Self-Confidence, Self-Promotion, and Self-Delusion: A Case Study of a Saviour Who Failed

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Joseph Campbell was born near Sydney in 1856. His education was strong in science in general and geology in particular, both of which he studied, along with theology, at the University of Sydney.[1] In his words, he 'took holy orders because he believed that science and theology should go hand in hand'.[2] He modelled himself on two Australian priests who were also pioneer geologists, William Branwhite Clarke and Julian Edmund Tenison-Woods.[3] In addition to being a clergyman, he taught geology at the university and for the Board of Technical Education for some years during the 1880s and 1890s, and for five years in the latter decade ran a secondary school for boys that concentrated on science and the training of 'mining experts'.[4]

In 1884, Campbell published his most important book, *Simple Tests for Minerals, or, Every Man his own Analyst*, which went through several editions and reprints until 1936.[5] According to Campbell, it had 'been instrumental in opening up' unspecified 'mines of great value in Australia and South Africa'.[6] The fourth edition included an advertisement for 'Campbell's Prospectors' Box', which contained '33 different Chemicals and Articles' for testing ore; it could be posted to any part of Australasia.[7] He claimed to have 'made a special study of the treatment of refractory ores' in his laboratory and on several Australian goldfields, again unspecified.[8] In 1895, he published *Gold & How to Get it; or, one solution of the unemployment problem*, his 'popular geological lecture' given in Sydney to a large audience, whose 'cheers' were noted several times, provides an illustration of his self-promotion. Copies were distributed at the expense of himself and some friends, for he considered he could cure unemployment by encouraging parties of men equipped with basic skills to prospect the 92,000 square miles of New South Wales he considered were auriferous.[9] After this lecture was repeated, the New South Wales Co-operative and Mining Association' was formed and sent 18 men to prospect an area he nominated.[10] This failed venture was omitted from his autobiographical sketches.

Despite his claims of scientific rigour, Campbell published some curious theories. He believed in Spiritualism, claimed that Australian Aborigines 'for thousands of years had handed down the secrets and preached the same teachings' as Freemasons, and in

1923 wrote that Earth was 'enveloped in an electrical ring, and … its gradual descent upon the earth, now in course of progress', would destroy insect pests.[11]

The hyperphoric process tested in New Zealand and New South Wales

When in New Zealand, Campbell spoke as if he were the inventor of the thermo-hyperphoric process for treating refractory ore. In reality, as he earlier admitted,[12] he had modified a method developed by a New Zealander, Alfred Andrew Lockwood, an experienced miner,[13] but self-taught in the technicalities of treating ore. When mining at Karangahake in the late 1880s, Lockwood experimented with roasting quartz to save gold, being assisted by the Professor of Chemistry at Auckland University College. Instead of using fluxes, he used steam during the roasting process like some earlier inventors, with encouraging results.[14] Patents were taken out,[15] and, lacking capital, he went to Sydney to erect a trial plant with the aid of Herbert Chappell, a 'well known' mining agent.[16] Chappell became joint owner of the patent, formed a syndicate, and came to New Zealand to erect a plant at Waitekauri.[17] Despite high expectations, the plant failed because, it was said, the ore was valueless;[18] in fact, the process failed.[19] Nevertheless, it was claimed that over 150 samples tested by it had saved from 87 per cent to 90 per cent of the assay value, and Lockwood returned to Sydney to take charge of a plant erected there by Chappell's syndicate.[20] This small testing plant reportedly successfully treated 'the worst specimens' obtainable.[21] Lockwood claimed his process was superior to the new cyanide process, and that the syndicate was 'entering largely into arrangements with different mining companies' in New South Wales to erect plants.[22] Only one has been traced, at the Sir Walter Scott mine at Cangai, in the Clarence River district.[23]

According to Campbell, Lockwood's patent was submitted to him 'for examination' in 1890:

> It was then in a very crude state, but, as I was convinced of its value, I bestowed careful attention upon the matter, and having fully demonstrated the efficacy of the treatment, applied it on a large scale to ores containing 20 per cent of arsenic and zinc, lead, copper, and iron sulphides, with the result that I saved 95 per cent of the assay value…. Having recently brought the furnace in connection with the process to perfection, I took out patents for the treatment in every country of importance, and applied to it the distinctive name of "Thermo-Hyperphoric Treatment."[24]

He derived the name from Greek, signifying 'first, that which is pre-eminent, and second, that which produces a change by the elimination of certain base substances that

prevent the amalgamation of gold with quicksilver'.[25] Campbell always maintained that his process attained perfection. For instance in an 1896 interview he claimed:

> It is scientific and it is pre-eminently practical. I have treated, often working with my own hands, 150 tons of ore more refractory than most of what I have seen in New Zealand, and I always got more than three times as much gold as was yielded by battery treatment.

The process used water gas, which he admitted had been known about for 35 years, but using it to treat ore was new, as was the method of applying it in airtight furnaces. The gas was made 'by passing superheated steam over incandescent coke':

> When the steam is split up the hydrogen exists in a pure state. The oxygen first unites with the carbon to make carbonic acid; this carbonic acid meeting with more carbon is further acted on, and by the excess carbon present becomes carbonic oxide. The furnace … is so constructed that this gas … passes into and amongst the ore, which is broken to the size of walnuts; it is raised to a temperature of 1200 degrees, and the gases which act as reducing agents eliminate all the sulphur, arsenic, antimony, zinc, tellurium, iron oxide, or any other substance that interferes with the amalgamation of the gold.[26]

He expected this method would be 'universally adopted'.[27] It had already been tested at the Sir Walter Scott mine, from whence in November 1890 'very favourable reports' were received about trials of Lockwood's process and a battery on his design was 'being pushed on vigorously'.[28] In fact it was not, for two years later Campbell and Lockwood spent four months supervising its erection.[29] It treated the modest amount of nearly 40 tons a week at from 8shillings to 9s a ton; Campbell claiming that the 'virtually abandoned' mine became 'a most valuable property'. Similar plants could be erected anywhere for £1,000, and 'however refractory the ore, fully 90 per cent of the assay value will be won'.[30] He later claimed that the cost of treatment 'never exceeded 5s per ton'; after a flood wrecked the plant a director had told him that, as his process 'had proved superior to all others', a larger one would be erected.[31] If it was, it cannot have succeeded, for historians have ignored this mine.[32] Despite Campbell's insistence that he had applied his process 'with success',[33] no other use in Australia has been traced; had it been used elsewhere, undoubtedly he would have publicised this fact.

