Phillip Davies, Californian Sluicing and Kiandra

By ROBERT ASHLEY

Phillip Davies (1831 – 1898) was a Welshman who began his working life in the coalmines at Dinas in the Rhondda Valley of Glamorganshire, Wales and immigrated to Victoria after eleven years working as a coal miner. His father was William David, later known as William Davies who was born about 1796 in Llansamlet where he married about 1821, Elizabeth Benyon, also of Llansamlet. Sometime in the 1820s William David took a team of pit sinkers to Dinas in the Rhondda Valley to drive and sink shafts for the coalmines prospected by Walter Coffin. Eventually in 1832 a new shaft known as No. 3 was sunk some 300 metres higher up the than the first shaft where a seam of bituminous coal was found. Coal from this pit gained a high reputation for quality and low impurities, and was popular in working metal and for cooking purposes. This shaft was worked until 1893. According to Emrys Pride, three hundred men and boys were employed by 1831, creating the first real mining settlement in the Rhondda Valley.[1] William David and his family became permanent residents of Dinas and descendants still live there. William David built five cottages with the help of his sons and these premises appear from the 1841 census to have been located near 'Appletree', to the south of the village centre. The new terraced houses in Dinas were occupied by the families of colliers, builders, masons and other tradesmen. The quarries where the stone was found to build these homes and chapels can still be seen along the slopes of the hillsides close to where the buildings were erected.[2]

William and Elizabeth raised a family consisting of Mary (born 1822); Sarah, (born 1826); William (born about 1829, died 1899); Phillip, (born 1831, died in Sydney, NSW, 1898); Elizabeth (born 1834 died 1918); Richard, (born 1837, died in Parkes, NSW, 1915) and Jemima (born 1841, died at Dinas 1903). William Davies senior died on 13 March 1849 when he was aged about 53 years, however, he left his wife in comfortable circumstances.[3] Elizabeth usually known as Betty died at Dinas aged 90 in March 1889. Phillip had begun work about 1838 at the age of seven as an 'Air-door boy' and a year later as a 'Haulier' driving horses. Air-door boys were required to open the air-door to allow a haulier with horse and tram to pass and then to close the door.[4] Although a tiring occupation with only bread and cheese for mid-day meals, Phillip may have also attended night school in Dinas.

On the first day of the year 1844, when Phillip was only thirteen, disaster struck the Dinas colliery when an explosion killed seven men and five boys, with later reports recording another dead boy and another who suffered injury.[5] The explosion was blamed on an individual who had failed to properly close an airdoor.[6]

None of the Davies family sustained a loss in this tragic explosion, but Phillip appears to have been considerably affected and it is known that throughout his mining career in Australia he showed a lasting concern for mine safety and the welfare of miners. In 1865 Phillip Davies stated that he had worked in the coalmines for eleven years, which suggests

that between 1848 and 1852 he was seeking to 'better himself'.[7] His name is not shown in the 1851 census for Dinas.

Early in May 1852 an advertisement appeared in a leading Bristol newspaper intimating that the British built sailing ship, *Deborah* of 1,000 tons[8] burthen was to sail direct in the last week of May to the Australian gold district for Port Phillip and Sydney. Third class fare by rail and steamer to Bristol was to be paid for intending passengers.[9] Phil, now aged 21, took passage on the *Deborah* and arrived in Melbourne on 15 September 1852.[10]

Rushing to the Goldfields

After mining at Forest Creek he went to Ballarat where he became a successful mine manager. He was the defendant in a famous court case that became one of the motivating factors leading to Victoria's, Mining on Private Property Act of 1884.[11] Moving to New South Wales, Davies became a renowned mining expert and was called upon to investigate and report upon mining propositions across Australia.

Following a successful mining career at Parkes, Davies went to the New Consolidated Gold Mine at Laclmalac near Tumut. While in the district his attention was drawn to reports of the alluvial deposits at Kiandra and during 1878 he made an attempt to bring water from the head of the Tumut River to the Nine Mile Diggings, about 14 kilometres south of Kiandra Township. This attempt failed, but Davies continued to see great possibilities in the huge areas of alluvial drift and the probability of discovering the reef or reefs that had shed teasing samples of quartz and gold since the initial rush of 1859.[12]

Early in December 1880, Phillip Davies again visited the Tumut district and proceeded to Kiandra to interview John Maximus Lette who owned the Empress deep lead mine at the Nine Mile. People in Tumut expressed their hope that Mr Davies' visit would lead to the permanent re-opening of the Kiandra goldfield.[13]

During this month, Phillip Davies and his partners organised a survey to be carried out to ascertain the best scheme for bringing water to the Nine Mile and to New Chum Hill at Kiandra. Frederick Bowdler Gipps completed the survey in the middle of April.[14] He proposed that a dam, 50 feet deep,[15] should be built near the head of the Tumut River. It was to be financed by an English company and would take three or four years to construct at a cost of £71,000, however, this project was deferred. [16]

Another reservoir was to be made at the Three Mile, this one 45 feet deep and a mile long, to be used for working the New Chum Hill. It was proposed that this dam would be the first commissioned, would be commenced in the coming spring and hopefully completed by the end of summer to enable washing up operations to begin in the winter.[17]

