

Development of Tasmanian water right legislation 1877-1885: a tortuous process

By KEITH PRESTON

Prior to the Australian gold rushes of the 1850s, a right to water was governed by the riparian doctrine, a common law principle of entitlement that was established in Great Britain during the 15th and 16th centuries.¹ Water entitlements were tied to land ownership whereby the occupant could access a watercourse flowing through a landholding or along its boundary. This doctrine was introduced to New South Wales and Van Diemen's Land in 1828 with the passing of the Australian Courts Act (9 Geo. No. 4) that transferred 'all laws and statutes in force in the realm of England'.² The riparian doctrine became part of New South Wales common law following a Supreme Court ruling in 1859.³ During the Californian and Victorian gold rushes, the principle of prior appropriation was established to protect the rights of mining leaseholders on crown land but riparian rights were retained for other users, particularly for irrigation of private land. The principle of prior appropriation was based on first possession, which established priority when later users obtained water from a common source, although these rights could be traded and were a valuable asset in the regulation of water supply to competing claims on mining fields.⁴ In Tasmania, disputes over water rights between 1881-85 challenged the application of these two doctrines, forcing repeated revision of legislation.

The Tasmanian Parliament passed the first gold mining legislation in September 1859, eight years after the first gold rushes in Victoria and New South Wales, which marked the widespread introduction of alluvial mining in Australia. The Gold Fields Regulation Act (23 Vict. No. 26, Section 8) made provision 'to grant water-rights and other easements ... and to fix the amount paid by way of rent or royalty for the same'. In 1862 the Mineral Lands Act (26 Vict. No. 4, s. 3) introduced the same right to water when mining metalliferous deposits (other than gold) or coal. Regulations for water rights were expanded under the 1870 Gold Fields Regulation Act (44 Vict. No. 16: s. 32 to 42). Much of this early legislation was drawn from the gold rush-era Victorian legislation, particularly the by-laws introduced by Mining Boards, which included water right regulations.⁵ This legislation proved adequate prior to 1875 when mining was principally for gold, but following the rapid introduction of tin mining at Mount Bischoff (lode deposits) and the northeast of the state (large-scale alluvial mining), legislators realised that additional measures were required.

In 1875, the first Mineral Lands bill drafted by Attorney-General William R. Giblin (Fig. 1) in conjunction with the Minister of Lands & Works (William Moore) was defeated, but the following year a further bill promoted by Moore's successor (Christopher O'Reilly - Fig. 2) formed the basis for the 1877 Mineral Lands Act (41 Vict. No. 7).⁶ Regulations under this act outlined information required when applications were submitted, such as the source and quantity of water in sluice-heads,

the number and location of proposed storage dams, length of the supply race and its intended course.⁷ If a survey plan was not submitted when a water right application was lodged, the Lands Department was responsible for undertaking a survey of the race alignment and proposed dam locations, before a lease was issued.

Figure 1: *Attorneys-General William Giblin (left) and Sir John Dodds (right).*



Source: Tasmanian Archive & Heritage Office, 'Members of the Parliament of Tasmania'.

1877 Mineral Lands Act

In accordance with established law, a water right was treated as an easement in the 1877 Mineral Lands Act (Section 18), whereby a 6.1m wide strip of land was reserved to serve 'for protection of race', a measure introduced in the 1870 Gold Fields Regulation Act (34 Vict. No. 6).⁸ Where multiple applications for water from a common source were submitted, precedence in order of application date applied in accordance with the prior appropriation doctrine. The sluice-head had also been introduced in the 1870 Act to standardize water measurement, this now replicated in the 1877 Mineral Lands Act as the 'quantity of water as shall pass through an aperture sixteen inches wide and one inch deep, with a pressure not exceeding six inches'.⁹ This followed the lead of New South Wales and New Zealand, drawing on practices established in California and adopted in Australia during the 1850s.¹⁰

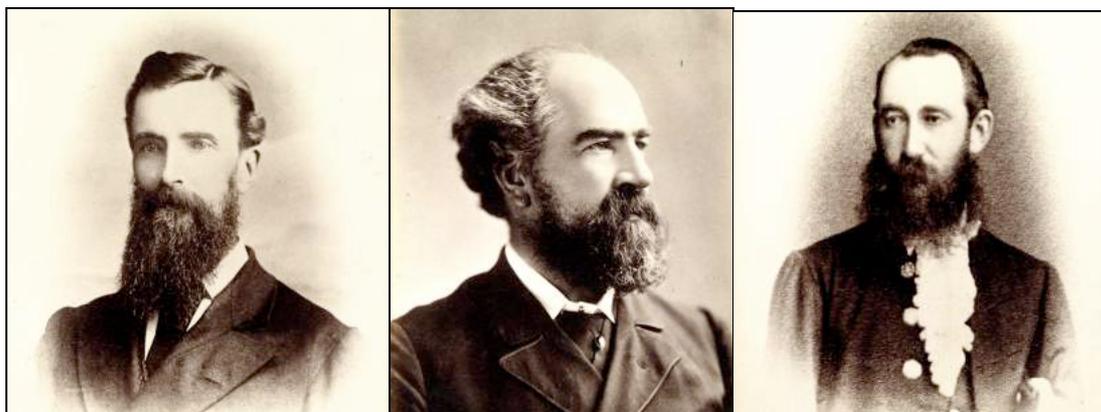
By 1880, amendments to the Act were required to resolve conflicting issues when both gold and other metalliferous ores (mainly iron or tin) were discovered within the same lease, resulting in confusion and confrontation, particularly on the Beaconsfield goldfield. In May 1880 a Launceston public meeting resolved to form the Tasmanian Mining Association 'to encourage the settlement of a mining population and the investment of capital'. Prominent members holding tin mining interests included directors of the Briseis TM [Tin Mining] Co., Henry A. Thompson (vice president) and Thomas Bruce. In response, Lands Minister Christopher O'Reilly and Attorney-General John S. Dodds (Fig. 1) visited Mount Bischoff later in the month requesting input into revised mining legislation.¹¹

The 1880 Mineral Lands Amendment Act repealed 12 of the 54 sections of the 1877 Act, including five sections relating to the powers of the Mines Commissioner and the Supreme Court.¹² As this failed to eliminate confusion with respect to gold being mined in conjunction with other metals, the 1881 Mineral Lands Amendment Act was passed the following year, in which a further section of the 1877 Act and four sections of the 1880 Amended Act were also repealed.¹³ During passage of the 1881 bill, the competence of legislators was widely criticised and even ridiculed by the press, being summed up following a select committee review:

... the alterations made in the Assembly were few, but considering the amount of ignorance manifested by Ministers as well as members, and the desire evinced by the latter to strike out everything that they did not understand, it is a matter for congratulation that the bill escaped serious mutilation in Committee.¹⁴

Regulations under the 1881 Mineral Lands Amendment Act were released in February 1882, containing amendments and additions that had been inserted following the first significant test of the legislation in the Court of Mines during the latter half of the previous year – this was a dispute between the Briseis and Brothers' Home No. 1 Company's.¹⁵

Figure 2: *Lands Ministers Christopher O'Reilly (left) & Nicholas Brown (centre), with Secretary of Mines Bernard Shaw (right).*



Source: Tasmanian Archive & Heritage Office, 'Members of the Parliament of Tasmania'.

