

MINERS' AND PROSPECTORS' SKILLS IN GENERAL AND AT  
TE AROHA IN PARTICULAR

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## MINERS' AND PROSPECTORS' SKILLS IN GENERAL AND AT TE AROHA IN PARTICULAR

**Abstract:** *Mining was a skilled occupation, and untrained men were poor miners. A variety of skills were required to trace ore and to develop safe and well-operated mines. Mine managers needed not only to understand all aspects of mining but also required knowledge of geology and an understanding of treatment processes. Ensuring safety was paramount. And ideally, in some circumstances they should have the fortitude to stand up to their directors.*

*In the small mines of the Te Aroha district, as elsewhere, managers worked alongside miners, which could be bad for discipline. Examples are cited of managers who were unfairly dismissed for not finding high-grade ore. It was vital for the welfare of the industry that all their reports were accurate and not adjusted to suit share trading. Until late in the nineteenth century, managers were appointed because of their experience, but from 1887 onwards training was required, though for a time some very competent managers were granted certificates of competency without having to pass examinations in technical subjects. For long a preference was expressed for 'practical' men rather than the newly trained, and in the 1890s overseas experts were commonly ridiculed.*

*An ability to trace payable ore on the surface and underground was vital, and also one of the most difficult tasks facing both prospectors and miners. Untrained prospectors were notable for misunderstanding geology and wasting their efforts, as illustrated by some over-optimistic amateurs who failed to find anything of value despite years of effort. But even experienced men struggled to find good ore – hardly surprisingly because of its rarity. At least such men were not tempted by some of the more esoteric prospecting methods tried.*

*Because many in the mining industry realized their lack of knowledge, they were enthusiastic to learn from visiting lecturers and the schools of mines that were established in the 1880s. And several became inventors, with not all their inventions being limited just to the mining industry.*

### A SATIRICAL VIEW

Some of those involved with mining, especially investors who paid the wages of miners who often had little or no training, doubted the competence

and even the honesty of those working their claims. In 1901, the *Ohinemuri Gazette* reprinted a story in the Sydney *Bulletin*:

Sam and I were sent down by a Sydney syndicate to try a reef near Andon. They were an Unreliability Co. and we knew it, but we were tired of working in the sewers, and bosses had a habit of asking us to leave, anyhow.

Sam infused some energy into the secretary of the syndicate (a barber) by styling him the Legal Manager, and we left Sydney with £100 and got our fares paid to the nearest railway-station to the reef.

The reef was three miles from a pub; but we partly overcame this inconvenience by camping half-way between. Then we started to make inquiries over the bar about the original prospectors and the reef. The landlord, as he changed a fiver for Sam, predicted a great future for the mine. Sam said it was likely-looking country for gold, and we did some preliminary prospecting between the camp and the pub, and camped-out several nights without blankets.

Then we started to select a site for a new shaft. There was a shaft already sunk on the reef, about 20ft deep; but Sam decided that it was not sunk in the proper place, so we began to sink another near a shady tree. The old shaft was in the full glare of the sun. I did the sinking, and Sam read up some mining literature in the shade, until the shaft required a windlass. We had sunk 12ft when the handle came out of the windlass (our own make), and it and the bucket fell on me. Sam was not hurt, but stuck to the handle manfully, and, after he hauled me up, went on cracking quartz and spitting on it, as usual. He, however, decided that the shaft needed timbering. He said there were several ways to timber a shaft, but that I had better do it my own way, and I did it that way. The reef had a big underlay, or else it was a knock-kneed reef, and the bucket used to drag out some of the timber, but I had the shaft constructed on safe principles, and used to suspend all operations whilst the bucket was going up or coming down, which, however, was not often.

Sam was boss, and it was through a relation of his that we got the appointment. The aforesaid relation had to pretty well support Sam, so he distributed Sam's keep amongst a mining syndicate. I lent Sam a pound, and, as I seemed the only one likely to lend him another, he selected me as his mate. Neither of us had ever done any mining, but Sam was a liar of a high order.

His first report read: "Sinking on a body of ore, payable quality; reef, 3ft wide; in well-defined walls." Brief reports, Sam said, were the best; but still our wages were in arrears, and the publican was no longer effusive in his manner toward us.

People of various occupations used to call. They all said they could see no gold in the stone, but Sam said it was mineralised stone, and that gold was not visible in that kind of stone.

An unforeseen occurrence, however, disturbed things. We saw gold in the stone; it was only one color; still, even Sam could tell it was gold, so he decided to go down the shaft and inspect the new development. He tied himself securely in the rope and got me to lower him. It was his first time down, and he was pale with excitement – so he said – at the discovery. Presently he called on me to heave-up. I got him to the surface with such vigour that he “concussed” badly against the windlass. There was not much skin left on his hand, or much bad language left that he didn’t use – but he never mentioned how the accident happened in his next report, which was: “Had bad accident; hand severely crushed. Discovered rich shoot of gold; will have to put on man. Will personally superintend operations, however.”

This report brought down our money and the man’s wages, and the publican seemed sorry for past coolness.

We had been using dynamite – in our reports – for some time, but now there was a probability of having to use it in earnest. Sam ordered me to bore a hole in the reef. That hole took some time as I tapped the drill very lightly so as not to hurt my hand too much when I missed the drill. Sam told me to put plenty of stuff in the hole, but I “struck” when it came to lighting the fuse, and a coil of fuse would not reach to the surface. Sam overcame that difficulty by getting me to put some dry bushes down the shaft, and then dropping a fire-stick on them. This idea worked well, but we forgot to take off the windlass. The explosion was more thoughtful, and after it was over we required some new rope. I thought we also required a new shaft, and went on strike again.

About this time the company wanted us to forward some specimens. There was also some talk of the legal manager bringing down a speculator with a view of placing the mine on the London market. Sam was very indignant and threatened to resign if they interfered with his management. I thought it very probable they would interfere, but I was strong on having a new shaft and buying some specimens to pacify the directors.

