplying the bagged tin to the Irvinebank Mining Company's smelter at Irvinebank. In the first six months of 1908 the company sold 34 tonnes (28 tons) of tin for £2,120 but that was not economical for either the company or tributors.¹⁶

Hydraulicising by 'Giant' nozzle was being used at the Annan River south-east of Cooktown from 1906 where water was brought by the water race along Parrot Creek between Leswell and Collingwood through a tunnel. This plant operated until September 1916 when removed to Cooktown. Operations were recommenced by tributors in 1917 and operated until 1922.¹⁷

In summation, it appears that on Thursday 14 March 1901 the politicians and public servants of New South Wales were celebrating a more parochial event. To claim that that Cope's Creek Company's tin dredge at Tingha was the first in Australia is to ignore the active operation of the tin dredges in the forests of western Tasmania in 1900.

NOTES

1. Helen Brown indicated to me that the *Inverell Times* was the source of her information. There is obviously a typographical error in her book, *Tin at Tingha* (Armidale, Helen Brown, 1982) on page 51, as the *Inverell Times* of 16 March 1901 stated that the Cope's Creek dredge was opened officially on 'Thursday last' which was the 14th.
2. *New South Wales Mines Department Annual Report 1900*, pp.35, 37 and 59; 1901 pp.34 and 36.
3. *Inverell Times*, 6 February 1901.
4. *Inverell Times*, 9 February 1901.
5. *Inverell Times*, 16 February 1901.
6. *Inverell Times*, 16 March 1901.
7. P. J. Thibault, 'Metallurgy of Tin', in *Australian Mining Standard*, 1908, pp.9, 55-70, 73-80; see also *Australian Mining Standard*, 10 April 1907.
8. Report of the Royal Commission on Gold Mining in Victoria, 30 September 1891 p.xxv. Victorian Parliamentary Papers 1891 Vol. 5.
9. *Tasmanian Mines Department Annual Report 1899-1900*, p.10.
10. *Tasmanian Mines Department Annual Report 1900-1901* pp.xi, xii, xxix, xxxii, xxxiii.
11. *Report on the Mineral Districts of the Scamander River and St Helens, 4 June 1900*, Government Geologist's Office, Launceston, pp.92-93.
12. See *A Biographical Register 1788-1939* Vol. 2, p.344 for biographical details of George Charles Willocks (1857-1916). As a railway contractor, he constructed the following Queensland Government railways between 1887 and 1903: Cooran to Gympie, the Cleveland branch, Yandina to Cooran, Charleville to Wyandra, Bundaberg to Gladstone Section 2B, the Broadmount Branch, Rockhampton to North Rockhampton including the Alexandra bridge, Hughenden to Winton Section 3 and Gladstone to Rockhampton Section 2. He partnered Firth to construct Gayndah Branch Section 2, and with Overend, constructed the private Mount Garnet railway in north Queensland in 1900-1902. Willocks also constructed several New South Wales railways.
13. *Queensland Government Mining Journal* Vol. 1 p.88 (15 August 1900).
14. *Annual Report of the Queensland Mines Department 1900*, pp.15, 16, 124-5; including Report of the Queensland Geological Survey for 1900 by William Rands, Government Geologist, pp.181-182, and photographs of the Stanthorpe Proprietary Company and Broadwater pontoons.
15. *Annual Report of the Queensland Mines Department 1901* p.107; 1902 p.108.
16. *Annual Report of the Queensland Mines Department 1907* p.12; 1908 p.75.
17. *Annual Report of the Queensland Mines Department 1906* p.50; 1907 p.48; 1916 p.70; 1917 p.70; 1922 p.49.