Briseis vs Brothers' Home No. 1 dispute

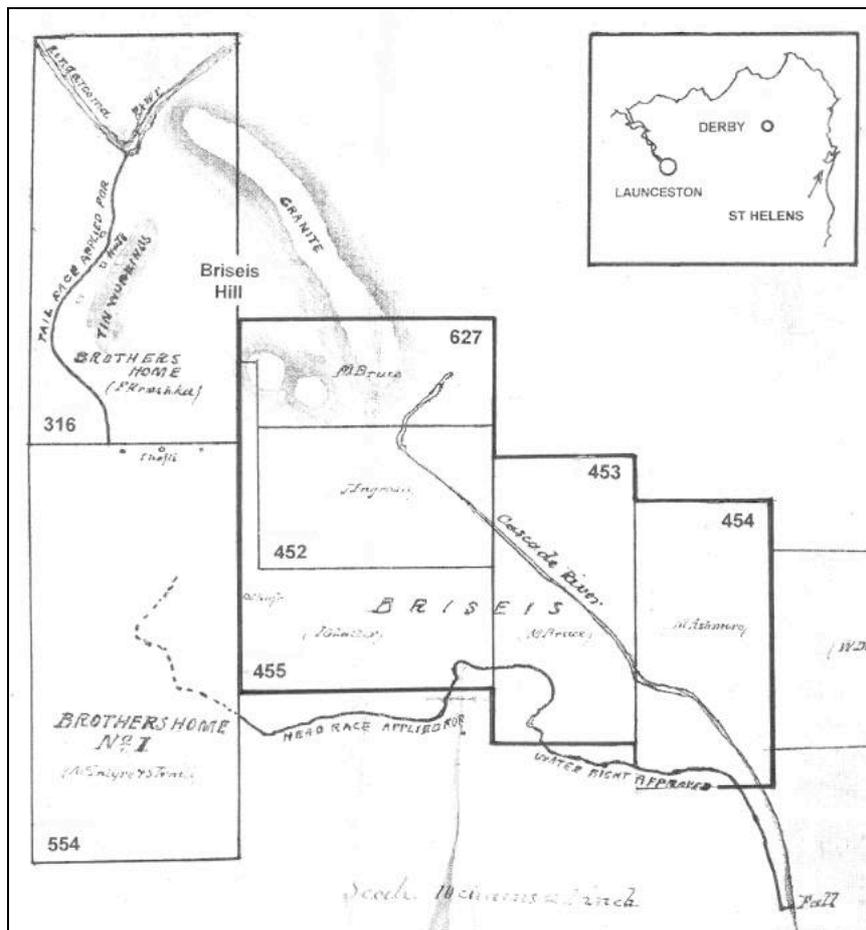
In mid-1876 a deep lead was being worked by the Krushka brothers on a 32ha lease (No. 316) fronting the southern bank of the Ringarooma River at Derby. Adjoining leases were promptly taken up and consolidated into the holdings of the Briseis and Brothers' Home No. 1 TM Company's (see Fig. 3).¹⁶ The most convenient source of water for working both the Brothers' Home No. 1 [hereafter BH1 Co.] and Briseis leases was the Cascade River that flowed through the Briseis leaseholdings. The Briseis Company had exercised its riparian right to water from the Cascade River in August 1878, when mine manager Maxwell Bruce supervised construction of a 1,208m long race.¹⁷ A cutting in the granite bedrock some 3.35m deep and of similar width had been formed at the head of the race, which was then conveyed across the river gorge by

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means of a 'race made of timber [that] resembles a large punt'.¹⁸ No further reports of progress have been found, suggesting that the shallow alluvial deposits were quickly exhausted.

An application for 20 sluice-heads by the BH1 Co. was registered in December 1880, with the intake to be located upstream of the Briseis lease boundary.¹⁹ Before the race alignment had been determined by survey, the Briseis Co. lodged an objection with the Lands Department in March, claiming that the application did not conform with the requirements of the 1877 Mineral Lands Act, because part of the intended race extended through their leases, thereby potentially creating problems for future mining.²⁰ At the Court of Mines hearing five months later, Commissioner for Mines & Gold Fields (Bernard Shaw - Fig. 2) ruled that no decision could be made concerning the water right application prior to completion of an accurate survey plan. Further, the Commissioner pointed out that the Minister of Lands would need to authorize any water race construction on claims held by third parties.²¹ Following the withdrawal of the Briseis objection, discussions between the two parties commenced at the end of November 1881 to establish a race alignment. This occurred prior to the survey being undertaken and WR [water right] 16 being granted on the 18th March 1882.²²

Figure 3: Sketch plan of Brothers' Home No. 1 and Briseis lease holdings together with Brothers' Home No. 1 supply race (WR 16). Lease numbers added. (See Appendix 1 for details of water right details).



Source: Tasmanian Archive & Heritage Office, MIN 1/1/44, undated but probably Sep-Oct 1882.

1881 Mineral Lands Amendment Act

As a result of the *Briseis vs BH1* dispute, two additional regulations were added under the 1881 Mineral Lands Amendment Act, the first (Section 26) dealing with the sale of water for the first time:

the holder of a water-right ... shall not be restricted to the use of such water in or upon or in connection with any claim held by him, but may sell and dispose of such water for mining purposes or for the domestic purposes of those engaged in mining.²³

This measure was a likely acknowledgement of impending water right applications for quantities exceeding 20 sluice-heads, in anticipation of large-scale tin mining developments.²⁴ The following section of the new regulations sought to clarify the quantity of water that could be taken by riparian right from a natural watercourse located within a mineral lease. This replicated Section 37 of the 1870 Gold Fields Regulation Act (34 Vict. No. 6) but was now intended for alluvial tin working:

- for sluicing – one sluice-head for every three men employed;
- for puddling by horse – 0.5 sluice-head per horse-power;
- for puddling using steam power – up to 2 sluice-heads;
- for ‘pumping or crushing with water-wheel’ – up to 2 sluice-heads;
- for ‘crushing purposes, for every stamp-head employed’ – 1/8th sluice-head.²⁵

The small water quantities cited and references to ‘puddling and crushing’ clearly indicated a lack of understanding by legislators of alluvial tin processing practices. In addition, there was no provision for the impending take-up of hydraulic sluicing, where in order to provide adequate water pressure for satisfactory operation, long supply races were required that extended beyond individual lease holdings, that is, riparian water rights were inappropriate.

Within six weeks of the new regulations being gazetted, in mid-February 1882, representatives of a committee of the Launceston Stock Exchange raised their objections directly with Premier William R. Giblin.²⁶ The views of the committee were no doubt strongly influenced by its chairman Henry A. Thompson (also a *Briseis* director), who was Melbourne-based and held significant mining interests in Victoria.²⁷ In linking water rights with labour employment in Section 27, the committee was concerned that riparian water entitlements would be disadvantaged by water rights granted under prior appropriation, particularly where large water rights of 40-60 sluice-heads were awarded. Another deputation, that included Thompson, met with Lands Minister O’Reilly and Goldfields Commissioner Shaw three weeks later to emphasize the deficiencies of the new legislation. Thompson ‘pointed out the difficulty of taking Victorian regulations as a guide for Tasmania’ in some detail, and also lobbied for the Lands Office in Launceston to be given greater autonomy in administering the northern mineral districts – this the first of many such calls extending into the 21st century.²⁸

Briseis vs BH1 dispute renewed

Construction of the 2,015m long headrace (WR 16) to the Brothers Home claim was practically completed in July 1882, when mining engineer John Lewis was engaged to review future mine working. He complimented mine manager Matthew Patrick in overcoming adverse terrain that required the erection of fluming along the precipitous bank of the Cascade River.²⁹ In a provocative move, the Briseis Co. waited until production on the Brothers Home claim was about to commence in September, before lodging an objection with Lands Minister O'Reilly, claiming that the race 'is cut for some 302m in a tin-bearing drift which is now in course of working by the Briseis Company'.³⁰ An injunction was obtained the following day by the BH1 Co. preventing trespass (by mining) of the race easement, and the Briseis Co. responded by obtaining an injunction preventing use of the race. Both parties contravened the injunctions: the Briseis Co. to 'cut away' a section of the race and the BH1 Co. to replace the damaged section of race with fluming in order to continue mining. At a Court of Mines hearing the following month before Commissioner Shaw, some doubt was raised about discrepancies between the race alignment determined by the Lands Department surveyor, and a survey plan attached to the water right. Commissioner Shaw promptly adjourned the hearing pending further survey work.³¹

In advance of a resumed hearing, Shaw prepared a report for the Lands Minister absolving the mining companies of any attempted fraud or coercion of the Lands Department surveyors, concluding that the water right:

is so faulty ... that it would be useless to attempt to rectify it simply by endorsing on it a new plan and amended description ... if possible it ought to be surrendered and cancelled ... and a fresh lease issued in the form prescribed in the present regulations.³²