Sam placed his view of the matter before the company. The mine was too good to sell. It was only mines that were worked-out or else no good that were put on the London market. He would not take £5000 for his interest in the mine – a twelfth. This report put matters on a more solid basis for us; and, after an elaborate survey, Sam fixed a site for a straight-shaft to cut the underlay at 100ft. The site selected for the new shaft was nearer to the public-house than the old one.

Then Sam, in a burst of excitement, raked-up some specimens and forwarded them to Sydney. The co. was so pleased that it

came up bodily and inspected the property. And now I am afraid there is nothing else for it but the sewers again.<sup>1</sup>

## SKILLS REQUIRED BY MINERS<sup>2</sup>

Henry Andrew Gordon, when Inspecting Engineer of the Mines Department, published *A Miners' Guide* in 1889 explaining mining methods. The portions relevant to the Te Aroha district are cited here, commencing with the methods of working quartz mines:

If the lode is found on a high elevation, and the sideling of the range is of a steep character, the best method to open out a quartz lode is to construct an adit-level in from the face of the range, to strike the lode about from 150ft to 200ft below the outcrop or cap of the reef. After the lode is cut the adit should be constructed along the line of the lode, and uprisers or passes made from the main adit to work the lode overhead... In some instances, where the lodes are found running along a ridge, a portion of the lode is worked in an open face like a quarry, if the lode is of great width; but this system has many objections, as it breaks the surface and allows the rain-water to follow down the workings.<sup>3</sup>

The latter warning was ignored in the New Find, Colonist, and Premier mines, creating wet working conditions for the miners working below in the now very well ventilated mines. Opening up to the surface also created potential dangers.<sup>4</sup> The next relevant sections dealt with timbering the adits, constructing passes, stoping and filling in the stopes, and timbering passes:

Whenever the lode is cut and the main adit follows along its course heavy timber must be put in. A manager of a quartz-mine should always see to have the main adit-level following along the course of the reef or lode constructed with strong timber-sets, placed about 4ft from centre to centre, and to have strong laths on

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<sup>1</sup> 'Yokel', 'Our Mine', *Bulletin* (Sydney), n.d., reprinted in *Ohinemuri Gazette*, 22 February 1901, p. 3.

<sup>2</sup> For illustrations of mining at Karanagahake, see *New Zealand Graphic*, 13 July 1895, pp. 28-29, 7 December 1895, p. 717.

<sup>3</sup> Henry A. Gordon, *A Miners' Guide* (Wellington, 1889), p. 56.

<sup>4</sup> For example, the accident to Edwin Hadfield, described in the paper on the New Find mine.

the top; for on this depends the whole of the after-workings being carried on economically....

The uprisings or passes are constructed up to such a height as will admit of several stopes being commenced. They are in many instances allowed to stand for a time until the stoping gets up to this distance, and as a rule the uprisings require no timber unless the rock be of soft and of a flaky nature, and they are constructed sufficiently large to admit of them being portioned off into a pass for the quartz and a ladder-pass for the workmen to get to and from their work.... These uprisings generally follow the footwall of the lode....

Whether the uprising is constructed to the full height of the lode intended to be worked from the main adit at once or whether it is carried on by successive stages as required, it is finally carried up until it meets the adit-level overhead, or, in the case of the surface, it is carried to a short distance below the surface. The surface of the ground should not be broken, as this admits of the rain-water following down the workings to their full depth....

The first stope is commenced on the top of the main adit-level, and carried along at such a height as the workmen can with advantage take out the lode. If the lode is wide the workmen generally require to keep the stope timbered close up to the face; but unless the roof is bad this does not require to be done. The first stope is carried on in this manner until it comes up to the next pass, when another stope can be commenced above the stope already taken out, and so on....

In some mines there is nearly enough of mullock in the lodes to fill in the stopes as they are taken out; but where this cannot be done arrangements have to be made either to send down the filling-in material from the surface or to construct a cross drive to get material for filling up each stope as it is taken out. There is generally one stope left open, and when the one above it is taken out the laths are taken up from the top of the lower set of timber, which formed a floor for the second stope, and the lower stope is filled up with mullock, and so on as each second or upper stope gets taken out all the way up.<sup>5</sup>

In Waiorongomai, as the best mines extracted large portions of the reefs, there was little mullock to fill the stopes, which were left open, and indeed, in the case of the New Find, were later expanded.<sup>6</sup>

The passes require to be logged up with strong logs, one laid close above the other, and this logging is carried on as the stopes get

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<sup>5</sup> Gordon, pp. 59-61.

<sup>6</sup> See paper on the New Find.

opened out. At the bottom of each pass they are formed hopper-shape, having either strong planks or a sheet of boiler-plate laid at such an inclination up the pass that the quartz will readily run down the end of the planks or boiler-plate, which projects a little into the adit-level, so that trucks can be run under it, and, through a door which is opened by means of an attached lever, the quartz falls down and fills the truck underneath, when the door is shut down again until another empty truck requires to be filled.<sup>7</sup>

Bert McAra, mine manager at Tui in the 1940s and later a mining inspector,<sup>8</sup> in his history of mining at Waihi described the methods used there in the 1880s. Drives, running in the same direction as the reef,

were usually seven by five feet if unsupported, but if they were timbered they were general six and a half feet high, four feet wide at the top, and five and a half feet at the bottom (measured inside timbering). The timbers were mostly of the order of ten to twelve inches, either squared or round but chosen according to the work they had to do. "Sets" up to twenty inches square were sometimes required where there was a great weight of country to support.<sup>9</sup>

At that time there were no rock drills, and the method of drilling holes for explosives was by hand drilling:

Usually, a man held the one-inch-diameter, chisel-pointed, "hand-steel" in position, turning it slightly each time his mate struck it with an eight-pound hammer. As a dozen or more holes might be required to break out a drive face in "tight" ground, drilling was a laborious and difficult process and good drillers were always in demand....