Formation of the Kiandra Gold Mining Company in England

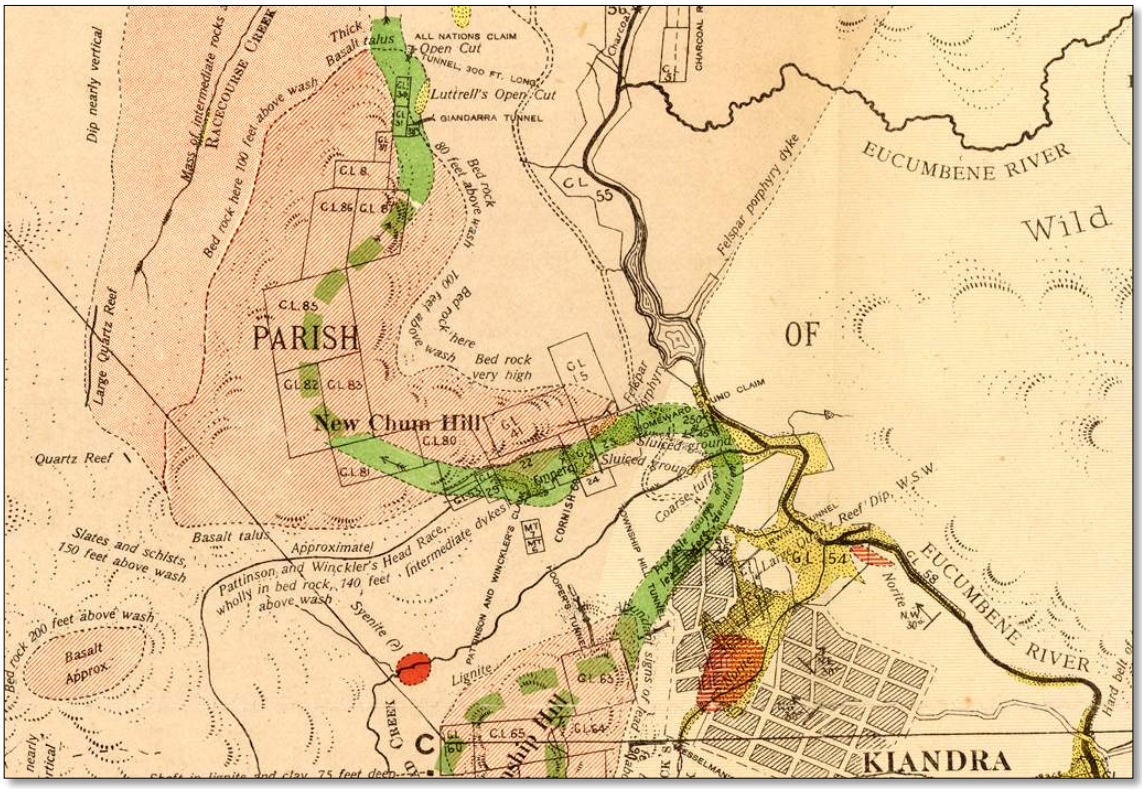
Through the promotion of Phillip Davies, the Kiandra Gold Mining Company Limited was formed in London to take over and work the Empress, Emperor, Homeward-Bound and Cornish gold mines situated on the best part of the Kiandra goldfield. Following registration of the company on 15 July 1881 various newspapers in England published

the prospectus,[18] and further declared that the properties were secured under 'Miners' rights and titles', consisting of 65 acres of land.[19]

According to the *Manaro Mercury* of September 1881, all the mines to be worked by the proposed English company were under the ownership of John M. Lette,[20] and apart from the Empress Gold Mine at the Nine Mile they were all situated on the New Chum Hill. Lette and his sons had worked the Nine Mile and the New Chum areas since 1861.[21]

On 9 September a report from the *Home News* concerning the formation of the Kiandra Gold Mining Company was published in Sydney.[22] The company was listed with a capital of £150,000 in £1 shares, 40,000 of which were taken by the vendors in part payment of the purchase money, and 110,000 to be offered to the public. The offices of the company were in London.[23] The properties contained auriferous wash from 20 to 30 feet in thickness, and the prospectus claimed that the scarce water supply at Kiandra would no longer stand in the way of mining, as a full supply could easily be obtained from the construction of large dams. It went on to state that by spending the sum proposed 'a goldfield known to be one of largest and richest in the world may be opened up'. The general management of the company in Australia was to be left to the consulting and mining engineer, Phillip Davies.

Figure 1: *Kiandra geological map showing New Chum Hill 103, leases and Water Races.*



Source: Courtesy of State Library of New South Wales, 'Portion of the Geological Map with section of the Kiandra Gold Field' by E.C. Andrews, B.A., Geological Surveyor, assisted by C.E. Murton, Field Assistant, Department of Mines and Agriculture, Sydney, 1901.

According to Phillip Davies, the English Company objected to the miserable size of the leases. While the prospectus clearly stated the area at 65 acres, it appeared that a large area was then held under miners' rights with only a few small leaseholds, prompting questions about title security. The £25,000 that had been paid down was therefore refunded, but this non-functioning company was not dissolved until some years later by notice in the *London Gazette* of 14 September 1888.[24] Possibly arising from questions concerning the size of the property, on 15 October 1881, J.M. Lette applied for three leases at New Chum Hill. Two leases contained 25 acres and the other one contained four acres, for a total of 54 acres.[25]

Formation of Kiandra Gold Mining Companies in New South Wales

Following the withdrawal of the English Company in December 1881, the *Sydney Morning Herald* published the prospectus for another Kiandra Gold Mining Company Limited, with a capital of £50,000 in 50,000 shares of £1 each. This company was formed to purchase and work the Emperor, the Homeward Bound and the Cornishman, and modified the size of the area involved. These claims were all located at New Chum Hill, and altogether the area under leases now amounted to 54 acres as applied for by Lette.[26] The provisional directors for the company were Russell Barton, M.L.A.; A.H.M. M'Culloch, M.L.A.; Captain John Broomfield; George Maiden; Alfred Harcourt and W.H. Paling, merchant and founder of the music firm of Palings. The prospectus declared it was proposed to work the mines by hydraulic sluicing, a new method in the colony, but one that had been employed to great advantage at the 'famous Blue Lead' in California.[27] The term hydraulicking or hydraulic sluicing should not be confused with ground sluicing or earlier mechanical means of washing dirt in cradles or long toms. Ground sluicing was practised in the Beechworth district, Victoria, through the use of long water races to deliver sufficient water. It is claimed that hydraulicking using a nozzle or monitor first appeared in New South Wales on the Turon River. Frederick B. Gipps who advertised himself as a mining manager, agent and reporter, at Wattle Flat in 1872[28] was appointed mining manager in 1876 to a company formed by Davies Gilbert of Cornwall, to establish the Circus Point Hydraulic Company. Early in 1877 Gipps advertised for tenders for the cutting and construction of about 15 miles of sluicing and the laying of about half a mile of piping.[29] The pipes were imported from San Francisco and the Little Giant Monitor patented by Richard Hoskins, which in this instance had a nozzle size of 2½ inches, was also obtained.[30] The monitor or nozzle had a 'deflector' added to it which was possibly the one patented by Henry Perkins in December 1876.[31] While the works of the company near Sofala were successful, work ceased during 1879 when the water supply failed.[32] Subsequently, the member for the Hunter River; John McElhone, M.L.A., made a disparaging claim against Gipps claiming that the works failed due to Gipps attempting to run water uphill. This led to a court case in May 1881 in which Gipps had the satisfaction of having his reputation reinstated when the case for damages against McElhone ended in a nonsuit.[33] It is significant that Gipps carried out a survey of proposed sites for water storage at Kiandra during the first few months of 1881 and was appointed to supervise the construction of the Three Mile reservoir at Kiandra in 1882.