At the resumed hearing on the 11th December, Commissioner Shaw revealed that the 'Government ... were taking steps to rectify a blunder made in the Lands office by a draughtsman', highlighting deficiencies in the administrative capability of the under resourced department.³³ A meeting of the State Executive Council had been held ten days earlier, the participants comprising 'a whole host of legal talent' including the Governor Sir George C. Strahan, Premier (also Attorney-General) Giblin, Colonial Secretary William Moore, Treasurer and former Attorney-General John S. Dodds and also Nicholas J. Brown (Fig. 2), who was sworn in as the new Lands Minister.³⁴ O'Reilly's resignation had been expected as he was held accountable for the 'internal disorganisation of his department, partly through the insufficiency, partly through the incompetency, and, truth compels us to say, partly through the malpractices of officers of the department'.³⁵ Four months earlier, O'Reilly was criticised in the House of Assembly by former Attorney-General Alfred Dobson, who moved a motion supporting the formation of a mines department.³⁶ O'Reilly's vigorous defence succeeded in having the motion withdrawn, by pointing out that resources had not kept pace with a ten-fold increase in lease applications between 1874-1881 (to 1463), only 20 per cent of the applications having been processed.³⁷

As the Briseis tin deposits were effectively sterilised by the water right lease, Henry Thompson now resorted to a final disingenuous proposal for continued working. He approached Lands Minister Brown for a section of the race to be tunnelled to eliminate the circuitous route within the corner of Leases 453 & 455 (Fig. 3), this proposal relayed to the BH1 Co. by Commissioner Shaw. A negative response was unsurprising, given that Thompson made no apparent offer to fund further construction, leaving the BH1 Co. to bear the potential costs.³⁸

1882 Mineral Lands Amendment Act

The Briseis vs BH1 Co. dispute galvanised legislators into action with the task of preserving the validity of all existing leases, in order to maintain confidence in their administrative capability and secure a vibrant mining industry. One of Minister O'Reilly's last actions was to urgently draft another bill to further amend the 1877 Mineral Lands Act before the end of the last parliamentary session of 1882. To ensure industry acceptance and a smooth passage for the bill, Attorney-General Dodds distributed the draft bill to Launceston mining interests. A petition was hastily prepared under Thompson's guidance, and a large deputation descended on the Premier and Lands Minister on 31st October in time for the second reading in the Legislative Council the following day.³⁹ Given the concern about the legality of water rights issued by the Lands Department, Section 5 provided that 'All Water-rights and all Rights to construct races heretofore granted ... shall be deemed to have been validly granted'. The same section also reiterated the riparian water rights of leaseholders. Passage of the bill following a third reading on the 4th November, completed the whirlwind passage of legislation only two weeks after the Court of Mines hearing of the Briseis vs BH1 Co. dispute.⁴⁰

However, an issue raised by BH1 Co. director Charles H. Grant at the meeting with the Premier remained unresolved, this being an industry-held view that water entitlements 'should be given in the form of water-rights, and not leases of land'.⁴¹ Over the following month recriminations were vented in the press by opposing directors Thompson and Grant: the BH1 Co. being unfairly criticised for contouring their supply race around the hillside rather than over an elevated basalt capping layer requiring an expensive engineered solution; the Briseis Co. for misleading conduct in initially approving the race alignment, only to renege on a verbal agreement once tin deposits were cut during race construction.⁴² The adjourned Court of Mines hearing was finally resumed on 11th December, with all obstacles removed by re-issuing the BH1 Co. water right and the introduction of revised legislation. Only formalities were left to be resolved: that of lifting the injunctions and apportioning costs. A claim for legal costs totalling almost £191 was duly submitted by the BH1 Co. three months later, together with an endorsement from Commissioner Shaw that no blame should be attributed to the company.⁴³

Premier Giblin continued to re-organise his ministry in December when he exchanged his secondary role as Treasurer with Sir James Dodds for that of Attorney-General, the timing no doubt influenced by the government's inability to produce

effective mining legislation. Giblin's heavy workload during his five-year term was a likely factor in his premature resignation from parliamentary duties in November 1886 due to failing health from heart disease, and his early death aged 46.⁴⁴

Office of Mines established

Separation of the mines section from the Lands and Works Department commenced in late 1882 at the instigation of the Mines Commissioner Shaw, who was rewarded for his stellar efforts over the previous three years by being appointed to the newly created post of Secretary of Mines, in January 1883.⁴⁵ The number of mining districts was increased to five, each administered by a Commissioner for Mines & Goldfields: Eastern (office at St Helens), North-Eastern (Scottsdale), North-Western (Emu Bay), Western (Remine) and Northern and Southern (Launceston) embracing the remaining mining areas.⁴⁶ Commissioner Shaw was replaced at Launceston by Francis Belstead, and former Lands Minister O'Reilly was appointed to administer the North-Eastern District, which included the Ringarooma basin tin deposits.⁴⁷

Shaw was critical of the chaotic state of the records received from the Lands Department, 'a large number of applications for leases and water rights [total of 2,092] were in abeyance; of water rights especially very few indeed had ever been issued'.⁴⁸ All correspondence had to be transcribed and sorted, a system of registering all lease applications (including water rights) implemented, and processes streamlined to minimise delays in awarding leases. Similar reforms were also required within the Survey Branch following the appointment of Charles P. Sprent to the Deputy-Commissioner of Crown Lands.⁴⁹ One important task remained to be undertaken, that of 'the preparation of a complete set of reliable plans [which] is a matter I have been unable, with the present strength of the office, to attempt. Those handed over ... are not accurate'.⁵⁰ Assistant Surveyor-General of Victoria (Alexander Black) undertook a review of survey practices, urging that priority be given to the compilation of mineral charts showing leases.⁵¹ On reviewing progress during the first 18 months operation of the Mines Office, Shaw revealed that enquiries relating to pre-1883 transactions 'involve a vast amount of labour ... appears to be in no appreciable degree diminishing'.⁵²

1884 Mineral Lands Act (47 Vict. No 10)

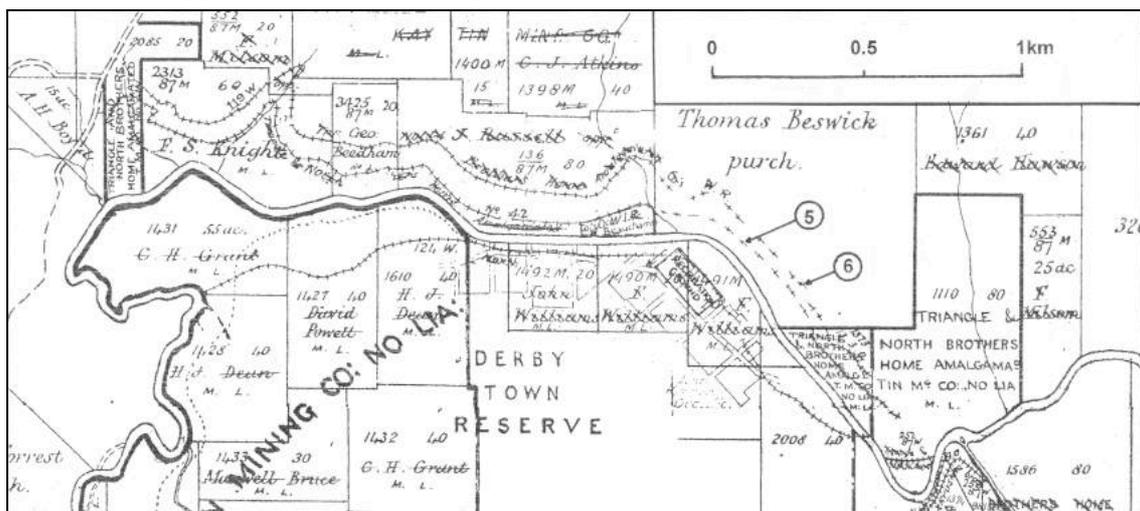
During the first half of 1883 Lands Minister Brown and Attorney-General Giblin drafted a new Mineral Lands bill to replace the 1877 Act, and again sought the views of the Launceston Stock Exchange. The contentious Section 27 of the 1881 Amended Mineral Lands Act for a riparian water right, was replaced by an entitlement to an unlimited quantity that 'shall not exceed the quantity actually and *bona fide* required in connection with mining operations'.⁵³ On the recommendation of the Launceston Stock Exchange, water right entitlements were separated for the first time from those for easements. A mining easement included the right 'to cut, excavate, sink, erect, build, make, or construct drains, tailraces, sludge channels, tunnels, shafts, buildings, tramways, or other works for mining purposes'.⁵⁴ Provision was made in Section 50 for

compensation to be awarded for damage resulting from the construction of water races or other works on easements. All regulations in force under the 1877 Mineral Lands Act were retained under the new act.