Hand drillers became extremely adept at their job and it was a long time before the first crude power-drills could compete with them. Three men, working triple-handed – two striking the drill and one man turning it – could put a hole in a depth of two or three feet in a matter of minutes.

The art of the drill sharpener was also one of great skill.... The cast-steel had to be of the best quality and the shape and temper of the bit had to be exactly right, neither too hard nor too soft: in the first case, the edge would shatter and the corners break off; in the second case, the clearance would be lost too quickly, the bit would jam in the drill hole and the following drill would not fit in

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<sup>7</sup> Gordon, p. 62.

<sup>8</sup> See paper on the Auckland Smelting Company.

<sup>9</sup> J.B. McAra, *Gold Mining at Waihi 1878-1952*, rev. ed. (Waihi, 1988), pp. 59-60.

the bottom of the hole. When used in hard rock the miner's pick, also, had to be carefully tempered by an expert, as it was used for cutting hitches to seat timbers and to make a flat surface upon which to start drilling in the hardest of rocks.<sup>10</sup>

Dynamite, the explosive normally used, 'required considerable care in handling, being particularly dangerous if frozen, when it had to be thawed in a warm-water-jacketed can. The copper-sheathed fulminate of mercury detonators were very sensitive to heat, shock and friction'.<sup>11</sup> The complexities of these mining techniques proved that mining was a skilled occupation, as was argued at the time.<sup>12</sup>

As an example of the tools used, those stolen from one miner, Alexander Mackay,<sup>13</sup> included 'seven miners' picks, two striking-hammers, a blacksmith's hammer, a hand-saw, an adze, a brace and 2-four bits, a rasp, two pick-handles, a shovel, two chisels, two hand-saw files, a set saw', and nails.<sup>14</sup> He also owned timber-cutting and woodworking tools: 'a 1 1/4in. auger, an American axe with broad blades, a small spokeshave, a cold-chisel, and a lightning-saw'.<sup>15</sup>

## MINE MANAGERS

When George Wilson,<sup>16</sup> the mining inspector for Hauraki, was farewelled when leaving Thames to become Inspecting Engineer for the Mines Department, he described local mine managers as 'a class anyone could get on with - jolly, straightforward fellows - and, moreover, they were men who knew their work and did it properly'.<sup>17</sup> In his *Mining and Engineering; and Miners' Guide* of 1894, Gordon, his predecessor, quoted a Californian expert's view that a manager

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<sup>10</sup> McAra, pp. 60-61.

<sup>11</sup> McAra, p. 62.

<sup>12</sup> For example, *New Zealand Herald*, 27 April 1881, p. 5.

<sup>13</sup> See paper on his life.

<sup>14</sup> *New Zealand Police Gazette*, 16 January 1889, p. 11.

<sup>15</sup> *New Zealand Police Gazette*, 27 July 1904, p. 216; for illustrations of some of the basic tools, see McAra, p. 38.

<sup>16</sup> See paper on his life.

<sup>17</sup> *New Zealand Herald*, 9 November 1896, p. 3.

should be able to run an engine; know how to run a mill in all its branches; know when each stamp is doing its duty; detect a loose mortar-bolt; cut out any kind of timber for a shaft, drift, or elsewhere; sharpen a pick or drill; and, in fact, he must be a miniature encyclopaedia - a man honest, temperate, and kind.

He noted that in 'older countries' men were not permitted to manage a mine unless they possessed considerable knowledge of geology, of working a mine, and of extracting metals from the ore. In contrast, in the colonies 'many' were 'pitchforked into positions, the duties of which they know very little about, and hence the many failures in working mines'.<sup>18</sup> James Herbert Curle, who published his second edition of *The Gold Mines of the World* in 1902, agreed:

A good man, with a good record, especially a trained mining engineer, cannot be secured for the small salary which ignorant bodies of directors insist on offering to their managers, and the natural consequence is that an unsuitable man, frequently some novice who is a friend of one of the directors, is secured.

While a trained mining engineer was 'not absolutely necessary to the ultimate success of a mine', an experienced man 'most certainly' was. The manager had to oversee the surveying of the property, deciding where to drive or sink, to order machinery, know the mining laws and be able to understand accounts, and, 'the most important point of all', to sample the ore:

Here the most level-headed experienced man, one with the soundest judgment and strictest integrity, is necessary to the success of the company. If the ore is found to be quite unpayable, and the reef itself is not of a permanent nature, it would be his duty to inform the directors, without reservation, and to recommend the closing down of the mine.

If the ore was possibly payable ore, he should warn of probable failure but also recommend further development. If the ore was of low grade 'but probably sufficiently good to pay if worked on a large scale', he had the difficult task of explaining the situation to the directors, recommending development, and planning to spend all the company's money on developing

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<sup>18</sup> Henry A. Gordon, *Mining and Engineering, and Miners' Guide* (Wellington, 1894), pp. 47-48.

the mine in all ways bar obtaining essential machinery. Curle considered the biggest ‘test of the manager’s capacity and strength of character’ his ability to stand up to directors who were only interested in the share market, not the mine. Few did this, especially inexperienced men who were pawns of the clique controlling the company:

Such men hardly have opinions of their own: the directors’ slightest suggestion is law. If they know that they are expected to cable home good assays, they do so, whether the ore assayed is found on their own property or elsewhere. If it is gently intimated to them that the ordering of a battery would have a cheering effect on the shareholders, the battery is at once ordered. Servility to the interests of the promoter clique is their motto. A man of this class clings to the mine and his salary to the very last.<sup>19</sup>

He was referring to managers employed by English companies, but the same principles also applied to small Hauraki mines, whose managers received small recompense for the many duties and responsibilities imposed on them. In 1891 the average pay of a Thames manager was ‘about £4 per week’.<sup>20</sup> This level of payment was, according to Joseph Dreyer, a Thames mining engineer and surveyor,<sup>21</sup> partly explained by the more limited tasks required, being ‘eminently of a practical nature’:

He spends the whole day at the mine examining the workings, and if there be not a great number of men employed, is often working himself cutting timber or sharpening tools. The area of his mine is about 20 acres, and he is governed by a board of directors, from whom he receives frequent visits. A legal manager keeps the books of the company, and all the mine manager has to do besides supervising the mine is to make out a pay sheet, and send away a weekly report.<sup>22</sup>

One feature of nineteenth century mining that created difficulties for managers was that their predecessors took all the records and plans of their

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<sup>19</sup> J.H. Curle, *The Gold Mines of the World*, 2 ed. (London, 1902), pp. 344-345.