Initial investigation of Te Aroha ore

Campbell first visited Te Aroha in mid-1896 at the invitation of a mine manager and mining investor aware of the difficulties of treating the ore.[34] Three samples from the

area to be worked produced only from three to 15 grains of gold,[35] which did not discourage Campbell, who chose not to publish this result, instead over-stating the prospects. He assured a local audience that their district contained 'immense ranges containing innumerable reefs, representing enormous wealth, very many millions of pounds, which only requires the cheapest and best methods of gold-extraction to place us in a highly prosperous and flourishing condition'. He predicted that 'in less than five years the mines will be effectually worked for the saving of the precious metals. (Loud applause)'.[36] Naturally they applauded; having failed to make a success of their field using capital provided by local and overseas companies, here was someone congratulating them on their 'splendid prospects'.[37] Not just Te Aroha but also the whole Hauraki Peninsula would have, 'in the near future, a period of activity and prosperity such as never before … been experienced'. Simply travelling through the district had convinced him 'that payable reefs must exist in all that country', if the ore was treated correctly:

> I have approached the subject of the saving of gold from refractory ores with an unbiased mind. A true scientist cannot be a narrow-minded man, and I welcome every new process that comes before the public, as I have but one desire; that is, to see the mineral resources of the colonies developed. Perhaps I shall hardly be credited with such disinterestedness, but such is the fact. And though I have been working for 15 years, in nearly every instance I have given my service gratuitously.

After thus portraying himself as a self-sacrificing servant of science and mining, he had 'no hesitation in saying that all the ores' he had seen 'could be treated at a cost of from 3s to 5s per ton', and was willing to examine any ore 'or give any advice'[38] (his advice was always that his process should be adopted). Just before leaving for England to raise capital, he said that he had not seen any Te Aroha ore that could not be treated by it, and was 'convinced that with systematic development on a large scale millions of money could be won … in the near future'.[39] This message was repeated in a crowded lecture in Auckland attended by 'leading citizens and representatives of English and local companies'.[40] He surprised them by stating that the nearest gold-bearing area was a volcanic island in the harbour only a few hundred years old, and that he had taken a sample of Te Aroha ore 'worth £1,050 to the ton', without indicating that this value was highly atypical. No gold-bearing ores in New Zealand were 'impossible of profitable treatment', for he had obtained good results with much more refractory Cangai ore and his furnace was now 'greatly improved'. He prophesied success for every mine mentioned, forecasting that 'the goldfields had a bright future before them, and the time

would soon come when the little insignificant towns of the districts would develop into big cities'.[41] All these predictions pleased the audience,[42] but none were fulfilled.

Raising capital in England

In England he lectured on 'The Gold-Fields of the Hauraki Peninsula, New Zealand' to the North of England Institute of Mining and Mechanical Engineers. He covered New Zealand's geology; the chemical reactions that formed its auriferous reefs; the vegetation and hot springs of Te Aroha mountain; the volcanic district of Rotorua; his predictions for valuable reefs being discovered in (allegedly) unprospected areas; the exceedingly rich ore at Te Aroha (the £1,050 sample was again cited); and how cyanide would 'absolutely' fail to treat refractory ores compared with his process, which would extract 95 per cent of the assay value of 'any ore' at a cost of, at most, 5s per ton.[43] (Lockwood's role in devising the process was not mentioned, and would never be mentioned again). In the discussion of what he admitted was 'a somewhat fragmentary paper',[44] he was criticized for making mistakes about the geology, being too general about the mines and his process, and accused of putting forward 'purely speculative ideas' of 'not the slightest value'.[45] Henry Louis, author of *A Handbook of Gold Milling*, cited a 1672 report to prove that Campbell's process was very old, 'apart from using the current of water-gas before amalgamating'.[46] In failing to answer the criticisms adequately, Campbell admitted that there was more to understand. 'He was a hard-working student, not in the least dogmatical, and he was only too glad to get any assistance from anybody, even from the very humblest miner with whom he came in contact'.[47] Nonetheless, he repeated that his process would save 95 per cent of all refractory ore, now at from 5s to 10s per ton.[48]

According to Campbell, his process

> was examined and tested in every possible way by the leading metallurgists of England – those connected with the Royal School of Mines, the Royal Mint for instance – and they recognised the importance of the discovery, according me their hearty interest and support, and expressed themselves as being more than satisfied with the result. A miniature plant was erected at the Royal Mint, and the process subjected to the severest test possible, ores of the most refractory nature from Australia and South Africa being treated, and with wonderful success.[49]

His lectures were designed to help raise capital.[50] In 1897 he formed the Montezuma Gold Mining Company, a private syndicate of his 'friends and personal connections'.[51] The prospectus misleadingly claimed that its Te Aroha property

contained 'fully two miles in length of gold-bearing reefs' and was 'very rich in gold ore'. Campbell 'had agreed to act as consulting geologist and managing director in New Zealand, and to direct all operations'.[52] As a laboratory would be provided to give him 'every facility' for scientific work, he 'felt in duty bound to accept the appointment'.[53] The capital was only £30,000.[54]

The Thermo-Hyperphoric Ore Treating Syndicate, also floated in London, registered his patent under its name.[55] This preliminary company had a capital of £25,000; in time a larger one with up to £500,000 capital would be formed to extend operations worldwide.[56] Lockwood, who was not involved with Campbell at Te Aroha, went to England to erect a plant to demonstrate its capabilities by testing samples from India, Canada, Australia, and New Zealand.[57] He soon abandoned it to manage a large mine in Wales,[58] and never returned. Reportedly tests were 'eminently satisfactory',[59] and Campbell was asked to go to England to superintend the erection of new furnaces; he declined because of his work at Te Aroha.[60]

Putting his theories into practice in New Zealand

In mid-1897, Campbell closed his school in Sydney and settled in Te Aroha, planning to stay for a year.[61] His plant took longer than anticipated to erect,[62] not being ready until May 1898 but during that time he kept repeating that it would treat any ore cheaply.[63] He was distracted by a new goldfield north of Auckland, which he claimed contained 'some of the best ore he has seen in New Zealand', but he actually acquired claims in a worthless field.[64] He also developed the Montezuma Company's claims in a small way: the largest number of miners employed was 12.[65] Despite his prediction that it would cost £1,500, the plant cost £12,000.[66]

Would 'the most perfect furnace and ore-treating method in the world' (his description)[67] succeed? Although hoped so, because similar ore abounded elsewhere,[68] experienced miners lacked faith, as his process was only in the experimental stage.[69] First reports were positive, at the end of April, Campbell announcing that 'everything worked very satisfactorily' during 'a preliminary run'.[70] A reporter, 'on seeing large clouds of smoke and steam hovering round' the plant, went to investigate, but was not allowed inside:

> From what we could gather it would appear that everything was just on the point of starting. Though we cannot furnish our readers with particulars just yet, we ascertained that the smoke and steam were caused by the working of the gas-producers, and that the massive furnace was gradually attaining a great heat. This furnace has to be heated up to the enormous temperature of

> something like 2000 degrees Farnh. We are informed that great interest centres on this furnace, on account of it being the first of its kind that has ever been heated by producer gas.[71]

It was announced that the first experimental crushings were successful, but that Campbell 'has determined to preserve a rigid silence until the plant may fairly be said to be in perfect going order, and the bare chance of a mishap eliminated'. Those permitted to inspect declared 'themselves satisfied that the process will be a success'.[72] After a few more days of experimentation while residents grew impatient,[73] Campbell announced that

> everything promises to be pre-eminently satisfactory. All parts of the machinery perform the duties assigned to them, while the furnace is one of the most perfect he has ever seen. During the next three or four days one or two pullies are to be adjusted, slope of hopper altered, shoots arranged, and then the running will proceed without the slightest hitch. Mr Campbell says that he is satisfied that his process will be very successful in dealing with all classes of New Zealand ores.[74]

He continued to claim that his process would work satisfactorily.[75] He was 'so very mysterious, and apparently desirous of keeping everything secret', because he had 'many initial difficulties' to overcome and 'did not want to be hampered with too many around him'. Soon people would be invited into the plant to be told about its operations. 'After twenty-four days and nights of anxious toil he was able to tell them that these difficulties had been overcome'.[76]

By early July, 'about 200 tons' had been treated.[77] Campbell produced a 'wedge of bullion weighing some 102oz and valued at from 8s 6d to 10s per oz', recovered from low-grade ore 'not amenable to the cyanide process'. The cost was 8s per ton, which Campbell hoped to reduce to 5s. He wanted the company to expand the capacity and install better rock-breakers but while this change was made and he consulted his fellow-directors, the plant was closed.[78] He evaded giving precise details, but insisted that the furnace 'in every way … came up to expectations'. From different samples he had saved from 60 per cent to 80 per cent of the bullion, lower than forecast, anticipated increasing this to 95 per cent, and when experimenting had noticed 'many important and interesting points'. Asked about the 'impression that extensive alterations' were required and that if extra capital was not forthcoming the plant would be abandoned, Campbell laughed and denied 'the slightest truth in the rumour'. The alterations would not cost more than £1,000, though he admitted that it had 'cost more than anticipated' and that expansion was required because they lacked 'rich refractory ore to treat'. The

larger plant was 'necessary to secure decent profits. As to abandoning the thing now – nothing is further from our thoughts. Why, we have but commenced':

> We will increase the amalgamating plant, and erect concentrating tables to deal with certain classes of ore. I can honestly say that the treatment has proved a success in each parcel of ore dealt with, and all that we now require is a little time in which to effect certain alterations, so as to enable us to put through from 50 to 60 tons per day, at a cost of about 8s per ton. The treatment of refractory ores is now an easy matter, and I am prepared to treat 25s ore, and make it pay its way in any part of the country where suitable fuel … can be obtained at a cheap cost.[79]

His claims prompted a newspaper in a nearby mining district to point out that the facts Campbell had 'left unrecorded might have cleared up the cloud of mystery which has hung over the process since its inception'. His reports only wrapped 'a thicker veil around it', for to make sense of the trial the number of tons treated should have been given. That the plant would close for some months was 'ominous', because if the 'experiment had proved payable one would have supposed it the reverse of payable to hang up the mine for so long'.[80] A few days later, a carpenter informed the Minister of Mines that

> I do not think from all I hear that it is a success so far. I have it on the Best Authority (outside Mr Campbell) that is from the man who has carted Coal and the quartz that he has been using about 35 tons of Coal per week and I have it from men who have been working in the Battery that he has not been treating that quantity of quartz, and he has had three shifts of nine men employed, so that I do not think we shall get any relief from that quarter.[81]

Not until a year later were the official results released:

> The mill was worked experimentally for fifty days; 307 tons of quartz were dealt with, some being treated and amalgamated, some concentrated raw, and concentrate treated. Some of the ore was worth 12s 6d per ton, and some of greater value. The total value of the bullion extracted was £191 15s, the price per ounce being from 5s to 10s.[82]

As the parcels of ore treated 'did not turn out as well as anticipated', work had stopped.[83] Campbell received six months' protection for his mines while he completed and enlarged his plant, which now would include cyanide treatment.[84] He insisted that 'the satisfactory results' had met his expectations, 'several minor difficulties' had 'disappeared', and the plant was 'working smoothly'; he repeated that the 'certain little alterations' would extract 95 per cent at a cost 'in no case' exceeding 8s per ton. The importance of his process could not be 'too highly estimated', because it meant 'the

successful treatment of thousands of tons of payable ore all over the Hauraki Peninsula, which have hitherto remained untreated on account of their refractory character'.[85]

Instead of concentrating on refining the process, Campbell toyed with establishing a sanatorium at the hot springs,[86] experimented with manufacturing gas for lighting and heating,[87] and planned to float a company to develop some soda springs.[88] Nothing came of any of these diversions.

Four months after the plant closed, Campbell insisted that he had 'determined beyond doubt that 80 to 96 per cent of bullion in the most refractory ore' could be saved at a cost now estimated as from 8s to 12s per ton.[89] Instead of his going to London to prove this claim to his fellow directors, the latter sent a representative to inspect. When he reported unfavourably, Campbell rejected his criticism, claiming 'there was every reason to believe' that the process 'would result satisfactorily'.[90] He accused this director, who wanted the plant erected in New South Wales and was unimpressed with the value of the ore in sight, of being 'prejudiced against New Zealand mining in favour of Australia before leaving London'.[91] Campbell claimed this man had seen 'a mine and mining machinery for the first time in his life when I showed him this company's property', and this 'Bradford weaver' had 'thought his qualifications as such fitted him to judge New Zealand mining, which he has condemned in sweeping terms'.[92] He was in fact a Scarborough engineer.[93]

Another chance to prove the success of his process came in August 1898, when the Great Barrier Gold and Silver Mining Company gave him 40 tons of 'good quartz' for 'experimental purposes'.[94] Four months later, a shareholder complained that no results had been received, and noted that 'cynical shareholders' believed that the process was 'essentially that of the laboratory, and when tested on a working or commercial scale, will prove a failure'.[95] Campbell responded that he had made a progress report before treating the balance of the ore. He guaranteed a saving of 80 per cent, believed he could extract 95 per cent of the assay value, and proved his belief in the ore and the 'adaptability' of his method by purchasing 200 shares in their company.