Mining north of the Ringarooma River commences

News that rich tin deposits were being mined on the Krushka Brothers lease spread to Melbourne, encouraging mining investor E.B. Firebrace to take up the 32ha Lease 1110 north of the Ringarooma River (Fig. 4), which was transferred to the recently formed North Brothers Home TM Co. [NBH Co.] in November 1881.⁵⁵ Notice that the company had been floated also revealed that an application had been lodged for a 40 sluice-head water right from the Legerwood Rivulet, some 7.5km (in a direct line) to the WSW of the claim. This was not granted until July 1883 (as WR 61) following the transfer of records to the Mines Office – the recently compiled indexes also revealing that a further 10 sluice-heads (WR 42) had been granted two months later.⁵⁶ This same water right was originally granted by the Lands Department on 6th September 1882 – another example of the shambolic record keeping.⁵⁷

Figure 4: Supply races of the North Brothers' Home Co. on the northern bank of the Ringarooma River extending from Boyd's Creek: low-level WR 42 & high-level WR 119W. (See Appendix 1 for water right details).



Source: Mineral Resources Tasmania, Mineral Chart 149b, November 1885 - May 1891.

Mine manager James Brown was appointed at a directors meeting at the end of December 1881, and Lands Department surveyor Nicholas Simmons was on site a month later to peg a suitable race alignment from Boyd's Creek located approximately 4km west of the claim – this later referred to as the *low-level race*.⁵⁸ Tenders were called at the end of February for construction of 'the largest water-race in the colony', and in June the survey of a circuitous extension of some 33km to the Legerwood River was completed.⁵⁹

Challenging terrain was encountered along the first section of the race to Boyd's Creek as it 'passes along a very steep sideling', resulting in an overly steep grade being adopted, associated with a reduction of the pressure head for sluicing. Present day topographical mapping reveals that the Ringarooma River is contained within a steeply

incised 100m deep gorge immediately to the west of the claim, preventing direct access to the river. Following a site visit in November to re-survey the race, director and mining engineer Richard D. Thompson explained at a shareholders meeting in November 1883:⁶⁰

that serious errors had been made in running the levels of the water-race; that a loss of at least 75ft. in the height of the head race had resulted ... the sole difficulty in obtaining payable outputs of tin ore continuously was the intermittent and insufficient supply of water at a sufficient elevation to command the top stuff [overburden], which must be removed to reach the richer underlying deposits of tin.⁶¹

As the difference between the design grade of the race and the as-built grade surveyed by Thompson does not explain such a large error, it is possible that the government surveyor became a convenient scapegoat to deflect criticism of the management's lack of engineering oversight. While on site, Thompson surveyed a *high-level race* alignment to regain the 22.875m lost elevation and an application for six sluice-heads was lodged later in the month.⁶²

Lands Department legacy: North Brothers' Home [NBH] vs Triangle dispute

In May 1882, Charles Fry transferred to the aptly named Triangle TM Co., a small 5.2ha claim adjoining the western boundary of the NBH Co. The Launceston-registered company was controlled by the three Krushka brothers, with a combined 31 per cent share holding.⁶³ In a re-run of the Briseis vs BH1 dispute, the Lands Department had issued a lease for the claim only two months after the NBH Co. WR 42 had been granted, this water race extending through the Triangle lease. (Fig. 4). In December Commissioner Shaw, who took up the post of Mines Minister ten days later, was alerted to the potential problem as the 'lease of Triangle Co. not yet exchanged but the North Brothers Home Co. hold the lease for their water right'.⁶⁴ The timing of a Ministerial tour of the North-East mining district four months later, which included recently appointed Lands Minister Brown, appears more than mere coincidence. The party was met at Moorina by Mines Commissioner O'Reilly, local member of parliament Charles B. Grubb MHA (for Selby), James Scott MHA (South Launceston) and prominent prospector George R. Bell who joined the tour to inspect the BH1, NBH & Triangle properties.⁶⁵

Mining of the Triangle claim proceeded by progressively cutting a face northwards from the flood plain into the steeply-inclined river bank. In May 1883 tenders were called for carting tin oxide to Bridport for shipment to Launceston, and by December regular shipments were underway in combination with the Krushka brothers and Arba mines.⁶⁶ Approaches by the Triangle Co. to obtain water from the NBH Co. supply race or to consider amalgamation, were initially rejected. Despite warnings and exchange of correspondence between the legal secretaries concerning the inevitable outcome, slumping of the overburden above the Triangle face cut the NBH Co. race on 11th December. A temporary repair by means of '48ft of fluming put in to bridge over the damaged portion of the race ... [at a] great height (over 70ft) where the race was

carried away', resulted in only 50 hours lost production. The ramifications for future operations were, however, of greater severity.⁶⁷

In January 1884, Commissioner O'Reilly heard a charge of trespass by the Triangle Co. on the NBH Co. water right in the Court of Mines. Lands Department surveyors testified that there were discrepancies between their surveyed plans, showing the NBH Co. water race and the position of the race shown on the plan attached to the Triangle lease, this produced by a Lands Department draughtsman.⁶⁸ There was no order from Shaw for a check survey to be undertaken however, as the findings would further highlight the shortcomings of the Lands Department prior to January 1883. As O'Reilly had overseen the introduction of the 1882 Mineral Lands Amendment Act, which made all earlier leases and water rights valid, there was to be no repeat of the legislative wrangling that followed the *Briseis v BH1* dispute. Shaw pointed out that the dispute could have been avoided, as there was provision in the 1882 Amended Act (Section 7) for a Commissioner:

to order and determine the mode in which any race or drain shall be carried or constructed, or in which water shall be conveyed, through, over or across any land, so as to cause as little interference as the Commissioner may deem practicable with the profitable working of such land.

Shaw may have implied that a deviation of the NBH Co. race was possible within the legislative framework to enable the Triangle Co. to continue mining, but as the water right application was made two months prior to the enactment date of the 1882 Amended Act, it seems pertinent that for a retrospective ruling to apply, it would need to be tested in court.⁶⁹ As no challenge was forthcoming, the Triangle Co. was found guilty and ordered to discontinue further trespass, that is, no further mining operations that could undermine the race were permitted.⁷⁰

Triangle Co. appeal

An appeal by the Triangle Co. to the Supreme Court in April 1884 was heard before Justice John W. Rogers and Acting-Chief Justice William L. Dobson.⁷¹ Counsel for the Triangle Co. argued that the NBH Co. had not 'maintained' their water race by lining the ditch with clay to prevent infiltration from weakening the highly permeable alluvial deposits, thereby leading to slumping above the opencut face.⁷² NBH Co. mine manager Michael J. Griffin had testified at the Court of Mines hearing that the face 'was "weeping", prior to the earth giving way on the 11th December... if [the water] got through the basaltic crust it would percolate through the drift very quickly', but additional evidence failed to reveal the source of the water.⁷³ Justice Dobson considered that any groundwater seepage resulting from 'overflow or percolation ... would amount to trespass' on the Triangle lease, but this had not been addressed by Commissioner O'Reilly. Justice Rogers went further in stressing that a:

grant of a water right ... carries with it the obligation on the grantees of constructing the race in so skilful and efficient a manner as that no overflow or percolation shall escape into a neighbour's land by which a larger extent of

adjoining land would be necessary to support the race ... unless this principle were maintained, the granting of parallel races at no great distance apart, might shut up a whole country side from mining operations'.⁷⁴