The Kiandra Gold Mining Company was declared to have been formed on Tuesday 3 January 1882,[34] but Davies' shareholding is unknown.

The Empress Gold Mining Company of 28,000 shares of £1 each and the Eight Mile Gold Mining Company of 25,000 shares of £1 each, were formed on 27 October 1882 as limited liability companies, each with a separate existence but with the same directors and shareholders as the Kiandra Company.[35] Phillip Davies was a substantial shareholder, holding 1,000 shares in the Empress Company and 2,500 shares in the Eight-Mile Company, with shares in the Eight Mile Company being paid up to ten shillings.[36]

Two further limited liability companies were formed by Davies and others, the first being the South Bloomfield Company, situated about half way between the Four mile and Nine Mile creeks and formed in Sydney on 20 March 1884. The other company was the North Bloomfield Company, formed on 30 April 1884; both companies consisted of 25,000 shares of £1 each. A total of eight shareholders held 20,000 paid up shares and the same shareholders held a total of 5,000 contributing shares. Davies held 4,000 fully paid up shares and 1,000 contributing shares subject to calls which were due and payable when notice by advertisement was given by the legal manager. According to W.H.J. Slee in his report of February 1885, neither of the two companies did a lot of work, and the companies ceased to exist about 1887.[37] It is possible that the two mines were re-worked at a later date by other parties.

Commencement of work at Kiandra on Water reservoirs

Work at Kiandra commenced on 12 January 1882 and good progress was made with the water scheme. By early February all the ground for the base of the large Three Mile Dam was cleared and approaches to the outlet tunnel completed.

d.Figure 2: *Wall of Three Mile Dam 113, built in 1882 for sluicing the New Chum Hill.*

Source: Photo by R. Ashley, 23 March 2016.

The puddle trench was extended by some 1,200 yards and treated with clay, while four thousand feet of the large supply ditch was also completed. The tailrace at the mine was also in course of construction. Eighty men and 16 horses and drays were employed in this work.[38] By 18 February the construction of the three-mile dam [Fig. 2] and race was rapidly progressing. Over 100

men and 27 carts were then employed and work had commenced on the Homeward Bound tailrace.[39]

Phillip Davies visits California

In early 1882, the Kiandra Company requested Phillip Davies to go to California to inspect and fully report on all kinds of the latest gold saving machinery in use.[40] F.B. Gipps then managed the initial works at Kiandra and soon after, John E. Wren was appointed manager at Kiandra for the Kiandra Company. Wren's duties increased later when he was also appointed manager for the Eight Mile Company and the Empress Company.

On 23 March 1882, Phillip Davies and his wife left Sydney bound for San Francisco.[41] Amongst the mines visited were the Sierra Butte, Northern California, the Great North Bloomfield Hydraulic mine, the Bald Mountain Company, and Forest City, California. The tailings, dumped into the Yuba River, destroyed farmland as far west as Sacramento, and created California's first major environmental controversy. Following upon an anti-debris lawsuit, hydraulic mining in Gold Country abruptly ended in 1884. The tailings can still be found on the river known as the Yuba Goldfields.[42] A survey in 1878 by state engineers found that at least 18,000 acres of once fertile farmland along the Yuba River had been buried beneath tons of mining debris. The Greenhorn Creek had been buried beneath two hundred feet of mine gravel while silt from hydraulicking was carried down the Sacramento River to San Francisco and out into the Pacific Ocean.[43] Twenty-two kilometres from Nevada City, the view of the multicoloured spires that form the cliffs of the Malakoff Diggings remain a spectacle from the days of hydraulic mining. Great man-made canyons, 5,000 feet long and five to six hundred feet wide with banks as high as 500 feet, were carved out by water travelling at 150 feet per second.[44]

The effects of hydraulicking at Kiandra do not appear to have caused complaints to any extent. Either the amount of gravel and sand that went down the Tumut River failed to spread across the agricultural lands near Tumut, or what was sent down the Eucumbene River was too remote for any protests. Similarly, Hydraulic mining at Cobungra near Omeo seems not to have given rise to any great protest in spite of dramatic despoliation of the natural environment.

At the beginning of May 1882, work was suspended for the winter and Messrs M'Callum and Hoad's employees returned to Tumut. The local Brass Band met the procession of forty horse drays and played them through the town to the tune 'Marching through Georgia', and other popular airs. It was claimed that 300 Europeans and Chinese had been employed upon the company's works. The wall of the embankment for the dam had reached a height of 30 feet but there was still a way to go to reach the target height of 44 feet, which was expected to be achieved when work resumed about October. It was also believed all the preliminary works would be completed by February or March 1883.[45]

On 29 May 1882, Phillip Davies wrote from San Francisco to the Directors to inform them that he had visited nearly all the leading hydraulic gold mines in California and noted the extensive and expensive waterworks associated with each mine. With

banks as high as 600 feet they were often loosened by gunpowder charges. Davies reported:

> I have only found one company here whose gravel will average as much as the Emperor Company, New Chum Hill. All the fluming is charged with mercury, then at the very end of the long fluming comes the important branch of the hydraulic gold saving apparatus, viz., the undercurrents produced by grizleys.[46] I have now a perfect knowledge of that work; it is as simple as ABC. Some of these undercurrents, after a run of two miles in the flumes, can save over 10 per cent of the gold. [47]

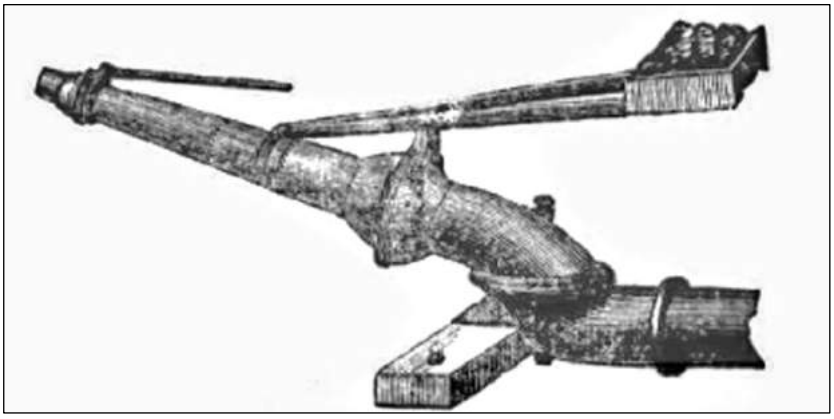
Davies arrived back in Sydney on 29 July 1882 bringing plans of the Californian placer nozzle along with notes on the use of mercury in freezing conditions and the general machinery of sluicing. [48] In November 1883, the Mort's Dock Engineering Company was manufacturing the wrought iron piping and hydraulic sluicing nozzles for the Kiandra, Eight-Mile and North Bloomfield Companies.[49]