> I am sorry that anyone should think I withheld information … Those who know me best generally blame me for telling too much, but I like to make known any facts I may discover, the publication of which may lead to the development of your goldfields.[96]

Nothing further was heard for nine months, when 'Investor', who had acquired shares on the basis of Campbell's assurances, requested information.[97] When

interviewed, the company secretary complained that he had not received detailed results.[98] Campbell responded that he had reported that the ore was nearly half the value he had been led to expect. 'When the greatest care was exercised' he had been able to extract 80 per cent of the value, but at other time it was only 50 percent or lower. He had obtained £93-worth of bullion from 35 tons and had tailings to the value of £20 to treat. He still guaranteed extracting 80 per cent, 'probably 90 to 95, at a cost not exceeding 12s per ton'.[99] The chairman of directors then pointed out that his report lacked detail, that Campbell had admitted not using his process, and the low assays he reported did 'not compare with bulk assays made' by another syndicate.[100] Campbell responded that his assays were accurate and did not reply to the charge that he had not used his process, merely repeating that it worked if there was value in the ore. If given more ore, he now offered to guarantee 80 per cent extraction using his process at 20s a ton, a much higher figure than any previous one, or alternatively 95 per cent extraction - 50 per cent cheaper than 'any other process that can be shown to extract a similar percentage from an equal quantity of ore'.

> Two years' hard, and, I may add, unsympathetic, work, among your New Zealand refractory ores has put me in the position to state positively and emphatically, without fear of contradiction, that I can successfully deal with any of them.[101]

This was not answering the question. As 'Investor' pointed out, it was not the value of the ore that mattered but 'how many tons were hyperphorically treated in 24 hours; by what means the bullion was subsequently recovered; how much bullion was extracted, and at what cost per ton'.[102] 'Shareholder' considered Campbell's system a failure because it produced a return of £93 from ore assaying as worth £184 8s. Campbell's report was 'full of excuses, and most unsatisfactory. He enlarges theoretically upon what he can do, but in practice fails entirely in producing satisfactory results'. That Campbell still promised excellent results showed that he was 'convinced that theoretically he is right'.[103] Campbell uncharacteristically failed to respond, but the following month guaranteed to save 80 per cent from 100 tons of ore from a different mine at a cost of 12s per ton.[104] His offer was not taken up.

In 1932, Campbell claimed that the shareholders of the Montezuma Company decided to give up when the ore 'cut out – only temporarily I believe'. He described the company as 'a small one of £10,000, and the shareholders lost heart when funds were exhausted and further prospecting could not be carried on'.[105] This was deliberately misleading: the nominal capital was three times that amount, £18,000 was raised on

flotation,[106] and not all was expended. In February 1899, the shareholders agreed to liquidation,[107] Campbell's explanation being that as a result of the English director's criticism the £3,000 required to complete the plant and develop the property was not provided. The New South Wales shareholders acquired the property as The Twentieth-Century Gold Mining Company for £1,200, and 'the necessary work' was 'carried out under the direction and personal supervision' of Campbell, who was still 'satisfied' that he could save from 80 per cent to 95 per cent of 'any refractory ore'.[108] Some additions were made, with the usual prophecies of profitably treating ore from various areas.[109]

Leaving the plant working in a small way, Campbell took 'highly remunerative' examples of concentrates to Sydney, where he sought more capital.[110] He gave several lectures on his time in New Zealand, illustrated by limelight views of scenery, minerals, and his machinery.[111] He stated that he had decided to treat the Te Aroha ores, which no method had been able to treat successfully, because 'if he could deal successfully with these ores he could treat anything in the mineral world'. He had overcome 'difficulty after difficulty', and 'confidently' asserted that the ore concentrators added would 'give very large profits'.[112] Reportedly he returned with sufficient capital to make 'substantial additions' and improvements, and some work resumed, without details being made public;[113] clearly the changes did not bring success.

End of his experiments

In late February 1900, Campbell publicly admitted for the first time that he had not overcome all his difficulties. Te Aroha ores were

> too low grade to be worked with financial success unless local fluxes could be effectively employed. The ore containing from 12s 6d to 15s per ton worth of silver with a trifling quantity of gold was too poor to warrant the use of imported fluxes, and so far his attempts with local fluxes had not been entirely successful, and his hopes of their ultimate success was not strong.[114]

A week after this uncharacteristically pessimistic statement, he announced that tests with local fluxes had been 'crowned with success', and only 'a severe mishap to the smelter by which it was rendered useless' had prevented him treating a large parcel. He was to test a modified smelter that would be much cheaper. 'Everything' had been done to create 'a perfect plant', and it would only be closed down if payable ores were unavailable.[115] Three weeks later, he announced that most ores were 'not worth

handling by his process', although ore assaying over 30s per ton could be successfully treated. He had been

> trying to devise a cheap method of smelting concentrates from such ores after treatment, and he yesterday proved that he has been successful, as he extracted 99 per cent from concentrates assaying £5 per ton, by means of a cheap form of smelter he has arranged, and the use of local fluxes…. The process is a decided success in all cases where there is any value in the ore.[116]

He informed the Warden that he had 'made a most important discovery in the form of a method of [s]melting refractory concentrates quite new to metallurgical science'.[117] Instead of providing details, at the end of June 1900 he announced that, 'after three years of patient investigation', he had concluded there was 'no refractory ore problem in New Zealand to be solved'. The quantity of payable ore not amenable to cyanidation, a process which worked, merely occurred in patches 'not worth working', and although his plant was 'complete in every particular for dealing with any class of ore, either free milling or refractory, experience shows that none is obtainable in the district'. Accordingly, he had 'decided very unwillingly' to close and sell the plant.[118] He promised to publish details of his 'discovery of a cheap method of smelting ore concentrates',[119] but did not. He now admitted having made only 'a cursory examination' of the ore on his first visit, when at the time he claimed to have made a thorough geological survey.[120] At his farewell social he reportedly said that the ore had proved 'too complex and refractory', and that although 'he had given an immense amount of labour and study to the solution of the problem', it had 'proved too much for him. One result was that he could now safely assert, that what he did not know about refractory ores was not worth knowing'.[121] Campbell quickly denied saying the problem had proved too much for him: he had said he had proved the ores were non-payable. Any refractory ore valued at 35s per ton, a much higher figure than earlier quoted, could be 'profitably handled'.[122]