A further hearing of the Court of Mines was ordered by the Supreme Court to obtain additional testimonies relating to the cause of damage to the water race. Commissioner O'Reilly duly convened a two-day hearing in Branxholm at the end of June that was followed by a site inspection and time to 'fully analyse the evidence'. He found the evidence to be 'very contradictory', ruling that the Triangle Co. was solely responsible for the damage by encroaching too close to the water race.⁷⁵

Aftermath of the North Brothers' Home vs Triangle dispute

The Court of Mines ruling of the 7th February seeking to safeguard the NBH Co. race, held for only three weeks before further slumping threatened the flumed section of the race. Triangle mine manager James Hocking was charged with 'disobeying an order' and appeared in the Police Court in early September, ironically before magistrate O'Reilly. Before the hearing resumed in early October, NBH Co. mine manager Griffin appeared in the Court of Mines before O'Reilly charged with trespass – this relating to a leak that developed from the unlined race on the 14th August. Griffin was found guilty of the accidental discharge and ordered 'not to allow or permit water to flow on or over the Triangle claim from the North Bros' Home race'. He was back in the Court of Mines 15 months later for a repeat offence, when he was 'severely censured' by O'Reilly. The 1884 Mineral Lands Act that O'Reilly's successor (Lands Minister Brown) assisted in drafting, resulted in a significant increase in his workload.⁷⁶

Meanwhile the NBH Co. had suffered considerable delays during construction of their 3,705m long-level race, which had reached the western boundary of the Triangle claim in March. Completion was prevented by

opposition of the latter Company [Triangle], and the culpable neglect and bungling of the surveyors in not carrying out their work in such a way as to enable the department to have a water-right issued in accordance with the diagrams received.

The survey issues remained unresolved in October as there was:

still some hitch in connection with the adjustment of survey, over which there appears to be an unlimited amount of bungling. Mr Walpole [legal secretary] is now about to make us re-survey of whole (2½ mile of) the race ...'.⁷⁷

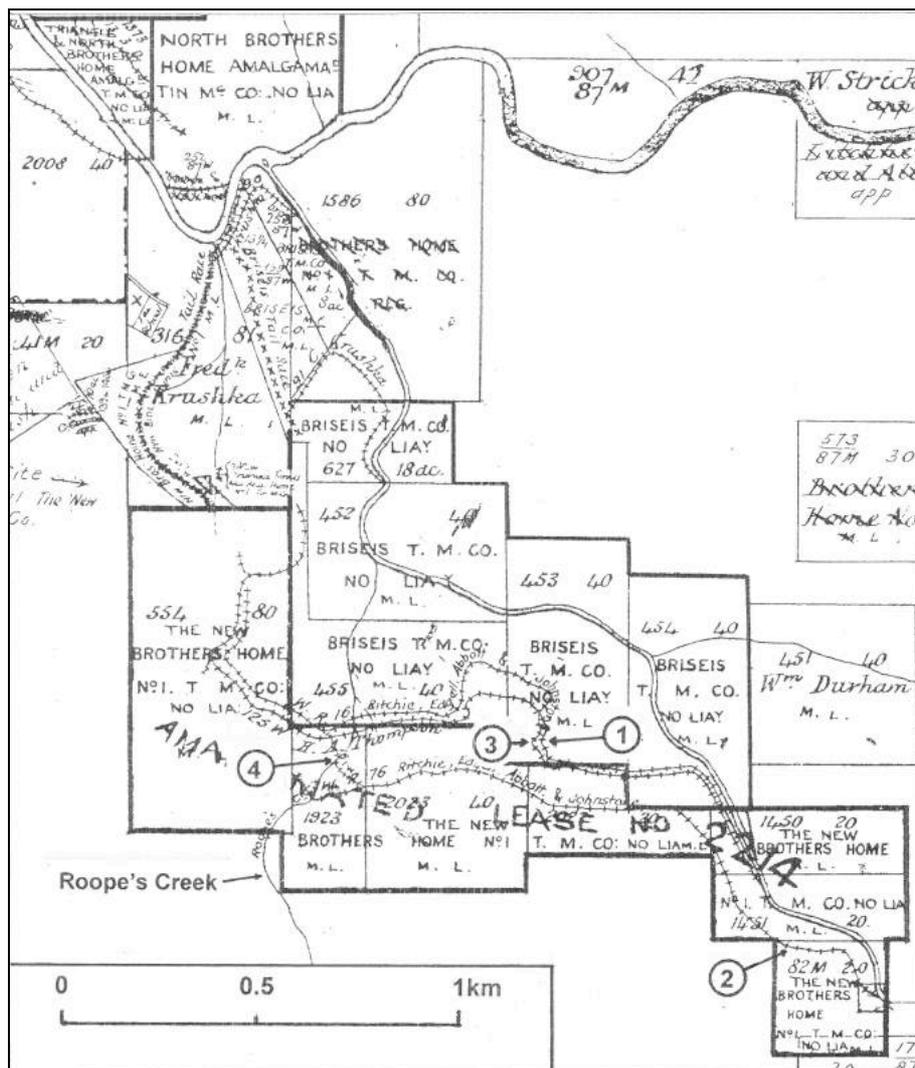
This prompted director William G. Lempriere to travel to Hobart to review 'the company's titles to their water race'. Although work on the race had resumed a month later, the race was not fully operational until June, following winter rainfall.⁷⁸ After the court ruling, as the Triangle Co. was unable to undertake large scale overburden stripping by hydraulic sluicing, tribute working was undertaken but limited by the high cost of obtaining water from the river by steam pumps. The rich tin deposits were effectively sterilised until after the two companies amalgamated in February 1889.⁷⁹

Further Briseis – BH1 Co. disputes

By June 1884 the Briseis Co. required an increase in water pressure for hydraulic sluicing to continue. Henry Thompson applied for 30 sluice-heads (WR 125W) from the Cascade River, the intake located 181m south of Lease 454, which was also held by Thompson. This would establish the Briseis intake upstream of the BH1 Co. intake (WR 16), the principle of prior appropriation ensuring that the BH1 Co. water rights would take priority in periods of reduced flows. The adjoining Lease 1450 was one of five held by the rival BH1 Co., which encircled the western and southern limits of the Briseis lease holdings, these granted either before, or immediately following the formation of the Mines Office in January 1883 (see Fig. 5).⁸⁰ Thompson revealed on the water right application that the proposed intake was located:

... in a rocky gorge of said river on part of a section (belonging to the Brothers' Home No. 1 TM Co.) useless for mining purposes other than as a dam site. But in the event of permission being granted for the construction of the dam ... the proposed race, may only start from the top of the dam wall.⁸¹

Figure 5: Lease holdings of the Krushka Bros, Brothers' Home No. 1 and Briseis Co's south of the Ringarooma River. (See Appendix 1 for water right details).



Source: Mineral Resources Tasmania, Mineral Chart 149b, November 1885 - May 1891.

As the BH1 Co. was also developing plans for a high-level race, no objection was lodged enabling Shaw's Mines Office to grant the water right promptly on the 1st October. Four months later construction of the race was sufficiently advanced for it to interfere with the BH1 Co. mining operations on Lease 554, an objection being lodged citing Section 61 of the 1884 Mineral Lands Act. This was basically the same as Section 7 of the 1882 Amended Act that Commissioner O'Reilly had flagged in February during the NBH vs Triangle dispute – the 1884 Act coming into force in March 1885.⁸² As no compromise could be negotiated, Commissioner O'Reilly ordered that the section of the race traversing Lease 554 be removed within seven days.⁸³ The Briseis Co. complied and re-directed the race through their adjoining lease 'at a sacrifice of a few feet of pressure', all construction costs being met in accordance with the 1884 Act.⁸⁴

Plans by the BH1 Co. for a high-level supply race were also well advanced by this time, a lease for 60 sluice-heads (WR 76) from the Cascade River having been acquired from Maxwell Bruce in 1883, following a rancorous split with the other Briseis Co. directors in January 1881.⁸⁵ Tenders were called for the construction of a 2,555m long 'all fluming' race in February 1885 to provide high pressure water for hydraulic sluicing.⁸⁶ The race comprised a 1,510m section at the eastern end, then via a natural gully (Roope's Creek as WR 161W - see Fig. 5), to connect with the existing low-level race of WR 16.⁸⁷ In order to avoid the on-going maintenance costs of the now redundant section of the earlier race, an application by the BH1 Co. to shift the existing intake upstream to WR 76 was approved.⁸⁸ This was a well planned manoeuvre by the BH1 Co. to regain first use of the Cascade water, as their intake was now further upstream than that of the Briseis WR 125W.