In California, nozzles appeared up to twelve inches in diameter from various manufacturers, with five and one-half to seven-inch diameter nozzles being most common. Of the several companies making monitors, Richard Hoskins 'Little Giant' [Fig. 3][50] combined with 'Perkins Deflector' seems to have been the most popular. The 'Perkins Deflector' was later superseded by one of Hoskins own design. It seems likely that Phillip Davies obtained the plans for Richard Hoskins 'Little Giant' monitor.[51]

Trials of Hydraulic systems at Kiandra

During 1883, Wren had a telephone line erected between the Three Mile Dam and New Chum Hill where the sluicing was being carried on. This was more convenient and saved a considerable amount of time travelling back and forward[52]. On Friday 29 March 1883, the Chairman and Legal Manager of the Kiandra Company arrived from Sydney and on 1 April a trial of the 'water force' was made.[53] Some of the pipes gave way, but when this was remedied another trial was made and all was satisfactory, though some alterations had to be made subsequently before work could commence. Apparently, the directors were 'highly pleased' with the trial and the progress made.[54]

Figure 3: *Richard Hoskins of California 'Little Giant' Monitor.*

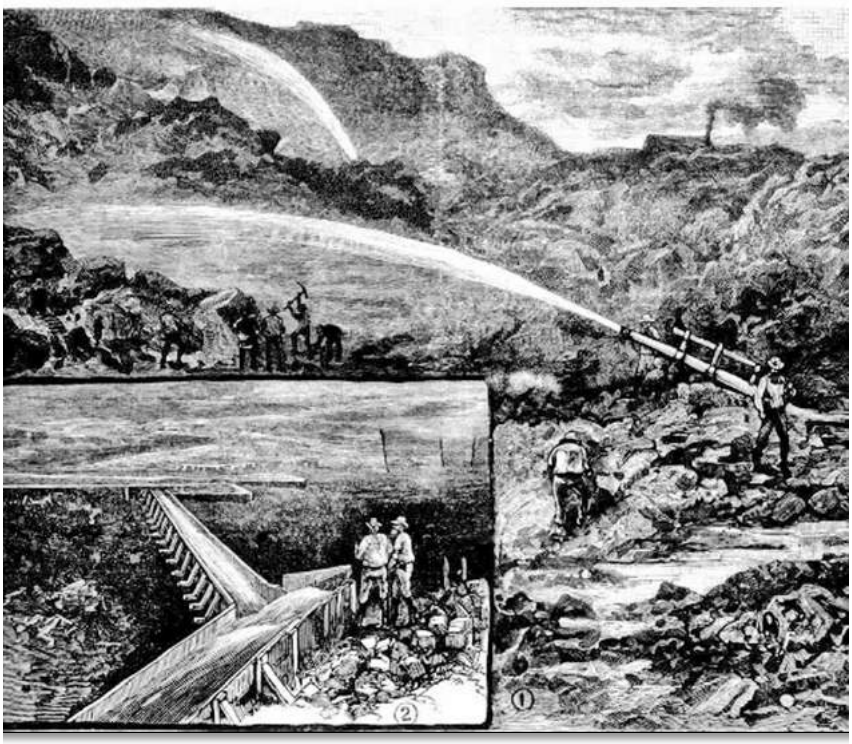


Source: *Australia Town and Country Journal*, 27 October 1877, p. 23.

Following Davies' successful visit to California the *Sydney Morning Herald* reported in 1883 upon a visit to the mountainous part of California by Cecil W. Darley who saw hydraulic sluicing, with water conveyed a distance of 40 miles from 'great reservoirs in the Nevada Mountains'. The pressure in the case of the North Bloomfield Gold Mine was 'enormous, throwing a jet to a distance of 570 feet'. But the havoc wrought in the valley by sluicing 15,000 cubic yards of earth each day was silting up San Francisco harbour at the rate of ten inches a year. The newspaper continued to suggest that this method of mining gold deposits should be tried at Wattle Flat where there were three or four miles of gold-bearing country. However, a problem was noted in the cost of providing reservoirs as well as the location and the manpower required to build them. [55]

While it is known, that ground sluicing had been introduced to New Zealand during the 1860s, the use of nozzles or monitors does not seem to have appeared until about 1880 when John Robert Perry who designed the Hydraulic Elevator for use at Gabriel's Creek near Otago, employed elevators in conjunction with sluicing nozzles.[56] The system of hydraulicking introduced by Phillip Davies appears to have been more advanced than previous machinery and methods, but further research is required in this instance. It also appears that no patent rights were taken out either by Davies or the Kiandra Gold Mining Company, as before long other mining concerns had the Californian type nozzles in use, not only at Kiandra but also elsewhere.

Figure 4: *Hydraulic Sluicing Kiandra Gold Mining Company*.



Source: 'The Kiandra Gold-Mining Company's Works', *Sydney Mail and New South Wales Advertiser*, 20 August 1887, p. 393.

In 1883 a company known as the Eureka Mining Company was said to be at work on the New Chum Hill, but required more water while completing their work.[57] Earlier, the prospectus for the Golden Crown Hydraulic Sluicing and Gold Mining Company had been published on 3 August 1882. This company advertised its capital at £30,000, in 30,000 shares of £1 each. The company also

proposed to mine by hydraulic sluicing on the 'American system' in an area of 65 acres of auriferous gravel situated on the bank of the Tumut River, about 12 miles south-west from Kiandra. Once again the civil mining engineer F.B. Gipps had prepared plans and a report for the new company, and others were also called upon to report on the new company's prospects including Hon. John A. Wallace of Victoria. Thomas Hedley was sent by Wallace to inspect the property, and he reported favourably on the Fifteen-Mile Mine. Gold was first discovered in this locality in 1872 by two miners named Green and Carmichael who worked on the surface of Cornish and Sailors' Gullies. Ten thousand shares only were to be offered to subscribers, with 20,000 shares in the proprietor's hands.[58] The dam was constructed at Granite Creek one of the sources of the Toolong River, beginning at a swamp near Round Mountain. Water was brought to the mine along a ditch 16 miles long, though one report stated it was 23½ miles in length and capable of delivering 20,000,000 gallons daily,[59] while another report said it was capable of delivering fourteen million gallons daily to a place about 250 feet above the bottom of the mine.[60] During May 1883 Messrs Hassall, Price and Johnson arrived at the Golden Crown to take over from Gipps who was leaving for Sydney,[61] and on 11 May 1883 a trial sluicing with a 'two inch little giant nozzle' was conducted.[62] The Golden Crown Company had a separate existence from the Kiandra Gold Mining group, and no detailed account stating the returns from the mine has so far been found. The site of this claim is now said to be under the waters of the Tumut Pondage, one of the reservoirs of the great Snowy Mountains Hydro-Electric scheme.