<sup>20</sup> Letter from J[oseph] Dreyer, *New Zealand Herald*, 12 May 1891, p. 3.

<sup>21</sup> See *Thames Advertiser*, advertisement, 26 October 1888, p. 3, 29 August 1889, p. 2, 16 December 1889, p. 2, advertisement, 30 December 1889, p. 2, 8 February 1890, p. 2, 24 April 1890, p. 2, 10 January 1891, p. 2, 12 July 1892, p. 2; *Thames Star*, 10 August 1891, p. 2.

<sup>22</sup> Letter from J[oseph] Dreyer, *New Zealand Herald*, 30 May 1891, p. 3.

work, which left the new manager ignorant of the previous workings. The *Thames Advertiser* considered that ‘regular records and plans of all work should be kept by each manager and periodically inspected by the Mining Inspector’.<sup>23</sup> At Waiorongomai, the only example known of information being inherited by a new owner was Edwin Henry Hardy’s<sup>24</sup> acquisition of the assay books of Aroha Gold Mines Ltd.<sup>25</sup> If managers working in the Te Aroha district in the 1880s kept records, none have survived. After 1891 these were required, and one has survived for the Golden Cross mine, at the head of the Waitekauri valley. Each week Henry William Moore, who had mined at Thames since 1867 and had managed mines there and at Ohinemuri since 1885,<sup>26</sup> inspected it, and each week he wrote the same report: ‘I have this day carefully examined the Buildings Machinery shaft levels tramways and all places used in working the Mine and am of opinion that everything is in good condition and safe for persons working in the Mine’.<sup>27</sup>

The emphasis on safety was paramount. Henry Brownlee, briefly associated with Tui mining,<sup>28</sup> when underground boss in the Moanataiari at Thames explained that newly-exposed faces had to be checked for unstable rock by ‘sounding’ with a pick and deemed safe before miners were permitted to work there.<sup>29</sup> A large mine could entail a great deal of work for the manager, as Duncan McIntyre, who participated in the 1880 Te Aroha

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<sup>23</sup> *Thames Advertiser*, n.d., cited in *Observer*, 3 August 1895, p. 4.

<sup>24</sup> See paper on his life.

<sup>25</sup> E.C. Macpherson to John Henderson, 12 November 1932, Mines Department, MD 1, 23/1/20, ANZ-W.

<sup>26</sup> See *Cyclopedia of New Zealand*, vol. 2, p. 507.

<sup>27</sup> Coromandel Warden’s Court, Golden Cross Mine, Record Book ‘kept for the record of Mine Manager’s Examination of the mine under Rule No. 39 of the Mining Act 1891’, p. 1, ZAAAN 14146/1a, ANZ-A

<sup>28</sup> Te Aroha Warden’s Court, Register of Licensed Holdings and Special Claims 1887-1909, folio 194, BBAV 11500/8b; Mining Applications 1909-1910, 129/1909, 20/1910, BBAV 11289/20a; Mining Applications 1913, 1/1913, BBAV 11289/22a, ANZ-A.

<sup>29</sup> *Thames Star*, 12 December 1904, p. 4; Inquest on James Mann, Justice Department, J 46, COR 1904/1035, ANZ-W.

rush,<sup>30</sup> explained in a letter describing his tasks when acting as manager for the Queen of the May in Thames in the mid-1870s:

I had two different parties of men employed in two different parts of the mine. One party was working from the Queen of the May shaft, and the other party was working from the Queen of Beauty shaft. Of course, I had to visit both parties twice daily, and in visiting the party in the Queen of the May shaft I had to walk down 200 feet of ladders, and of course come up the same way. I had to see the clerk for the Queen of Beauty twice daily to get a correct tally of the trucks raised by them for us. There was a tally boy, but still I had to compare notes with the clerk to save trouble in settling up. I had to go several times as far as the Ohio Creek, Tararu, to see about timber for the mine, and I had to go to the Shortland Saw-mills often upon the same business. I had to arrange with Mr [John] Quinlivan<sup>31</sup> for carting quartz to the Una battery. I had to get a road made to the paddock. I had to see that the draymen loaded their drays fairly with quartz.... I had to see that the stuff was properly trimmed and stacked at the Battery, and when crushing started I had to appoint men to look after the tables, and to visit them at least twice daily for eight days, and of course see the amalgam retorted, the gold melted, etc.<sup>32</sup>

All such matters would have to be dealt with by a manager in mines in the Te Aroha district as well, even in smaller ones where he worked alongside the other men. An 'old California miner' warned against this practice, writing in 1869 that it had become common at Thames to employ managers chosen from the workmen. These were 'supposed, for a salary of a few pounds per week, to overlook the mines, and at the same time to do his day's work with the rest', which was 'one of the most fatal of all errors'. He considered it 'impossible' for a man 'thus placed on an equality with his fellow-workmen, to hold that dignified control over those in his charge that he would have, provided a proper distinction were made'.<sup>33</sup> Certainly managers required skills of managing men, and at Norpac's mine, for

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<sup>30</sup> Harry Kenrick to Frederick Whitaker, 27 October 1880, Mines Department, MD 1, 12/353, ANZ-W; *Observer*, 18 December 1880, p. 126; Te Aroha Warden's Court, Register of Te Aroha Claims 1880-1883, folio 217, BBAV 11567/1a, ANZ-A.