The race was operational by August, inducing the Briseis Co. to lodge an objection at the end of the year seeking to clarify the quantity of water that could be drawn by the respective parties from the river, as a total of 110 sluice-heads (BH1 Co. holding 90 sluice-heads) had been granted, exceeding river flows for much, if not all, of the year.⁸⁹ A Supreme Court hearing was repeatedly adjourned until the following November as the BH1 Co. stalled all attempts to progress the case. As the Briseis leases had been granted prior to ownership of the company being transferred to Victoria in July 1883, the Registrar-General of the Victorian Mining Department appeared in person to clarify recent changes to the 1871 Mining Companies Act (35 Vict. No. 409) to assist the plaintiff's case.⁹⁰ Just prior to another adjourned court sitting, an out of court agreement was negotiated in March 1887 whereby all rights to the BH1 Co's high-level race (WR 76) were transferred to a newly-formed Cascade Water Trust to administer in accordance with the following guidelines:

- when >16 sluice-heads flowing in the race, BH1 Co. entitled to take 8 sluice-heads over 24 hours & Briseis Co. the remainder, and
- when <16 sluice-heads flowing, BH1 Co. to take 8 sluice-heads overnight between 4pm to 8am (16 hours), the remaining flow available to Briseis Co., the latter entitled to 100% of the flow between 8am to 4pm.⁹¹

Following a major expansion of the Briseis mine between 1900-1902, flows in each of the supply races were monitored. Although available records for the Cascade race are

incomplete, flows much greater than 15 sluice-heads (often exceeding 50 sluice-heads) were commonly available in all but the summer months between July 1903 - October 1905. This indicates that the Briseis Co. gained a considerable advantage from the agreement.⁹² To enable the deep lead to be economically mined by hydraulic sluicing, the two companies formalised an agreement in May 1903 for the Briseis Co. to undertake overburden removal on Briseis Hill that extended across the corners of Leases 316, 627, 452, 455 held by the Briseis Co. and the BH1 Co. Lease 554 (Fig. 6).⁹³ Water from the BH1 -level race (WR 76) contributed to this monumental task in an era pre-dating mechanised overburden stripping, ensuring that the amalgamated mine holdings remained a primary producer for the following 25 years.

Figure 6: *View of Briseis Hill (northeasterly direction) showing the Brothers' Home No. 1 open pit workings in the foreground and Briseis workings in the top right corner, the unmined strip of land in between located along the boundary between Leases 554 and 452. The steep batter slopes expose the weathered basalt capping layer.*



Source: State Library of Tasmania, LPIC 147-2-364, undated but probably early to mid-1902.

Conclusion

Introduction of the first comprehensive mining legislation in Tasmania, the 1877 Mineral Lands Act, was intended for a rapidly changing mining industry that was to be dominated until the mid-1890s by alluvial tin mining. Export revenue from tin (both unrefined ore and metallic tin) exceeded that of gold in 1876; tin revenue was not matched by that from silver-lead until 1894 and copper three years later, these resources largely obtained by underground mining of lode deposits.⁹⁴ Economic working of alluvial tin deposits on a large scale was associated with the rapid introduction of

hydraulic sluicing, which required copious amounts of water at elevated pressure. Deep lead tin deposits within the Ringarooma River basin were overlain by a considerable thickness of poorly consolidated alluvial sediments, and in places by a variably-weathered basalt capping layer. Hydraulic sluicing was also the preferred method of overburden removal (except for the basalt capping layer) in being efficient, relatively low cost when compared with alternative methods, and generally safe for the nozzle operators until working faces exceeded 10-15m in height. Riparian water sourced from creeks located either within or along the boundaries of mineral leases was generally unsuitable in providing the required pressure, unless consolidated lease holdings encompassed the headwaters of a watercourse. As it was essential for the intakes of water supply races to be located at increasing elevation, competition for suitable sites led to a rise in the number of disputes over water rights.

Disputes emanating from the rapidly expanding mining industry forced legislators to amend the 1877 Mineral Lands Act continually between 1880-84. This placed considerably strain on the administrative capability of the Mineral Lands Department, leading to a complete re-organisation in January 1883 and formation of a separate Office of Mines. A newly-appointed Lands Minister, Nicholas Brown, and the promotion of Bernard Shaw as the Minister of Mines ensured that an efficient system of registering all lease and water right applications was implemented, and processes streamlined to minimise delays in granting leases. Additional staff were recruited to the increased number of mining districts and the survey section overhauled, enabling accurate mineral lease plans (also showing water rights) to be produced, these generally unavailable before 1884.

Changes to the Mineral Lands Act between 1880-84 with respect to water rights were largely instigated by disputes arising from working tin claims in the vicinity of Derby, where non-riparian water rights traversed mineral leases of an earlier date. As water rights were granted as easements, trespass was invoked whenever mining disrupted the water race easement, or when leakage from a race led to damage on the adjoining mineral lease. These disputes were generally resolved in the Court of Mines, but in one high profile case, that of North Brothers' Home Co. vs Triangle TM Co, an appeal to the Supreme Court led to qualification of the duties of a race owner regarding the standard of construction and ongoing maintenance.

Water right disputes on the North-East District tinfield diminished towards the end of the 19th century as leaseholdings were consolidated by acquisition or amalgamation, thereby reducing competition. Larger, well-financed companies, such as the Briseis Co., were eventually encouraged to share their water allocation by selling surplus flows and to provide access to their expensive supply races. Formation of the Cascade Water Trust in 1887 to regulate water distribution between competing operations established a precedent that was emulated during the 20th century, increasingly for irrigation purposes.