An Auckland journal responded bluntly to Campbell's statement that his efforts 'had not been undertaken with the desire to enrich himself, but to obtain a knowledge of minerals and to study nature':

> Rats! But let us assume, for the sake of argument, that this is so. Did the Rev. Joseph Campbell tell the Home financiers, when he was raising money from them to exploit the Te Aroha mines, that the purpose was to study nature? Also, when he took up options over several mines, was it with the object of studying nature? Nonsense. Rev. Joseph Campbell does not

> require to study nature. He knows it too thoroughly – especially human nature.[123]

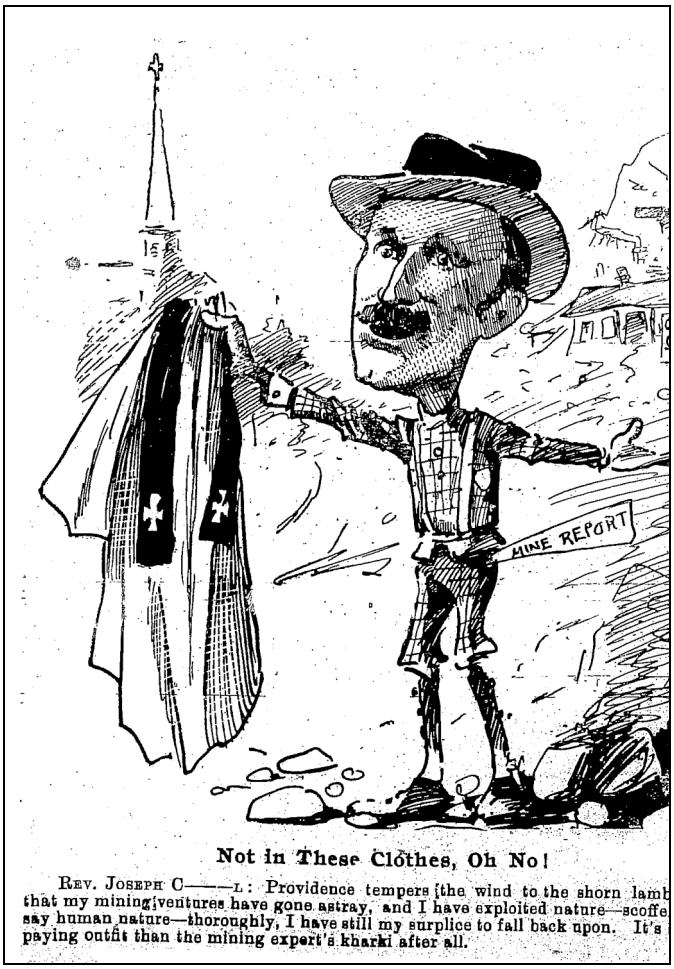
Another commentator, 'Anti-Gas (Hyperphoric or Otherwise)', denied Campbell was a true scientist, being merely a metallurgist making large claims for a process he had not invented and whose main features were 'in no way new'. He had a 'superabundance of poor refractory ore' to treat, but what was the practical result?:

> Absolutely nothing! He had advertised himself to the utmost extent during his experiment at Te Aroha in the press, at lectures, in church rooms, in private life, and even from the pulpit; but to a practical mining man the plain facts of the case are that, notwithstanding the overweening self-confidence displayed by him upon every occasion, his process as regards Te Aroha mines (which mines he deliberately selected for experiment after, I presume, carefully examining same) is a dead failure.[124]

Campbell responded that he was a practical scientist who had 'wrested from nature some of the secrets which have been hidden for years', citing scientists who allegedly praised his process. 'It is not my fault that there has yet been no refractory ore worth treating discovered in Auckland province',[125] thus again contradicting his unqualified enthusiasm for this ore on his first visit. In 1932, one year before his death, Campbell told a Te Aroha man trying to revive mining that it was 'strange' that his work was not known: 'Can it be I am absolutely forgotten?' He falsely claimed to have 'successfully demonstrated the process and saved 95 per cent of contents of all ores', but had closed the plant because insufficient ore was available:

> It was quite the fault of the people that my work then ceased, because I had given up my time and spent much money in fully demonstrating my ability to extract 95% of the value of any 5 or 10 ton lots sent to me from various Localities; but they only made use of what I did for them for the purpose of floating their particular properties.[126]

This was neither accurate nor charitable to those whose money he had wasted. In 1900, he had departed to be a clergyman in Christchurch, trying to avoid paying rent owed on his claims.[127] The caption on a cartoon about his change of occupation was blunt:



Cartoon by 'Blo' [William Blomfield], *Observer*, 10 February 1900, p. 5.

> Now that my mining ventures have gone astray, and I have exploited nature – scoffers will say human nature – thoroughly, I still have my surplice to fall back upon. It is a better paying outfit than the mining expert's khaki after all.

The following year, a newspaper noted that his plant, 'which was to have revolutionized Te Aroha mining, has long since departed, and (appropriately enough) is now said to form part of a gas works'.[128]

After Te Aroha

From 1900 until 1909, Campbell was a clergyman in Christchurch and then in Cairns before resigning to pursue his research into growing cotton.[129] He continued to be interested in geology until at least 1909, publishing in 1905, *The Key of Knowledge for Miners, or, What's the Value of this Ore?*.[130] For the remainder of his life all his 'spare time was devoted to the study of tropical industries', especially cotton and sugar.[131] David Branagan, who has studied Campbell's Australian career, considers that he successfully undertook a remarkably wide variety of agricultural experiments.[132] In

1922, as Director of the North Queensland Intelligence Bureau he advertised his services to anyone seeking advice on farming and geology.[133] Clearly few responded, for the following year he moved to Sydney and published a pamphlet entitled *Campbell's Key of Knowledge of Science and Industry*. Typical of his self-promotion and claimed successes, he stressed that he was a busy scientific experimenter, belonging to many professional societies, and was a popular lecturer for farmers and geologists who provided practical assistance through pamphlets, 'limelight views', and demonstrating simple experiments. Criticising professional scientists for failing to work with amateurs such as himself, who were their equals; he complained that government funding was not provided for his efforts to apply his knowledge to practical problems. 'To-day I probably know more about the potential wealth of tropical Australia than any one else',[134] and claimed he had solved a variety of problems affecting primary producers, which others profited from while his contribution was ignored. He wanted the community to meet his expenses so that he could continue experimenting for its benefit.[135] As this request was ignored, his remaining years until his death in 1933 were spent as a clergyman with a continuing interest in goldmining.[136]