<sup>31</sup> See *Daily Southern Cross*, 4 October 1875, p. 3; *Thames Advertiser*, District Court, 19 May 1876, p. 3, 6 March 1882, p. 3, 18 June 1890, p. 2.

<sup>32</sup> *Thames Advertiser*, 11 January 1876, p. 3.

<sup>33</sup> 'An Old California Miner', *History and Description of the Thames Goldfields* (Auckland, 1869), pp. 39-40.

example, a manager regarded as too easy-going with his men had his decisions over-ruled by the general manager.<sup>34</sup>

Sometimes managers were in charge of several mines at the same time. For example, Edward Quinn,<sup>35</sup> a manager at Waiorongomai and Tui,<sup>36</sup> in the mid-1890s managed five mines at Whangapoua. He visited them continually, even though they were three or four miles apart, doing 'his rounds each day on horse-back'.<sup>37</sup> Managers were expected to create productive mines. Charles Henry Wilson, who was a manager at Thames and Waitekauri before at Waiorongomai,<sup>38</sup> said a manager's life was no bed of roses. In addition to the constant worry about safety, he was 'the servant of many masters. And often times ... these masters become imbued with [the] idea that he carries the magic wand of Croesus, and it is only for him to strike the reef and gold will instantly glisten'.<sup>39</sup> These words were a response to his dismissal by the Waitekauri Company, justified as being an economy measure and made despite his excellent management.<sup>40</sup> Another example was John Watson Walker, an experienced manager on several fields,<sup>41</sup> whose abilities did not prevent an attempt being made in 1881 to dismiss him as manager of the Kuranui Hill United Company because he had not discovered sufficient gold, a move widely condemned as unfair.<sup>42</sup>

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<sup>34</sup> Michael Sprogue to Norpac Mining Ltd., 1 September 1966, appended to General Manager's Report 9/1 for period ending 30 September 1966, Box 5, NMC 19/2; Minutes of 11th Meeting of Directors held on 5 December 1966, Box 5, NMC 19/1, Norpac Papers, MSS and Archives, Vault 4, University of Auckland Library.

<sup>35</sup> See paper on his life.

<sup>36</sup> *Thames Star*, 14 December 1883, p. 2; *Thames Advertiser*, 5 June 1885, p. 2; Edward Quinn to Minister of Mines, 26 May 1887, and declarations of D.G. MacDonnell, 23 April 1887, and C.A. Cornes, 25 May 1887, Mines Department, MD 1, 87/584, ANZ-W.

<sup>37</sup> Charles Rhodes to Minister of Mines, 13 January 1897, Mines Department, MD 1, 96/2349, ANZ-W.

<sup>38</sup> *Thames Advertiser*, 10 March 1876, p. 2, 7 October 1876, p. 3, 3 May 1877, p. 3, 27 December 1877, p. 3, 12 July 1880, p. 2, 23 February 1882, p. 2, 27 September 1882, p. 3.

<sup>39</sup> *Thames Advertiser*, 31 October 1877, p. 3.

<sup>40</sup> *Thames Advertiser*, 20 October 1877, p. 2, Paeroa Correspondent, 23 October 1877, p. 3, 27 October 1877, p. 2, 29 October 1877, p. 3.

<sup>41</sup> See paper on his life.

<sup>42</sup> *Thames Advertiser*, 30 March 1881, p. 3, editorial, 6 April 1881, p. 2, 13 April 1881, p. 3, 14 April 1881, p. 3, 25 August 1881, p. 2; *Auckland Weekly News*, 2 April 1881, p. 5, 16 April 1881, pp. 9, 19.

A Mine Managers' Association was formed in 1892.<sup>43</sup> Early the following year it 'passed rules for their own protection, and that of claim-holders. All reports, wires, cables or information given or sent is to be gospel truth under penalty of expulsion from their midst. Some folk are under the impression that mining reports have not always been in strict accordance with the truth'.<sup>44</sup> As suggested by the latter comment, one particularly important task was to ensure that assays were competently and accurately made, for upon these the mine's development and share prices depended. There were always suspicions that assays gave selective rather than representative results, but in 1897 it was reported as not being 'safe for mining company directors to suggest to mine managers that their assays have been cooked. The last director who did it got his eye in mourning'.<sup>45</sup> Any assays later shown to give an exaggerated value for the ore would raise questions about the managers' trustworthiness.<sup>46</sup>

In the early mining days, men became managers through experience rather than special training. The limitations of this practice in Australia was explained by Geoffrey Blainey:

Most managers were miners who had won promotion through their physical strength and their skill in handling men. Overseas visitors often commented on the skill with which they mined and the clumsiness with which they milled. They received only slightly more pay than skilled miners, and spent much of their time doing manual work underground. The thumb was their ruler. They did not know how to sample an ore body accurately, could not compute the amount of water their machinery had to pump from their mine. Their uncanny skill in dangerous ground and their capacity for improvising did not always compensate for ignorance of scientific principles.<sup>47</sup>

The Mining Act of 1886 required all future managers to pass examinations before being granted a certificate of competency.<sup>48</sup> Until August 1887, miners were able to obtain this certificate if they could prove

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<sup>43</sup> *Thames Advertiser*, 2 November 1892, p. 2.

<sup>44</sup> 'Obadiah', 'Shares and Mining', *Observer*, 25 February 1893, p. 10.

<sup>45</sup> *Observer*, 3 April 1897, p. 3.

<sup>46</sup> Interview with J.B. McAra, Waihi, 4 August 1985, p. 43 of transcript.

<sup>47</sup> Geoffrey Blainey, *The Rush that Never Ended: A history of Australian mining* (Melbourne, 1964), p. 251.