The Eight-Mile Gold Mining Company commenced sluicing on 28 July 1883 and all the appliances worked well.[63] The nature of water quality in 1883 seems to have been almost ignored at Tumut apart from one lone voice stating the water was like 'soup'. The cause was attributed to the claims at the Eight-Mile near Kiandra.[64]

During January 1884, the weather turned unfavourably dry with bush fires breaking out on the surrounding hills and the dams drying up so as to interfere with sluicing. There was also a change in management of the Kiandra Gold Mining Company with the resignation of Wren and the appointment of James Patterson (sic) at the New Chum and Richard Davies, the brother of Phillip, at the Eight Mile.[65]

During August 1884, both the Kiandra and Eight-Mile Companies had 'wash-ups'. The result was considered satisfactory at the Eight-Mile and the Kiandra Company obtained a much higher result than was expected.[66] Following a dry winter the December washing-up of the Kiandra Company gave a return of 401ozs of gold,[67] and on 12 January 1885 it was reported that the directors of the Kiandra Company had declared another dividend of 6d per share.[68]

On 15 January 1885, the Empress Gold Mining Company and the Eight-Mile Mining Company had their fifth half-yearly meetings in Sydney to receive the Directors reports and balance sheets. The Eight-Mile Company meeting was to be held at 11.30am and the Empress Company at 11.45am. Obviously the business was light in nature. At 2pm a second half-yearly meeting was also scheduled for the South Bloomfield Company to receive the balance sheet, director's report and to transact general business.[69]

Phillip Davies letter concerning lack of acknowledgement

A short while later, Phillip Davies wrote to the Editor of the *Argus* newspaper in Melbourne complaining about the lack of acknowledgment he had received from the Cobungra Mining Company in Victoria. The John Ditchburn named in Davies letter was a well-known legal mining manager in Ballarat.

HYDRAULIC MINING.

TO THE EDITOR OF THE ARGUS.

Sir, I am just in receipt of your valuable journal of the 16th inst., wherein appears an elaborate article headed "Hydraulic Sluicing at Cobungra Mine." Some three years ago I visited the hydraulic mines of California in the interest of the Kiandra Hydraulic Mining Company, and obtained all information in connexion with that highly interesting class of mining, bought the most approved hydraulic plants then in existence on the Pacific Slopes, and on my return to Sydney I had duplicates of machinery made at, Mort's Dock, and through the application of Mr. John Ditchburn, one of the Cobungra directors, 1 furnished from time to time all details in connexion with hydraulics, even to the copy of specification for pipes, water gun, &c. As this information was given free of charge I think the least the directors of that company could have done was to mention my name to your able reporter as being the only person who contributed detailed information for their guidance, even to the use of quicksilver and how to apply it. It would appear from the remarks of your reporter that there is doubt yet existing in the minds of those in connexion with mining whether quicksilver will readily amalgamate with gold in cold climates. I may state that we have five hydraulic mines now at work in the Kiandra district, and they are on an average 5,000ft above sea level. The thermometer registered l8 below freezing point. While we were at work last winter every speck of gold was thoroughly amalgamated, including the smallest particles of specimens. At Sierra Butti, [sic. Butte] Northern California, the largest company there, they use quicksilver successfully, even in a crushing mill, elevation 7,000, and almost perpetual snow. The Great North Bloomfield Hydraulic mine is 5,000 elevation. They had a 3-ton charge of silver in the sluice at the time of my visit. Cold weather never is referred to as an objection to the use of quicksilver. The enormous friction brought about in hydraulic mining by the great volume of water, the tens of thousands of tons of loose gravel and boulders running through the sluice boxes at such speed, renders amalgamation perfect, and, indeed, quicker by far than can possibly be brought about in a crushing mill.[Bald] Mountain Company, Forest City, California, do not use quicksilver, owing to the peculiar nature of the gold. It is coarse, and covered over by a thin coating of oxide of iron, thus preventing the slightest affinity to quicksilver. This company is in cold climate elevation 5,400ft, and it is said that if they were in the tropics quicksilver would be of no use to them. This, I think, Sir, is sufficient to show that the Cobungra, or any other mine situated on the Cordillera, can use quicksilver to the great advantage of shareholders if properly applied.

Yours, &c., PHILLIP DAVIES, Mining Engineer, Director of the Kiandra Mines, &c

Hadley-Villa, Glebe Point, Sydney, N.S.W., Feb. 1870

While the original article in the *Argus* was extensive, no reply appears to have been made to Phillip Davies letter.[71] It should be noted that mercury, also known as quicksilver, melts at -38.87° C (-37.97° F) and boils at 356.72° C (674.1° F). Mercury will combine with all common metals except iron and platinum to form alloys known as amalgams. Mercury is removed from amalgams by distillation.

Slee's description of the Kiandra Gold Mining Company's plant

Mining Inspector Slee, writing from Kiandra on 12 February 1885, gave an interesting report on the various mines. At that time the Kiandra Company at New Chum Hill was the only mine carrying on sluicing. Slee reported that the auriferous wash in the face of the mine averaged from four feet to nine feet in thickness. It was of a cemented nature resting on Silurian slate, while above the wash was a bed of carboniferous clay or earthy lignite from 12 feet to 30 feet in thickness over which were layers of clay and sand and capped by a few feet of basalt. The overall height of the face was from 70 feet to 103 feet. The nozzle attached to the piping was located within 50 to 120 feet of the face and worked on a swivel by one man around the face and from top to bottom. The water when turned on has a head of 140 feet with sufficient force to break the cemented wash in small fragments, often causing falls of 100 tons of earth and lignite. During the previous year 16,955 tons of stuff had been sluiced in 2,997 hours, with a yield of 928ozs 11dwt 9 gr. of gold.

Figure 5: *View from the wall of the Three Mile Dam near Kiandra showing race to the New Chum, on the down side.'*

Source: Photo by R. Ashley, 23 March 2016.