Acknowledgements

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Endnotes

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- ⁶ *Australian Dictionary of Biography* [hereafter *ADB*], 'William Robert Giblin', vol. 4, Melbourne University Press, 1972, viewed at www.adb.anu.edu.au/biography/giblin-william-robert-3606/text5597: a barrister, Attorney-General February 1870 - November 1872, August 1873 - July 1876 & December 1881 - August 1884, Premier March - December 1878 and October 1879 - August 1884: resigned due to failing health from heart disease.
- ⁷ 'Regulations under the "The Mineral Lands Act, 1877"', Journals of the House of Assembly [hereafter *TPP*], Tasmania, vol. 35, no. 54, February 1878, p. 4.
- ⁸ 'Regulations under the "Gold Fields Regulation Act, 1870"', 34 Victoria, No. 6', *TPP*, vol. 35, no. 53, Section 38, 1878, p. 7.
- ⁹ *Ibid.*, Section 36.
- ¹⁰ Sluice-head a volumetric flow rate, in NSW: a sluice box 12 inches wide with 2 inch opening, 1857 Gold Fields Amendment Act (s. xix), amended to 12in. wide with 3in. opening, 1869 Gold Fields Amendment Act (s. 50); in New Zealand: sluice box 20in. wide with 2in. opening, *Otago Daily Times*, 2 August 1862, p. 7; 'The Rules and Regulations of the Otago Gold Fields', Dunedin, 1864, p. 6.
- ¹¹ *Launceston Examiner*, 1 May 1880, p. 2; *The Mercury*, 17 May 1880, p. 3; *ADB*, 'Sir John Stokell Dodds', vol. 4, Melbourne University Press, 1972, viewed at www.adb.anu.edu.au/biography/dodds-sir-john-stokell-3421/text5139: Dodds a barrister, Attorney-General December 1878 - December 1881, served in the ministries of Adye Douglas and James Agnew August 1884 - February 1887 then appointed puisne judge to Supreme Court, Chief Justice October 1898 - June 1914, knighted in 1900; www.parliament.tas.gov.au/tpl/datasheets/Governors_Table.htm: Sir John Dodds served as Governor in four short terms between August 1900 - June 1913; *ADB.*, 'Christopher O'Reilly', vol. 5, 1974, www.adb.anu.edu.au/biography/oreilly-christopher-4337/text7041.
- ¹² *Mineral Lands Amendment Act, 1880* (44 Vict. No. 17) enacted 1 November 1880.
- ¹³ *Mineral Lands Amendment Act, 1881* (45 Vict. No. 7) enacted 8 November 1881.
- ¹⁴ *Launceston Examiner*, 14 September 1881, p. 2.
- ¹⁵ *TPP*, vol. 43, no. 70, June 1878; *The Mercury*, 23 February 1882, p. 3.
- ¹⁶ 'Register of the issue of mineral leases', MIN120/1/1, *TAHO*: Lease 316 to Fred Krushka 1 November 1876; Leases 452 to 455 granted 1 August 1877 - transferred to Briseis Co; Lease 554 granted 1 June 1878 - transferred to BH1 Co.
- ¹⁷ No reference found to a water right application being registered or granted.
- ¹⁸ *Launceston Examiner*, 28 August 1878, p. 3.
- ¹⁹ 'Correspondence Briseis v Brothers' Home No. 1 TM Co.', MIN1/1/44, 20 November 1882, *TAHO*.
- ²⁰ *Ibid.*, Maxwell Bruce to Lands Minister O'Reilly, 4 March 1881, *TAHO*.
- ²¹ *Launceston Examiner*, 31 May 1881, p. 3, *The Tasmanian*, 4 March 1882, p. 238; measures for directing the deviation of water races within neighbouring claims introduced the following year in the Mineral Lands Amendment Act, 1882.
- ²² *Ibid.*, 5 December 1881, p. 3; *Ibid.*, 23 October 1882, p. 3.
- ²³ *Hobart Gazette*, 21 February 1882, 'Regulations under the "Mineral Lands Act, 1877"', the "Mineral Lands Amendment Act, 1880", and the "Mineral Lands Amendment Act, 1881", p. 418.
- ²⁴ Water rights granted: 60 sluice-heads (WR 22), Esk TM & Hydraulic Sluicing Co., 1 May 1882, MIN128/1/1; 60 sluice-heads Mount Cameron Hydraulic TM Co., 28 December 1882, MIN90/1/1; 40

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sluice-heads (WR 61) North Brothers' Home TM Co., 1 September 1883, MIN120/1/1; 60 sluice-heads (WR 76), Bruce Maxwell, 1 September 1883, MIN120/1/1, *TAHO*.

²⁵ Issued as By-law No. III of the Mining Board for the Mining District of Ballarat in 'Acts, orders in council, notices and mining board bye-laws, relating to the gold fields, 1865-68', Victoria Government Printer, August 1866, p. 212.

²⁶ *The Tasmanian*, 4 March 1882, p. 238; *Launceston Examiner*, 6 April 1882, p. 3.

²⁷ *Launceston Examiner*, 6 April 1882, p. 3.

²⁸ *Ibid.*, 25 April 1882, p. 3; www.tas.liberal.org.au: Hodgman Liberal Government announced the opening of a Mineral Resources Tasmania office at Burnie and transfer of Hobart personnel, press release 10 February 2016.

²⁹ *The Mercury*, 10 July 1882, p. 3.

³⁰ Solicitors Ritchie & Parker to O'Reilly, MIN1/1/44, 20 September 1882.

³¹ *Launceston Examiner*, 23 October 1882, p. 3.

³² Commissioner Shaw to Lands Minister O'Reilly, MIN1/1/44, 20 November 1882.

³³ *Launceston Examiner*, 12 December 1882, p. 3; *The Mercury*, 13 December 1882, p. 3.

³⁴ *Ibid.*, 2 December 1882, p. 2; *ADB*, 'Nicholas John Brown', vol. 3, Melbourne University Press, 1969, viewed at www.adb.anu.edu.au/biography/brown-nicholas-john-3081/text4555: Brown formerly the Minister of Lands and Works in the first Fysh Ministry, August 1877 - December 1878.

³⁵ *Ibid.*, 2 December 1882, p. 2; *ibid.*, 5 December 1882, p. 2.

³⁶ Glyn, 'The Tasmanian Government and the Metal Mining Industry – an Administrative History', Ph.D, University of Tasmania, December 2002, p. 42.

³⁷ *The Mercury*, 4 August 1882, pp. 2 & 3.

³⁸ Thompson to Brown, MIN1/1/44, 20 December 1882; *ibid.*, Commissioner Shaw to Brown, 30 December 1882, *TAHO*.

³⁹ *Launceston Examiner*, 1 November 1882, p. 2; *The Mercury*, 1 November 1882, p. 2.

⁴⁰ *Ibid.*, 2 November 1882, p. 3; *The Mercury*, 2 November 1882, p. 3; *ibid.*, 4 November 1882, p. 3; *Mineral Lands Amendment Act, 1882* (46 Vict. No. 36) enacted 6 November 1882.

⁴¹ *Ibid.*, 1 November 1882, p. 3; *ADB*, 'Charles William Grant', vol. 9, Melbourne University Press, 1983, viewed at www.adb.anu.edu.au/biography/grant-charles-william-7044/text11045: Grant an engineer working in the office of eminent civil engineer Robert Stephenson until 1866, supervising engineer of Tasmanian Main Line Railway 1872-76 then General Manager 1876-90, MLC (Hobart) 1892-1901.

⁴² *The Mercury*, 11 November 1882, p. 3; *ibid.*, 16 November 1882, p. 3; *ibid.*, 22 November 1882, p. 3; *ibid.*, 23 November 1882, p. 3; *ibid.*, 7 December 1882, p. 2.

⁴³ *Launceston Examiner*, 12 December 1882, p. 3; legal secretary Alex Young to Colonial Treasurer, MIN1/1/44, 10 March 1883.

⁴⁴ *The Mercury*, 25 November 1881, p. 2; *ibid.*, 9 December 1881, p. 2.

⁴⁵ C.A. Bacon, 'A brief history of the Department of Mines – 1882 to 2013', UR2013-07, p. 2, *Mineral Resources Tasmania* [hereafter *MRT*]; *The Mercury*, 6 September 1910, p. 5: obituary of Bernard Shaw.

⁴⁶ 'Report of the Secretary of Mines', AR1884, 12 July 1884, p. 3, *MRT*.

⁴⁷ *Ibid.*, pp. 7-8, *MRT*; *Launceston Examiner*, 1 January 1884, p. 2.

⁴⁸ *Ibid.*, p. 4.

⁴⁹ *Launceston Examiner*, 16 January 1883, p. 1; *Daily Telegraph*, 24 July 1884, p. 2: Sprent appointed Deputy Surveyor-General; see *The Cyclopaedia of Tasmania*, vol. 1, 1900, pp. 140-41 for Sprent and development of the Lands Department.

⁵⁰ AR1884, p. 5, *MRT*; see Roberts, 'The Tasmanian Government and the Metal Mining Industry ...', pp. 91-93, for an account of the deficiencies of the Lands Department including the Survey Branch.

⁵¹ 'Survey system of Tasmania', *TPP*, vol. 45, no. 54, May 1883, p. 14.

⁵² AR1884, p. 5, *MRT*.

⁵³ Section 41 of 'Regulations under the Mineral Lands Act, 1884', *Hobart Gazette*, 29 March 1887, p. 545.

⁵⁴ *Launceston Examiner*, 25 August 1883, p. 1.

⁵⁵ MIN120/1/2, 1 November 1881; *Launceston Examiner*, 16 February 1882, p. 3: lease granted 6 September 1882.

⁵⁶ *Launceston Examiner*, 29 October 1881, p. 2; MIN120/1/1: WR 42 granted 1 September 1883, WR 61 granted 1 July 1883, *TAHO*: intake located on Fenckers Creek, a tributary of the Legerwood Rivulet.

⁵⁷ *Ibid.*, 16 January 1884, p. 2.