<sup>48</sup> *AJHR*, 1887, C-9, p. 2.

they had been managing a mine successfully for 12 months; after that date, they would have to pass an examination. The intention was that, within three years, no uncertified person would be in charge of any mine.<sup>49</sup> There were immediate concerns that some men were not granted certificates when others of equal ability received them, and comments abounded that the older generation had nothing to learn from the new men, despite their lack of knowledge of surveying or geometry or suchlike. A Thames correspondent lauded the achievements of those who opened up his district despite their scant education; they were

infinitely preferable to a possibly younger generation, with sufficient “larnin’ ” to pass the examinations, but possessing comparatively little practical knowledge.... Amongst miners the one with showy accomplishments is not necessarily the most serviceable. The old adage “An ounce of practice is worth a pound of theory,” is of every-day application.<sup>50</sup>

Criticism of the value of the certificates continued to be aired by some involved in the industry and defended by others.<sup>51</sup> The mining columnist ‘Obadiah’ preferred ‘the old days, when a digger was a law unto himself’, and referred to the ‘new race’ that had been

created by the laws that snuffed out the old lot. One digger is now better than another; one has a first-class certificate granted by some old duffer who knows nothing about mining but a lot about red tape. Another lot has a second-class certificate granted by the first lot.... Many of the best have narry a certificate of any kind, and have forgotten more than any of the others ever knew. Old age and thirty or forty years of digging life is telling on them; they are outside the charmed certificated circle.<sup>52</sup>

‘One of the Men of ’67’ informed the *Thames Star* in 1899 that in the early days of that field the mine and battery managers were mostly ‘men of

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<sup>49</sup> *Te Aroha News*, 21 May 1887, p. 2.

<sup>50</sup> Thames Correspondent, *New Zealand Herald*, 19 January 1888, p. 6.

<sup>51</sup> See series of letters in *New Zealand Herald*, 12 May 1891, p. 3, 18 May 1891, p. 3, 21 May 1891, p. 3, 27 May 1891, p. 3, 30 May 1891, p. 3; for Australian doubts about the requirement to hold certificates of competency, see Blainey, pp. 251-252, and Jan Wegner, ‘Language and Power in Nineteenth Century Mining: A View from North Queensland’, *Journal of Australian Studies*, no. 61 (1999), pp. 164-166.

<sup>52</sup> ‘Obadiah’, ‘Shares and Mining’, *Observer*, 3 December 1892, p. 15.

ability, and had years of practical experience both in mine and mill – men whom we could respect’. He blamed the advent of the cyanide process and the Schools of Mines for what he described as a system of ‘dummying’, meaning young men without practical experience being appointed as managers who were ‘obliged to have a dry nurse to teach them their work’. The manager received ‘the big pay and any kudos that may be going, while the nurse gets perhaps the distinguished position of shift boss at 9s per day’. Knowledge came from ‘hard won experience, taking years to gain’. Whilst recognizing that scientific and theoretical knowledge had become a necessity, candidates for a manager’s job should prove that they had ‘put in their time in a thoroughly practical manner both in mine and mill’. He considered that ‘our hard-worked and much-abused tributers could give points to the so-called mine managers, and beat them every time’.<sup>53</sup>

Despite the nostalgia for the practical men who once controlled mining, by the late nineteenth century the world-wide trend was against them. ‘Increasingly, employers looked for people who could offer theoretical understanding as well as practical experience’.<sup>54</sup> In 1896, the president of the Institution of Mining and Metallurgy commented on this change:

We do not hear so much these days of the “practical man.” Time was when he was considered the only person to possess the necessary qualifications for directing the operations of a mine, and when the “theoretical man,” with a knowledge of the theory of mining, and of the sciences that come into play in that profession ... was regarded as unfit for assuming the responsible duties of mine manager. Times have changed, and it is a notable fact that the most important and responsible positions are going more and more to the scientifically trained man, while the purely practical man ... is gradually assuming a secondary role.<sup>55</sup>

New Zealand participated in this trend. In 1890, the Mines Department decided to ensure ‘that no competent man was refused a certificate because of his inability to pass in some of the more highly scientific subjects, a knowledge of which may not be absolutely essential to the practical work of such persons’. Some would be granted a certificate of

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<sup>53</sup> Letter from ‘One of the Men of ’67’, *Thames Star*, 30 March 1899, p. 3.

<sup>54</sup> Charles Harvey and Jon Press, ‘Overseas Investment and the Professional Advance of British Metal Mining Engineers, 1851-1914’, *Economic History Review*, second series, vol. 42 no. 1 (February 1989), p. 72.

<sup>55</sup> Cited in Harvey and Press, p. 72.

competency on the recommendation of their employers.<sup>56</sup> Those denied a certificate continued to complain, even accusing officials of bias in selecting managers.<sup>57</sup> As discontent continued over the requirements, in 1896 the minister, Alfred Jerome Cadman, explained the solution provided by his new Mining Act. He agreed that, whilst many of the older and poorly educated miners could not pass the written examinations, ‘anyone who knew anything of mining’ would rather provide capital to ‘an old miner who knew the practical part of the work’ than to ‘a youngster fresh from school, no matter how smart he might be’. Provisional certificates would be issued to whomsoever was chosen by the owners to be their manager, and the mining inspectors would report on their performance twice a year. After two years, the inspectors would report to the board of examiners, which could grant a first- or second-class certificate of competency without requiring an examination. Cadman considered that this would ‘get over a lot of soreness and trouble which had existed for a long time’.<sup>58</sup>

There continued to be distrust of book learning in place of practical experience. As late as 1929, an old miner asked a meeting at Waihi ‘if anyone in the room could instance the discovery of a gold-bearing reef by a geologist’. Upon being informed that geologists weren’t supposed to locate gold but to indicate suitable areas to investigate, the questioner was not convinced, this explanation being ‘received with a distinct snort as the prospector resumed his seat. Another instance of the old “Cousin Jack” (Cornish) idea that “where it be there it be and only the pick will tell.” It dies hard’.<sup>59</sup>

Not all lamented the passing of the days of the much-admired ‘practical men’. In 1895 a journalist met

some specimens of the new breed of mining experts and battery managers, clever young fellow, who, by examining a spec or two of dirt, can tell you how much it will go to the load. Theirs is a decided improvement on the old tin-dish method of discovery. But they don’t play “joker” and drink whisky - lawn tennis and vamping on the piano is their weakness.<sup>60</sup>

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<sup>56</sup> *Auckland Weekly News*, 22 November 1890, p. 14.