The reservoir covered an area of 80 acres 22 perches with a capacity of 431,937,300 gallons, while the water race was several miles in length with 1,071 feet of iron piping and fluming and the nozzles in general use were 4½ and five inches in diameter. The boxes were 1,574 feet in length including the under-current boxes

through which the finer stuff passed. Each box was three feet in width and lined with wood blocks, which left two feet clear by 18 inches high, with a fall of seven inches to 12 feet. Mercury was thrown in the boxes to amalgamate the fine gold.

Slee claimed, the Nine mile or Empress Mine was likely to be the richest at Kiandra, provided a large supply of water could be obtained. The Eight Mile Company was 'under the able and persevering manager, Mr Richard Davies, Phillip's brother, but was idle owing to insufficient water. A six inch nozzle connected to 20 inch piping with a head of 270 feet was employed at this mine'.[72]

Changing the Company's structure

Following an extraordinary general meeting of the shareholders during January 1887, the directors were authorised to sell, in England or elsewhere, the whole or part of the property of the company; the price and conditions being left to their own discretion.[73] A further meeting was called on 16 February for the purpose of adopting, or otherwise, the resolutions passed at the extraordinary general meeting.[74] A few days later the Kiandra Manager reported a clean-up of 1,216ozs of gold for four months work, using two placer nozzles.[75] This resulted in the Kiandra Company declaring a dividend of six pence per share payable on 10 March 1887.[76]

Notice of a general meeting of the Kiandra Company was next advertised on 19 November 1887, and on 7 December 1887 it was proposed that the capital of the company be increased from £50,000 to £55,000, and to issue 5,000 shares of £1 each named as 'preferent' shares.[77] It was evident that the mine had failed to attract any purchasers in Britain.

After seven months hydraulic sluicing, using two placer nozzles, the Kiandra Company had a clean-up resulting in 450ozs of gold. This came from the north face, known to be poor ground, and a tunnel for the new tailrace was not expected to be finished until the middle of January 1888.[78] Meanwhile the Kiandra Company was carting a nozzle and pipes from the South Bloomfield claim that was not being used, to begin with three placer nozzles when the new tail race was completed.[79]

It appears that the resolutions of 19 November 1887 were rescinded and a further meeting was called for 4 January 1888 when it was proposed to reconstruct by liquidating the old company and forming a new company,[80] to be known as the Kiandra Gold Sluicing Company.[81]

The Kiandra Sluicing Company and criticism of hydraulic sluicing

About 15 February 1888, C.S. Wilkinson and W.H.J. Slee who were members of the Prospecting Board arrived in Kiandra for a short visit. Wilkinson said he would return in the summer to have a geological survey made of the probable course of the deep leads and the best sites for tunnels and shafts to work same. The correspondent reporting on the visit noted that the Kiandra Gold Sluicing Company [this should have been the Kiandra Gold Mining Company] has taken five years to wash away with the aid of hydraulic sluicing, what could have been blocked out in twelve or eighteen months if the Ballarat method of working deep leads mines had been adopted. He went on to compare the Kiandra lead with the deep lead at Sebastopol, pointing out the heavy

snow in winter would not interfere with underground work.[82] Similar arguments were published later in December 1888, possibly by the same correspondent at Kiandra, but this criticism appears to have been ignored by the Kiandra Sluicing Company. The opinion of Phillip Davies was not published, but as an experienced miner who understood deep lead mining at Ballarat, one needs to balance his judgement as to why hydraulic sluicing was adopted. The Kiandra Sluicing Company lasted until 1889 when A.R. Winckler and others purchased the property.[83] According to Andrews, sluicing continued as late as 1910, however, this was most likely carried on by other smaller parties after 1901. Andrews thought that it was not practical to work the central section of the lead because of the overburden being several hundred feet high.[84]

The end of hydraulic sluicing and Davies role at Kiandra

According to Moye's *Historic Kiandra*, large scale hydraulic sluicing at Kiandra operated with only moderate success for ten to twenty years.[85] E.C. Andrews' report of 1901 for the three claims at New Chum Hill 1883 to 1900 gives an amount of 6,965oz 7dwt 9grns of gold from ten to twelve acres of sluiced ground.[86]

It is possible that Phillip Davies disposed of his shares in the Kiandra Gold Mining Company when the company was liquidated, but he appears to have retained shares in the other associated companies, which were possibly forfeited. It is not known at what date Davies ceased to be the superintending manager at Kiandra and advisor to the company. In 1888 Davies and three others purchased the Mitchell's Creek Estate near Wellington and turned gold mining there into a great success. The village that grew up in the vicinity of the mine was named Daviesville, but later changed to Bodangora.

Phillip Davies achieved the wish of the Tumut people in that hydraulic sluicing did open up new industry at Kiandra that gave employment to hundreds of miners and artisans, but surely he was disappointed at the less than spectacular results of the Kiandra sluicing companies. Interestingly, the sand deposits at New Chum Hill later provided the sand for the Tumut No. 1 Hydro Electric Power station, and sand from the Eight Mile deep lead was used for the Tumut No. 2 Hydro Electric Power Station.[87]

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This account is the result of a research request to the author by Andrea McGregor of New Zealand who is a great, great, grand niece of Phillip Davies and whose diligent genealogical enquiries has opened up a fascinating history. In this, she has been assisted by her father William E. Davies of Dinas, South Wales, who is a descendant of Phillip's brother William. Also Richard and Margaret Davies of Fig Tree, as well as Judith Mitchell, who are descendants of Richard Davies the younger brother of Phillip Davies.

The NSW State Archives in Western Sydney, the State Library of NSW and the National Library's TROVE digital newspapers on-line have proved invaluable. Also appreciated is Dr K. McQueen of Canberra, who raised the question concerning the physical properties of mercury.

It has to be stated that apart from one letter and a fragment of a letter, no private papers for Phillip Davies appear to have survived. The biography that is proposed to be published by the author, will therefore heavily rely on Davies' involvement with mining throughout Australia, using newspaper accounts. Local Historical Societies in several states have been visited and their assistance has been appreciated.

Finally, acknowledgement and appreciation is expressed for the suggestions made by the referees concerning environmental damage in California and Kiandra, hydraulicking in New Zealand and FB Gipps involvement with hydraulicking on the Turon.