⁵⁸ *Ibid.*, 2 January 1882, p. 3; *The Mercury*, 4 February 1882, p. 3.

⁵⁹ *Ibid.*, 27 February 1882, p. 3; *ibid.*, 27 May 1882, p. 3; *ibid.*, 20 June 1882, p. 3.

⁶⁰ *The Mercury*, 13 October 1883, p. 1; *Launceston Examiner*, 28 November 1883, p. 3.

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- ⁶¹ *Ibid.*, 5 February 1884, p. 3.
- ⁶² *Ibid.*, 6 December 1883, p. 3; 'Registers of applications for water rights', MIN90/1/1: application dated 20 February 1884 for 6 sluice-heads as WR 119W granted 1 October 1884.
- ⁶³ *Launceston Examiner*, 11 March 1882, p. 1; MIN120/1/2: Lease 1373 transferred to Triangle TM Co. 1 May 1882.
- ⁶⁴ 'Correspondence Triangle Co. & North Brothers Home', MIN1/1/47, 20 December 1882, *TAHO*.
- ⁶⁵ *Launceston Examiner*, 19 April 1883, p. 2.
- ⁶⁶ *Ibid.*, 3 May 1883, p. 1; *The Tasmanian*, 8 December 1883, p. 1421.
- ⁶⁷ *Ibid.*, 19 December 1883, p. 1.
- ⁶⁸ *Ibid.*, 16 January 1884, pp. 2 & 3; *ibid.*, 17 January 1884, p. 3; *ibid.*, 18 January 1884, p. 3.
- ⁶⁹ *Ibid.*, 16 January 1884, pp. 2 & 3: application for WR 61 dated 6 September 1882; *Mineral Lands Amendment Act* 1882 enacted 6 November 1882; MIN 120/1/1: WR 61 granted 1 July 1883, *TAHO*.
- ⁷⁰ *Ibid.*, 8 February 1884, p. 3.
- ⁷¹ For Dobson see *The Cyclopaedia of Tasmania*, vol. 1, 1900, pp. 126-27; also *ADB*, 'Sir William Lambert Dobson', vol. 4, Melbourne University Press, 1972, viewed at www.adb.anu.edu.au/biography/dobson-sir-william-lambert-3419/text5177: a barrister, appointed Attorney-General February 1861 - January 1863, November 1866 - February 1870, August 1877 - December 1878, Chief Justice February 1885 - March 1898; *ibid.*, 'John Warrington Rogers', vol. 6, Melbourne University Press, 1976, viewed at www.adb.anu.edu.au/biography/rogers-john-warrington-4498/text7353: a Victorian barrister, appointed puisne judge to the Supreme Court in February 1884; *The Mercury*, 1 January 1887, p. 1: legislation passed in 1886 to appoint a third judge to the Supreme Court.
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- ⁷³ *Ibid.*, 17 December 1883, p. 3.
- ⁷⁴ *Ibid.*, 30 April 1884, p. 3; *The Mercury*, 30 April 1884, p. 3, see also L.F.S. Hore, *Digest of Cases Decided in Tasmania 1856-1896*, Southern Law Society of Tasmania, 1897, p. 36.
- ⁷⁵ *The Mercury*, 30 June 1884, p. 3; *Launceston Examiner*, 25 July 1884, p. 3.
- ⁷⁶ *Launceston Examiner*, 9 September 1884, p. 3; *ibid.*, 13 September 1884, p. 3; *ibid.*, 14 December 1885, p. 3.
- ⁷⁷ *Ibid.*, 29 August 1884, p. 3; *ibid.*, 14 October 1884, p. 3.
- ⁷⁸ *Ibid.*, 11 November 1884, p. 2; *The Mercury*, 17 February 1885, p. 3; *The Age*, 10 June 1885, p. 7.
- ⁷⁹ *Ibid.*, 15 October 1884; *ibid.*, 5 February 1889, p. 4; *TPP*, vol. 12, No. 57, July 1887, p. 7.
- ⁸⁰ MIN120/1/1: leases acquired by Charles H. Grant included Leases 1450 & 1457 granted 1 June 1882, Lease 1923 - 1 November 1882, Leases 2022 & 2023 - 1 January 1883, *TAHO*.
- ⁸¹ 'Register of applications of water rights from the Derby Office', AC39/1/1, WR 125W application 23 June 1884, *TAHO*.
- ⁸² *Launceston Examiner*, 8 February 1884, p. 3; *ibid.*, 7 February 1885, p. 3; *ibid.*, 12 February 1885, p. 3.
- ⁸³ *Ibid.*, 25 February 1885, p. 3.
- ⁸⁴ *Ibid.*, 7 Mar 1885, p. 3; note that the original alignment of WR 125W continued to be shown on later mineral charts.
- ⁸⁵ *Ibid.*, 16 June 1881, p. 3; MIN1/1/44: Maxwell Bruce's attempt to dispose of Leases 453 & 627 to Brothers' Home No. 1 Co. directors in September 1881 prevented by the Supreme Court, finally secured for the Briseis Co. at auction the following month, 28 September 1882, *TAHO*; *Daily Telegraph*, 14 May 1887, p. 3: WR 76 transfer under 'indenture of lease of January 16 and December 31, 1883'; MIN120/1/1: WR 76 transfer to BH1 Co. dated 1 September 1883, application date unknown, *TAHO*.
- ⁸⁶ *Ibid.*, 13 February 1885, p. 1.
- ⁸⁷ AC39/1/1, WR 161W application 21 Jul 1885, granted 1 September 1885, *TAHO*.
- ⁸⁸ *The Mercury*, 1 June 1885, p. 3; *Launceston Examiner*, 1 August 1885, p. 3.
- ⁸⁹ *Launceston Examiner*, 24 July 1885, p. 3; *ibid.*, 17 August 1886, p. 3.
- ⁹⁰ *Ibid.*, 3 November 1886, p. 3; *Mining Companies Amendment Act, 1886* (50 Vict. No. 881) passed by Victorian Parliament 18 October 1886.
- ⁹¹ *Ibid.*, 23 March 1887, p. 3; *Daily Telegraph*, 14 May 1887, p. 3.
- ⁹² Cascade water race flows compiled from *Examiner*, 20 July 1903 p. 2; *ibid.*, 24 August 1903, p. 2; *ibid.*, 21 Nov 1903, p. 3; *ibid.*, 27 September 1904, p. 2: 6 month average; 'The Progress of the Mineral Industry of Tasmania', MININD1905-2, June 1905, p. 7: 3 month average, *MRT*; *ibid.*, MININD1905-3, September 1905: 3 month average, *MRT*.
- ⁹³ *TPP*, vol. 43, no. 26, September 1900, p. 26: Krushka Bros Lease 316 purchased by the Briseis Co. for £35,000.
- ⁹⁴ *Statistics of Tasmania, 1882*, pp. 142 & 253; *Statistics of Tasmania, 1915*, 'Mineral production since 1880'.

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Appendix 1: Summary of Water Rights

WR No. ⁽¹⁾	Ref. No. ⁽²⁾	Source	Lease Date	No. SH ⁽³⁾	Length (m)	Applicant
Brothers' Home No. 1 & Briseis Company's						
16	1	Cascade River	1/2/1882	20	c2,015	Brothers' Home No. 1
76	2		1/9/1883	60	c2,555	
125W	3		1/10/1884	30	?	Briseis
161W	4	WR 76	1/9/1885	–	c200	Brothers' Home No. 1
			TOTAL	110		
North Brothers' Home Co.						
42	5	Boyd's Creek	1/9/1883	10	3,945	North Brothers' Home
61		Legerwood Rivulet	1/7/1883	40	?	
119W	6	Boyd's Creek	1/10/1884	6	3,705	
			TOTAL	56		

Notes:

- (1) Mines Department Register of the issue of mineral leases (TAHO MIN120) and Register of applications of water rights (WRs) from the Derby Office (TAHO AC39).
- (2) See Figures 4 & 5.
- (3) SH = Sluice-head (Tasmanian), equal to 0.68 cubic metres per minute or 41.1 kilolitres per hour.