<sup>57</sup> For example, E.K. Cooper to Minister of Mines, 8 July 1891, Mines Department, MD 1, 91/566, ANZ-W.

<sup>58</sup> *Auckland Weekly News*, 21 November 1896, p. 20.

<sup>59</sup> *Waihi Daily Telegraph*, n.d., reprinted in *Te Aroha News*, 16 August 1929, p. 2.

<sup>60</sup> ‘A Tramp, Esq.’, ‘Casual Ramblings’, *Auckland Weekly News*, 18 May 1895, p. 38.

Based on his experience as a director of both the Battery Company and the Te Aroha Silver and Gold Mining Company, James McCosh Clark explained to English mining engineers why New Zealand did not make proper use of machinery:

He attributed that in great measure to the self-sufficiency of mining managers. The directors were not experts and were in their hands. The mining managers thought that they knew all about the working of the mines and mills, that they were doing the best that could be done, and they did not seem to care to learn more.<sup>61</sup>

### FOREIGN 'EXPERTS'

During the mining boom of the mid-1890s, some English-owned companies sent their own men out to manage their properties, to general derision from colonial miners. 'A certain Upper Thames mine manager [who] got lost on his own claim last week, and cooeed for help',<sup>62</sup> may well have been such a person. 'Mining Captain', using the Cornish term for a mine manager, complained in 1898 that there had been 'instances of men being sent here from other parts of the world to take charge of mines, who neither possessed certificates or any other qualification for a mine manager'.<sup>63</sup> In the same year, 'A Would-be Tributer' criticised the companies controlling Thames mining:

As for the so-called "experts" only about one per cent of them deserve a better fate than that reserved for useless puppies and kittens. I have met many of them during the last three years, and only *two* out of the lot knew anything about practical mining, the rest were rank duffers with a slight knowledge of mining phraseology, and unbounded cheek.<sup>64</sup>

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<sup>61</sup> James McCosh Clark, contribution to discussion after paper presented by George J. Binns, 'Mining in New Zealand', *Transactions of the Federated Mining Engineers*, vol. 3 (1891-1892), p. 670.

<sup>62</sup> *Observer*, 6 April 1895, p. 10.

<sup>63</sup> Letter from 'Mining Captain', *Thames Advertiser*, 25 July 1898, p. 4.

<sup>64</sup> Letter from 'A Would-be Tributer', *Thames Star*, 14 May 1898, p. 3.

A couple of months later, 'Pro Bono Publico' noted the disappearance of 'that noble army of "mining experts" whose golden treasures we so much treasured'. During their time in Hauraki, they had not been able to suggest better ways to find and treat the ore, and he compared their theories with the knowledge gained by 'personal experience and intelligent observation'. Practical knowledge should not be 'set aside to make room for ethereal and unpractised qualifications', and knowledge of the local geology should not 'be driven out by "scientific" ignorance. Let common sense rule and prosperity will follow'.<sup>65</sup> Two months later, the *Observer* criticized managers sent to manage English companies during the boom:

How many of the Home-appointed managers, in their fanciful costumes, and with their expensive tastes, knew anything about the work they were sent to do? One half of them did not know the reef from the country rock. Some of them have had many an assay of sandstone made, and because nobody dared tell them of their blunder, they have reported in their monthly bulletins to London that the ore gave only traces of gold. This may sound like fiction, but it is nevertheless gospel truth.<sup>66</sup>

The following month it reported a story which sounded so unlikely that it probably was the contemporary equivalent of an 'urban myth'. 'The representative of one of the big "wealthy mining syndicates" who directed the working of a mine at Coromandel topped the record for "new chum management" by putting in a circular drive, and coming out where he started'.<sup>67</sup> In 1906, it used the 1890s to prove that the 'merely theoretically trained manager' was no good:

With the influx of English capital there came also a hoard of appointees of London directorates - gentlemen more notable for their faultless shooting jackets and knickerbockers and spats, and their mouthfuls of technical lore about engineering and assaying, than for their practical knowledge of the handling of reefs and ore and the safe management of workings. The story told concerning one of them, that when advised that a new winze was required, he cabled to London for two winzes, may be a little the worse for wear, but it is worth recalling as characteristic of the class.

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<sup>65</sup> Letter from 'Pro Bono Publico', *Thames Star*, 2 July 1898, p. 2.

<sup>66</sup> *Observer*, 10 September 1898, p. 2.

<sup>67</sup> *Observer*, 29 October 1898, p. 3.

Most of these 'ornamental managers' left New Zealand when English capital ceased to be provided. Like others, he called for a combination of practical and scientific training.<sup>68</sup>

### KNOWLEDGE OF ORE

One mining engineer detected considerable differences in the abilities of miners and prospectors to trace ore:

A prospector watches every piece of float and studies its sources, knowing that it never came uphill, and he sees things which no one else would ever notice to tell which way the straws are pointed. The minuteness of his detection is marvellous. On the other hand, the miner sees nothing on the surface nor in the formation of the country, and would not even select a nice rich outcropping if he should stumble upon it, but when he gets inside of a tunnel he can take out the best ore in the shortest time. His instincts serve him well, but he sees nothing until he gets underground. A good prospector is seldom a good miner, and vice versa.<sup>69</sup>

By the nature of things, most day-to-day mining went unreported, and it is difficult to uncover many details of good or bad mining practice. The general assumption, usually valid, was that miners and managers were doing their best, and that if the mine was not a success then that was the fault of the ore, not of the miners. Naturally, the level of skills determined whether the best ore was traced. John Abatematteo, Norpac's mine manager in 1972, after investigating the former Galena and Diamond Creek mines at Waiorongomai, noted that 'the old miner would tend to turn away from the sulphide as soon as the latter was exposed, preferring to follow the barren quartz vein, this trend has been followed in all the workings which I observed'.<sup>70</sup> The skills deployed also depended on whether the miners were working for themselves or were wages men or contractors taking out ore as instructed. Eric Coppard, who worked at Tui in the late 1960s and early 1970s, recalled that contractors, paid by the amount of fathoms stoped, not

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<sup>68</sup> *Observer*, 14 July 1906, p. 3.