Endnotes

[1] *Historic Landscape Characterisation; The Rhondda. The Rhondda historical Processes themes and background*, Glamorgan-Gwent Archaeological Trust. www.cadw.wales.gov.uk
[2] William Edwin Davies, Dinas, Rhondda, Wales, Notes per e-mail to Andrea McGregor 13 February 2015; Emrys Pride, *The History of the Rhondda Valleys*, Starling Press, Newport, Gwent, 1975.
[3] 'Deaths,' *Principality*, 6 April 1849, p. 8, c. 4; 'Dinas (Rhondda Valley)', *Western Mail*, 22 March 1889, p. 3, c. 9, for obituary of Elizabeth Davies.
[4] Pride, *The History of the Rhondda Valleys*, p. 14.
[5] [5] http://www.welshcoalmines.co.uk/deathrolls/Dinas.htm
[6] 'Colliery. - Loss of Twelve Lives', *The Bristol Mercury*, 6th January 1844, p. 4, c. 1.
[7] Progress Report from the Select Committee on Cape Patterson Coal Fields', *Victoria Parliamentary Papers*, *Legislative Assembly*, 1864-65, D27, pp. 12-15. Phillip Davies gave evidence before the Committee.
[8] Units used in this paper: 1 inch = 25.4 mm, 1 foot = 0.3048 m, 1 mile = 1.609 km, 1 acre = 0.4047 hectares, 1 pound (lb) = 0.454 kg, 1 ton (long) = 2,240 pounds (lbs) = 1.01604 tonnes; 1 (imperial) gallon = 4.4561 litres.
[9] 'Notices', *The Bristol Mercury and Western Counties Advertise*r, 8 May 1852, p. 5, c. 3.
[10] Unassisted Inwards Passenger Lists to Victoria, 1852 - 1923, Public Record Office Victoria.
[11] Mining on Private Property Act No. 48, Victoria 796, 25 November 1884.
[12] David Scott, *A Draft History of the Nine-Mile Diggings, Kiandra Goldfield,* November 2008. For discovery of gold at Scott's gully and Nine-Mile in 1860, see http://www.kiandrahistory.net/NineMileHistory.pdf .
[13] 'Tumut News', *Gundagai Times*, 21 December 1880, p. 2, c. 5.
[14] Captain Frederick Bowdler Gipps, C.E., one of four officers of the Royal Sussex Regiment ordered out to India prior to the Mutiny. Gipps is credited with designing the Kenny Hill Water supply scheme for Sydney's water supply that was set aside in favour of the Prospect Scheme. During the 1881 court case of Gipps v McElhone, Gipps stated: 'he was an hydraulic engineer, and had had experience in this country and in California, extending over 6 years of actual practice and of study since 1857 or 1858; until recently occupied a position in the Harbours and Rivers Department under Mr Moriarty; he had no diploma, but had passed the necessary examination for military engineering, he was qualified as a civil engineer; had made a speciality of hydraulic engineering'. See *Sydney Morning Herald*, 28 May 1881, pp. 9-10. In May 1901 he suggested Lake George should be the site for the Federal Capital. Gipps died 25 January 1904 in Melbourne and was interred in the Cheltenham Cemetery. See *Argus*, 28 January 1904, p. 1.
[15] **Conversion units used in this article**: 1 inch = 25.4 mm, 1 foot = 0.3048 m, 1 mile = 1.609 km, 1 acre = 0.4047 hectares, 1 troy oz (the standard measure of gold and silver) = 20 dwt = 31.10348 g, 1 dwt = 1.555 g;1 pound (lb) = 0.454 kg, 1 ton (long) = 2,240 pounds (lbs) = 1.01604 tonnes; 1 (imperial) gallon = 4.4561 litres.
[16] 'Kiandra', *Manaro Mercury*, 27 April 1881, p. 4. c. 3.
[17] *Ibid.*
[18] 'Kiandra Gold Mining Company Limited (prospectus)', *Leeds Mercury*, 16 July 1881, p. 10, c. 5.
[19] Kiandra Gold Mining Company, Kew Archives, England, BT 31_2849_ 1566.
[20] 'On Dit', *Manaro Mercury*, 21 September 1881, p. 3, c. 7.
[21] 'The Miner. Hydraulic Sluicing at Kiandra', *Australian Town and Country Journal*, Sydney, 7 July 1882, p. 22, cc. 1-3.
[22] *Pall Mall Gazette*, London, 16 July 1881, p. 9, also reported the formation of the Kiandra GMC; The *Home News Article* was also published in the *Dundee Courier and Argus*, 19 July 1881.
[23] Kiandra Gold Mining Company, Kew Archives, England, BT 31_2849_ 1566.
[24] *Sydney Mail and New South Wales Advertiser*, Saturday 24 February 1883, p. 357. For reference to *London Gazette*, see National Archives, United Kingdom, Kiandra Gold Mining Company, BT_31_2849_1566, 7_048.
[25] *NSW Government Gazette*, 11 May 1883, p. 2647.