Conclusion

An Auckland journal described Campbell as 'a man of many parts … [who] invariably enters with enthusiasm into anything he undertakes ... Whenever he starts for a goal he generally gets there'.[137] A compulsive self-publicist, he blamed the ore rather than admit that his process had failed. Was he self-deluded into believing that he had succeeded? And how much of his agricultural research in North Queensland was both original and effective? His wide variety of experiments suggests tinkering rather than expertise in specialist areas, and for his research to be ignored by professional scientists suggests that many did not take him seriously. In 1897 he was noted as being 'well known as an enthusiast in geology, mineralogy, and mining matters generally',[138] but enthusiasm does not equate with genuine ability and success, as his involvement with mining at Te Aroha proved. Campbell was typical of many potential saviours who genuinely believed they had the solution to the industry's problems, but whose claims were disproved when tested.

Endnotes

[1] For his youth and education, see *Australian Mining Standard*, 15 July 1897, p. 2031; Joseph Campbell, *Autobiographical Sketch of the Demonstrator, for the Perusal of those who may wish to make use of his Services as Director of the North Queensland Intelligence Bureau*, Cairns, 1922, no pagination [pp. 1-3, 5, 6]; Joseph Campbell, *Campbell's Key of Knowledge of Science and Industry: 'The Opportune Moment' for the Man on the Land, for exterminating the fruit-fly pest[,] the sugar-cane pest[,] bunchy top in banana[,] timber borers and for getting expert advice in cotton-planting[,] peanut-growing[,] &c, &c*, Sydney, 1923, pp. 3, 7; David Branagan, 'Then Look Not Coldly on Science: Joseph Campbell, M.A., Journeyman Cleric', *Journal and Proceedings of the Royal Society of New South Wales*, vol. 131, parts 1-2, June 1998, pp. 19-30.
[2] *Auckland Weekly News*, 25 July 1896, p. 29.
[3] *Australian Mining Standard*, 15 July 1897, p. 2031. For Clarke, see Ann Mozley, 'William Branwhite Clarke', *Australian Dictionary of Biography*, vol. 3, Melbourne, 1969, pp. 420-22; Elena Grainger, *The Remarkable Reverend Clarke: The life and times of the father of Australian geology*, Melbourne, 1982. For Tenison-Woods, see B.H. Borchardt, 'Julian Edmund Tenison-Woods', *Australian Dictionary of Biography*, vol. 6, Melbourne, 1976, pp. 254-55; Isabel Hepburn, *No Ordinary Man: Life and letters of Julian E. Tenison Woods*, Wanganui, 1979.
[4] *Auckland Star*, 28 September 1896, p. 4; *Australian Mining Standard*, 15 July 1897, p. 2031; Campbell, *Autobiographical Sketch*, [pp. 6, 13].
[5] Branagan, 'Then Look Not Coldly', p. 24.
[6] Campbell, *Campbell's Key*, p. 3.
[7] Campbell, *Simple Tests for Minerals, or, Every Man his own Analyst*, 4th edn, Sydney, 1898, advertisement after p. 173.
[8] *Auckland Weekly News*, 25 July 1896, p. 29; *New Zealand Mines Record*, vol. 1, no. 12, 16 July 1898, p. 524.
[9] Joseph Campbell, *Gold, and How to Get It, or One Solution of the Unemployed Problem, Being a Popular Geological Lecture delivered in the Great Hall of the School of Arts, Sydney, New South Wales, on Monday Eve, December 3rd, 1894*, 2nd edn, Sydney, 1895, pp. 2, 4-6, 21-25.
[10] Campbell, *Gold, and How to Get It*, pp. 25-27.
[11] Joseph Campbell, *In the Spirit World*, Christchurch, 1902, especially p. 21; 'Mercutio', 'Local Gossip', *Auckland Weekly News*, 6 July 1900, p. 7; Campbell, *Campbell's* Key, p. 8.
[12] Campbell, *Simple Tests*, p. 62.
[13] See for example Coromandel Warden's Court, Register of Claims 1872-1885, folios 4, 15, 36, 47, 48, 61, 80, 90, ZAAN 14044/1a, Archives New Zealand, Auckland Office [hereafter ANZ-A]; *Thames Star*, 21 December 1881, p. 3; *Ibid.,* 25 November 1884, p. 2; *Auckland Weekly News*, 7 July 1888, p. 22.
[14] *Ibid.,* p. 22.
[15] *New Zealand Gazette*, 21 June 1888, p. 695; *Ibid.,* 12 July 1888, p. 758.
[16] *Thames Advertiser*, 17 August 1888, p. 2, 11 January 1889, p. 2; *Te Aroha News*, 12 December 1888, p. 2; *Ibid*., 15 March 1890, p. 2.
[17] *New Zealand Gazette*, 10 January 1889, p. 22, 31 January 1889, p. 122; *Thames Advertiser*, 11 January 1889, p. 2.
[18] *Waikato Times*, 1 June 1889, p. 2; *Thames Star*, 13 August 1889, p. 4; Bankruptcy Files, BBAE 5628/5, 93/33, ANZ-A; *Appendices to the Journals of the House of Representatives* [hereafter *AJHR*], 1890, C-3, p. 149.
[19] Bankruptcy of James McGuire, Bankruptcy Files, BBAE 5628/5, 93/33, ANZ-A.
[20] *Waikato Times*, 3 September 1889, p. 3.
[21] *Ibid.*, 20 February 1890, p. 2; *Daily Telegraph* (Sydney), 4 February 1890, reprinted in *Auckland Weekly News*, 1 March 1890, p. 30.
[22] Letter from Alfred Andrew Lockwood, *New Zealand Herald*, 15 January 1891, p. 3.
[23] Campbell, *Gold, and How to Get It*, p. 15.
[24] Campbell, *Simple Tests*, p. 62.
[25] *Ohinemuri Gazette*, 4 July 1896, p. 5.
[26] *Auckland Weekly News*, 25 July 1896, p. 29.
[27] *New Zealand Herald*, 2 July 1896, p. 6.
[28] *Australian Town and Country Journal*, 15 November 1890, p. 25; *Ohinemuri Gazette*, 4 July 1896, p. 5; *Auckland Weekly News*, 25 July 1896, p. 29.
[29] *Australian Town and Country Journal*, 5 November 1892, p. 15; *Auckland Weekly News*, 25 July 1896, p. 29.
[30] *Australian Mining Standard*, n.d., reprinted in *Auckland Weekly News*, 3 June 1893, p. 21.
[31] *Thames Advertiser*, 29 July 1897, p. 3; *Auckland Weekly News*, 25 July 1896, p. 29.

[32] See Isabel Wilkinson, *Forgotten Country: The story of the Upper Clarence gold fields*, Lismore, 1980; C.A.W. Baker, 'The History of Mining in New England', *Armidale and District Historical Society, Journal and Proceedings*, no. 14, April 1971, pp. 64-75; R.B. Walker, *Old New England: A history of the Northern Tablelands of New South Wales 1818-1900*, Sydney, 1966.
[33] *New Zealand Mines Record*, vol. 1, no. 12, 16 July 1898, p. 526.
[34] *New Zealand Herald*, 24 June 1896, p. 6, 2 July 1896, p. 6; *Te Aroha News*, 26 May 1898, p. 2.
[35] Thames School of Mines, Assay Book 1895-1897, entry for 3 July 1896, School of Mines Archives, Thames.
[36] *Ohinemuri Gazette*, 4 July 1896, p. 5.
[37] *New Zealand Herald*, 2 July 1896, p. 6.
[38] *Auckland Weekly News*, 25 July 1896, p. 29.
[39] *Auckland Star*, 28 September 1896, p. 2.
[40] *Ibid.*, 26 September 1896, p. 4; *Ibid*., 28 September 1896, p. 4; *Ibid.,* 29 September 1896, p. 4.
[41] *Ibid.,* 29 September 1896, p. 4.
[42] See editorial, *Ibid.*, 30 September 1896, p. 4.
[43] Joseph Campbell, 'The Gold-Fields of the Hauraki Peninsula, New Zealand', *Transactions of the Institute of Mining Engineers*, vol. 12, 1896, pp. 462-481.
[44] Campbell, 'Gold-Fields', p. 481.
[45] Thos. J. Bewick, in Campbell, 'Gold-Fields', p. 482, and for other points raised in discussion, see pp. 482-87.
[46] Louis Henry, in Campbell, 'Gold-Fields', p. 486.
[47] Campbell, 'Gold-Fields', p. 487; for his further response, see 'Discussion on the Rev. J. Campbell's Paper on 'The Gold-Fields of the Hauraki Peninsula, New Zealand', *Transactions of the Institute of Mining Engineers*, vol. 13, 1897, p. 151.
[48] Article by Joseph Campbell, *Mining Journal* (London), n.d., reprinted in *Thames Advertiser*, 28 July 1897, p. 3.
[49] *New Zealand Herald*, 26 April 1897, p. 5.
[50] For example, *Waikato Argus*, 26 May 1898, p. 4.
[51] *Ohinemuri Gazette*, 17 February 1897, p. 2, 24 March 1897, p. 2; *Auckland Weekly News*, 20 February 1897, p. 30; Company Files, BT 31/7207/50975, Public Record Office, London [hereafter PRO].
[52] *Ohinemuri Gazette*, 24 March 1897, p. 2.
[53] *Australian Mining Standard*, 15 July 1897, p. 2031.
[54] *New Zealand Mining Journal and Financial Guide*, vol. 2, no. 12, 1 February 1898, p. 385.
[55] *New Zealand Herald*, 16 March 1897, p. 6; *Thames Advertiser*, 28 July 1897, p. 3; *New Zealand Mines Record*, vol. 1, no. 12, 16 July 1898, p. 524.
[56] *New Zealand Herald*, 26 April 1897, p. 5.
[57] *Waikato Argus*, 20 May 1897, p. 2; *Ohinemuri Gazette*, 22 May 1897, p. 5.
[58] *Ohinemuri Gazette*, 9 August 1899, p. 2.
[59] *New Zealand Herald*, 25 August 1898, p. 6, 1 November 1898, p. 6.
[60] *Auckland Weekly News*, 17 November 1899, p. 13.
[61] *Australian Mining Standard*, 15 June 1897, p. 2031; *Auckland Weekly News*, 17 July 1897, p. 29.
[62] For examples of delays, see *New Zealand Mines Record*, vol. 1, no. 3, 16 October 1897, p. 103; *Thames Advertiser*, 4 December 1897, p. 3; *Te Aroha News*, 12 May 1898, p. 2.
[63] For example, *Te Aroha News*, 1 March 1898, p. 2; *Auckland Weekly News*, 11 September 1897, p. 19; George Wilson to Minister of Mines, 12 May 1898, *AJHR*, 1898, C-3, p. 74.
[64] *Ohinemuri Gazette*, 9 February 1898, p. 3; *Auckland Weekly News*, 19 February 1898, p. 30; *Thames Star*, 27 July 1898, p. 4; *Thames Advertiser*, 25 April 1898, p. 3.
[65] For example, *Thames Star*, 6 May 1898, p. 3; *New Zealand Mines Record*, vol. 1 no. 12 (16 July 1898), pp. 524-525; George Wilson to Minister of Mines, 12 May 1899, *AJHR*, 1899, C-3, p. 69.
[66] *Thames Advertiser*, 23 August 1899, p. 3; for original cost, see *Ohinemuri Gazette*, 4 July 1896, p. 5.
[67] *Thames Advertiser*, 17 March 1897, p. 3.
[68] For example, editorial, *Te Aroha News*, 10 May 1898, p. 2; T.W. Rhodes, *The History and Resources of the Auckland Goldfields*, Coromandel, 1899, p. 14.
[69] *Thames Advertiser*, 3 August 1897, p. 2; *Ibid.,* 25 April 1898, p. 3; *Te Aroha News*, 26 May 1898, p. 2.
[70] *Thames Advertiser*, 27 April 1898, p. 3; see also *Te Aroha News*, 30 April 1898, p. 2.
[71] *Te Aroha Times*, n.d., reprinted in *Thames Advertiser*, 7 May 1898, p. 4.
[72] *Te Aroha News*, 5 May 1898, p. 2.
[73] *Ibid.*, 10 May 1898, p. 2.
[74] *Ibid.*, 12 May 1898, p. 2.
[75] *Waikato Argus*, 26 May 1898, p. 4.
[76] *Te Aroha News*, 26 May 1898, p. 2.