[26] 'Public Companies. Prospectus of the Kiandra Gold Mining Co., Limited,' *Sydney Morning Herald*, 12 December 1881, p. 11, c. 2.
[27] *Ibid*.
[28] 'Business Cards', *Sydney Morning Herald*, 29 July 1872, p. 4, c. 6.
[29] 'Tenders', Sydney Morning Herald, 13 January 1877, p. 2, c. 3.
[30] 'Mines and Mining,' *Australian Town and Country Journal*, Sydney, 27 October 1877, p. 23, cc. 2-3.
[31] Powell Greenland, *Hydraulic Mining in California: A Tarnished Legacy*, The Arthur H. Clark Company, Spokane, Washington, 2001, pp. 124-125.
[32] Matthew Higgins, *Gold & Water: A history of Sofala and the Turon goldfield*, Robstar Pty., Limited, Bathurst, 1990, p. 93
[33] 'Law Report', Sydney Morning Herald, 28 May 1881, pp. 9-10. See also endnote 13 above.
[34] *Ibid*, 4 January 1882, p. 4.
[35] Eight Mile G.M.C., Ltd, item 302, NSW State Archives, Series 12951.
[36] *Ibid.,* Eight Mile GMC Ltd, item 302; *ibid.,* Empress GMC Ltd, item 310.
[37] 'The Kiandra Mines', *Sydney Mail*, 28 February 1885, p. 445, cc. 1-2. NSW State Archives, 12951 series, North Bloomfield G.M.C., Ltd., item 681.
[38] 'Mining News', *Evening News, Sydney*, 8 February 1882, p. 8, c. 5.
[39] 'Mining Intelligence', *Sydney Morning Herald*, 20 February 1882, p. 6, c. 6.
[40] *Ibid*., 4 August 1882, p. 6
[41] 'Departures – March 16', *Australian Town and Country Journal*, 25 March 1882, p. 37, c. 4.
[42] 'North Bloomfield Mining and Gravel Company', in R.L. Hill, S.L. Kohler, C.T. Higgins, L.G. Youngs, *The Influence of Gold Mining on the Development of California,* California Department of Conservation, Div., of Mines and Geology, 2001, quoted in Wikipedia, the free encyclopaedia.
[43] Osborn Woods, *Hydraulicking: A brief history of hydraulic mining in Nevada County, California*, The author, Nevada City, California, 1962, p. 22
[44], *Ibid*., p. 17.
[45] 'Crumbs', *Cootamundra Herald*, 29 April 1882, p. 6, cc. 3-4.
[46] Grizley: In mining, a form of grid made from heavy iron bars to prevent oversize material from entering the processing appliances. Still common in modern processing, as well as with vibrating separators.
[47] 'Mining Intelligence', *Sydney Morning Herald*, 4 August 1882, p. 6.
[48] *Ibid.,* 31 July 1882, p 4, c. 1.
[49] *Ibid.,* 15 November 1883, p. 11, cc. 1-3.
[50] 'Little Giant Hydraulic Machine', *Australian Town and Country Journal*, 27 October 1877. From left to right it shows the attached lever for operating the deflector mounted behind the nozzle and towards the right is the counter-weight box filled with stones which rests upon a flexible joint to ensure ease of movement of the machine by the operator.
[51] Powell Greenland, *Hydraulic Mining in California: A Tarnished Legacy*, The Arthur H. Clark Company, Spokane, Washington, 2001, pp. 121-126. The deflector was a contrivance which allowed an operator to easily change the stream of water to the direction required.
[52] *Ibid.*
[53] 'Mining Intelligence', *Sydney Morning Herald*, 4 April 1883, p. 10, c. 4, and 'News from the Colonial Goldfields,' *Australian Town and Country Journal*, Sydney, 7 April 1883, p 22, cc. 3-4.
[54] 'Kiandra', *Manaro Mercury*, 7 April 1883, p. 3, c. 1.
[55] *Sydney Morning Herald*, 20 August 1883, p. 7. c. 2.
[56] Nicol Allan Macarthur, *Gold Rush and Gold Mining: A Technological analysis of Gabriel's Gully and the Blue Spur, 1861-1891*, MA thesis, Otago University, 2014, pp. 40-41, 126-128. Note- Macarthur does not provide a clear date for the introduction of hydraulicking.
[57] 'Kiandra', *Manaro Mercury*, 12 May 1883, p. 3, c. 6.
[58] 'Prospectus of the Golden Crown Hydraulic Sluicing and gold Mining Company', *Goulburn Herald*, 3 August 1882, p. 3, cc. 3-4.
[59] 'Local News', *Sydney Mail*, 25 August 1883, p. 370.
[60] 'The Miner: Hydraulic Mining in New South Wales', *Australian Town and Country Journal*, Sydney, 30 December 1882, p. 22, c. 1.
[61] 'Kiandra Items', *Manaro Mercury*, 12 May 1883, p. 3. c. 6.
[62] *Ibid.*
[63] *Ibid.,* 1 August 1883, p. 3, c. 3.

[64] '*Gundagai Times,* 3 October 1883, p. 3, c. 1.
[65] 'Kiandra,' *Manaro Mercury*, 23 January 1884, p. 2, c. 4; This should read **James Pattinson** who was Manager for the Kiandra Gold Mining Company and the Gold Sluicing Company during their existence. He later formed an association with Captain Augustus R. Winckler a past shareholder of the Kiandra Companies to mine a claim at the Township Hill. James Pattinson, J.P., died at Kiandra on 9 August 1905 and was buried in the Kiandra Cemetery, his body being drawn on a sleigh due the heavy snow conditions. Captain A.R. Winckler, thought to be the last of the original shareholders in the Kiandra Gold Mining Company group of mines, died in Sydney on 3 February 1933.
[66] 'Kiandra', *Manaro Mercury*, 16 August 1884, p. 3, c. 4.
[67] 'Kiandra G.M. Co.', *Evening News*, Sydney, 30 December 1884, p. 2, c. 5.
[68] 'Monetary and Commercial', *Sydney Morning Herald*, 12 January 1885, p. 6, c. 5.
[69] 'Meetings', *Sydney Morning Herald*, 31 December 1884, p. 2. c. 5.
[70] 'Hydraulic Mining', *Argus*, Melbourne, 21 February 1885, p.12, c. 7.
[71] 'Hydraulic Sluicing at the Cobungra Mine', *Argus*, 16 February 1885, p. 9.
[72] 'The Kiandra Mines', *Sydney Morning Herald*, 24 February 1885, p. 8, cc. 5-6.
[73] 'Items', *Sydney Mail*, 12 February 1887, p. 355, c. 3.
[74] 'Meetings', *Sydney Morning Herald*, 16 February 1887, p. 4, c. 1.
[75] *Ibid.,* 22 February 1887, p. 8, c. 4.
[76] 'Items,' *Sydney Mail*, 5 March 1887, p. 511.
[77] 'Meetings', *Sydney Morning Herald*, 19 November 1887, p. 3, c. 3.
[78] 'Kiandra', *Sydney Mail*, 3 December 1887, p. 1202.
[79] *Ibid.,* 'Kiandra', 31 December 1887, p. 1404, c. 2.
[80] *Ibid.,* 'Kiandra', 15 December 1887, p. 10, c. 1.
[81] 'Meetings', *Sydney Morning Herald*, 4 January 1888, p. 3, c. 1.
[82] 'Kiandra', *Sydney Mail*, 25 February 1888, p. 433, c. 1.
[83] Captain Augustus Robinson Winckler, died at a Private Hospital in Darlinghurst, Sydney, 3 February 1933, aged 88 years. 'Deaths', *Sydney Morning Herald*, 14 February 1933, p. 8, c. 1, NSW Certificate of death 100/1933, Augustus R. Winckler.
[84] Edward F. Pittman, Government Geologist, introduction in E.C. Andrews, *Report on the Kiandra Lead*, New South Wales Department of Mines and Agriculture, Geological Survey, Mineral Resources No 10.
[85] D.G. Moye, Editor, *Historic Kiandra: A Guide to the History of the District*, Cooma-Monaro Historical Society, 1959, p. 55.
[86] E.C. Andrews. Geological Surveyor, *Report on the Kiandra Lead,* Mineral Resources, New South Wales Department of Mines and Agriculture, Geological Survey, Mineral Resources No. 10, p. 25.
[87] Moye, *Historic Kiandra: A Guide…*, p. 68.