[77] *Thames Star*, 6 July 1898, p. 1.
[78] *Te Aroha News*, 9 July 1898, p. 2; *Thames Advertiser*, 13 July 1898, p. 4.
[79] *Auckland Weekly News*, 23 July 1898, p. 20.
[80] *Waitekauri Age*, n.d., reprinted in *Thames Advertiser*, 20 July 1898, p. 4.
[81] James Mills to Minister of Mines, 25 July 1898, Mines Department, MD1A, 8/50, No. 1, Archives New Zealand, Wellington Office [hereafter ANZ-W].
[82] George Wilson to Minister of Mines, 12 May 1899, *AJHR*, 1899, C-3, p. 69.
[83] James Coutts to Under-Secretary, Mines Department, 29 April 1899, *AJHR*, 1899, C-3A, p. 53.
[84] Te Aroha Warden's Court, Applications 1898, 28/98, 35-41/98, BBAV 11582/4a, ANZ-A; *Thames Advertiser*, 8 August 1898, p. 3.
[85] *New Zealand Mines Record*, vol. 1, no. 12, 16 July 1898, pp. 526-527.
[86] *Auckland Weekly News*, 10 April 1897, p. 2.
[87] *New Zealand Herald*, 13 September 1898, p. 5; *Ohinemuri Gazette*, 14 September 1898, p. 3; *Auckland Weekly News*, 6 July 1900, p. 40.
[88] *New Zealand Herald*, 14 June 1899, p. 5; *Thames Advertiser*, 15 June 1899, p. 3.
[89] *Thames Advertiser*, 28 October 1898, p. 4.
[90] *Auckland Weekly News*, 6 January 1899, p. 14; *Thames Advertiser*, 5 January 1899, p. 4.
[91] *Auckland Weekly News*, 13 January 1899, p. 19.
[92] *Ibid.*, 13 October 1899, p. 19.
[93] Company Files, BT 31/7207/50975, PRO.
[94] *Observer*, 27 August 1898, p. 3.
[95] *Auckland Weekly News*, 23 December 1898, p. 21.
[96] *Ibid.*
[97] *New Zealand Herald*, 2 October 1899, p. 6.
[98] *Ibid.*
[99] *Ibid.,* 4 October 1899, p. 6, 6 October 1899, p. 6.
[100] *New Zealand Herald*, 6 October 1899, p. 6.
[101] *Ibid.,* 9 October 1899, p. 6.
[102] *Ibid.*
[103] *Ibid.*, 16 October 1899, p. 3.
[104] *Auckland Weekly News*, 10 November 1899, p. 21.
[105] Joseph Campbell to Charles Scott, 25 May 1932, Mines Department, MD1, 23/1/20, no. 1, ANZ-W.
[106] *New Zealand Mining Journal and Financial Guide*, vol. 2, no. 12, 1 February 1898, p. 385.
[107] Resolution passed on 23 February 1899, confirmed on 7 March 1899, Company Files, BT 31/7207/50975, PRO.
[108] Joseph Campbell to George Wilson, 10 April 1899, printed in *AJHR*, 1899, C-3, p. 69; Te Aroha Warden's Court, Mining Registrations 1899, 15/99, BCDG 11288/1a, ANZ-A.
[109] *Thames Advertiser*, 27 March 1899, p. 2, 10 May 1899, p. 3; *New Zealand Herald*, 12 May 1899, Supplement, p. 2, 9 June 1899, Supplement, p. 1.
[110] *Thames Advertiser*, 24 July 1899, p. 2, 16 August 1899, p. 3.
[111] *Auckland Weekly News*, 18 August 1899, p. 18; *Thames Advertiser*, 23 August 1899, p. 3; *Thames Star*, 23 August 1899, p. 4.
[112] *Auckland Weekly News*, 18 August 1899, p. 13.
[113] *Thames Advertiser*, 25 August 1899, p. 2; *Te Aroha News*, 11 January 1900, p. 2, 15 February 1900, p. 2.
[114] *Thames Star*, 23 February 1900, p. 4.
[115] *Te Aroha News*, 1 March 1900, p. 2.
[116] *Ibid.*, 17 March 1900, p. 2.
[117] Warden to Under-Secretary, Mines Department, 25 May 1900, *AJHR*, 1900, C-3, p. 117.
[118] *Auckland Weekly News*, 29 June 1900, p. 42.
[119] *New Zealand Herald*, 6 July 1900, Supplement, p. 1.
[120] *Auckland Weekly News*, 6 July 1900, p. 40; for his earlier claim, see *Auckland Star*, 28 September 1896, p. 2.
[121] *New Zealand Herald*, 31 July 1900, p. 6.
[122] *Ibid.,* 2 August 1900, p. 3.
[123] *Observer*, 10 February 1900, p. 7.
[124] *New Zealand Herald*, 6 August 1900, p. 7.
[125] *Ibid.,* 20 August 1900, p. 7.
[126] Joseph Campbell to Charles Scott, 25 May 1932, Mines Department, MD1, 23/1/20, No. 1, ANZ-W.
[127] For example, E.W. Cave to Joseph Campbell, 26 July 1900, Te Aroha Warden's Court, Letterbook, p. 570, BBAV 11534/1a, ANZ-A; *New Zealand Herald*, 11 September 1900, p. 5; *Waikato Argus*, 30

November 1900, p. 4; Joseph Campbell to Under-Secretary, Mines Department, 2 January 1901, Mines Department, MD1, 01/3, ANZ-W.
[128] *Thames Star*, 12 June 1901, p. 4.
[129] *Church Gazette*, March 1900, p. 46; *Auckland Weekly News*, 29 June 1900, p. 42; *New Zealand Herald*, 3 July 1900, p. 6; Campbell, *Autobiographical Sketch*, [p. 14]; Branagan, 'Then Look Not Coldly', p. 20.
[130] *Ibid.,* pp. 30-31.
[131] Campbell, *Autobiographical Sketch*, [pp. 3-5, 8-12]; Campbell, *Campbell's Key*, p. 13; Branagan, 'Then Look Not Coldly', p. 32.
[132] *Ibid.*
[133] Campbell, *Autobiographical Sketch*, cover, [p. 1].
[134] Campbell, *Campbell's Key*, pp. 15-16.
[135] *Ibid.,* p. 23.
[136] Joseph Campbell to Charles Scott, 25 May 1932, Mines Department, MD1, 23/1/20, No. 1, ANZ-W; Branagan, 'Then Look Not Coldly', p. 34; Death Certificate of Joseph Campbell, Deaths, 1876/1933, Registry of Births Deaths and Marriages, New South Wales.
[137] *Observer*, 2 September 1899, p. 7.
[138] London Correspondent, *Auckland Weekly News*, 9 January 1897, p. 39.