<sup>69</sup> *New Zealand Mining Standard and Financial News*, 9 January 1897, p. 7.

<sup>70</sup> John Abatematteo to F.J. Handcock, 2 October 1972, Norpac Papers, Box 5, MSS and Archives, Vault 4, University of Auckland Library.

by the quality of the stone, sent unsorted stone to the mill.<sup>71</sup> Arthur Pentland, an experienced Canadian geologist, warned a fellow Norpac director in 1971 that there was a need to ensure that only good ore was sent to the mill. ‘The miner will not do it. He is paid to break rock and he could not care less if it is ore or waste’. Pentland considered that ‘everything that was sent to the Tui mill during last year was marginal at best or even sub-marginal. This means that although some was good grade ore, too much was waste’.<sup>72</sup>

Even when the miners did care, which was certainly the case when working their own mines, their ability to detect ore was limited. Writing of Thames prospectors in 1895, a journalist wrote that they were not ‘scientific’ but had ‘a good eye for the make of the country’.<sup>73</sup> James Williams, who won a prize in 1907 for his essay on the state of mining in New Zealand, noted that most prospectors ‘knew free gold when showing in his dish. If he had Cornish experience he could probably identify certain lead, copper, and tin ores, but as a rule he called grey minerals “antimony” or “platinum,” and all yellowish minerals “pyrites” or “mundic” ’.<sup>74</sup> He criticized the youth of his day for having ‘neither love nor aptitude’ for prospecting and when consulting a mineralogy textbook ‘shrinks back appalled! It seems hopeless for him to attach unaided such a complicated subject’, and therefore needed to be taught about minerals.<sup>75</sup>

All the papers on Te Aroha mining and miners contain examples of competent miners unable to determine the true value of their ore, to anticipate prospects correctly, or to assess the likely success of a new treatment process. In May 1881, one correspondent wrote that the Shotover claim, which was soon proved to contain nothing of value, was ‘rather over-rated by some perhaps who have made the common mistake even with old and experienced diggers, of taking rather some deceiving grains as sulphide

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<sup>71</sup> Interview with Eric Coppard, Waihi, 4 August 1985, p. 86 of transcript.

<sup>72</sup> A.G. Pentland to B.H. Swig, 21 April 1971, Norpac Papers, N. A. Partners file, acquired by Mineral Resources and held at Union Hill, Waihi; access provided by Eric Coppard, Waihi.

<sup>73</sup> Special Reporter, ‘The Thames District’, *New Zealand Herald*, 1 November 1895, p. 3.

<sup>74</sup> James Williams, essay in *Three Prize Essays on the Present Condition and Future Prospects of the Mineral Resources of New Zealand and the Best Means of Fostering their Development* (Wellington, 1907), p. 186.

<sup>75</sup> Williams, pp. 187-188.

of iron, for instance, for gold'.<sup>76</sup> That ore was mistakenly identified was common knowledge. For example, at the 1886 celebration of the arrival of the first train at Te Aroha, 'several speakers pointed out that gold abounded in the ranges, but the scientific knowledge of the miners was not sufficiently cultivated to extract it from its natural bed'.<sup>77</sup> The warden, Harry Kenrick,<sup>78</sup> said that Te Aroha, like other parts of the peninsula, had suffered 'from miners' minds moving too much in one groove. They had been ignorant of the fact that they were actually treading under foot, and throwing away, a greater quantity of the precious metal than they were saving'.<sup>79</sup> One amateur miner noted that when he visited the Champion 'several of the miners said they didn't understand the kind of stuff they were getting out, but they were told it was all right'.<sup>80</sup> The following year, William Arthur Hills, an English metallurgist recently arrived in New Zealand to inspect the mining districts,<sup>81</sup> instructed miners on 'the great importance of ascertaining what Minerals that they find, really were, by sending samples for Assay - instead of merely guessing'. Many valuable minerals were not recognized 'because the Miner does not know them from their appearance only - This especially in the Te Aroha and West Coast districts'.<sup>82</sup> A decade later, the *Mining Standard* cited a Waiorongomai incident as proof of such ignorance still existing:

A heavy shot had been fired in one of the mines, and on the men going back to view the result they found in the "breakdown" several pieces of stone that appeared to be exceptionally rich specimens. The yellow metal could clearly be distinguished in the stone, and had all the appearance of rich wire gold. The discoverers were as much astounded as they were delighted, and made all haste to town to report the new gold find, the specimens

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<sup>76</sup> Te Aroha Correspondent, *Waikato Times*, 26 May 1881, p. 2.

<sup>77</sup> *Observer*, 6 March 1886, p. 13.

<sup>78</sup> See paper on his life.

<sup>79</sup> *Thames Advertiser*, 2 March 1886, p. 3.

<sup>80</sup> John Squirrel, 'Mining at Tui Creek N. Zd: How I came to go Mining', n.d. [August 1888], p. 1 of typescript, MS 288, Library of the Auckland Institute and War Memorial Museum.

<sup>81</sup> W.A. Hills to Minister of Mines, 2 December 1886, Mines Department, MD 1, 86/2456, ANZ-W.

<sup>82</sup> W.A. Hills to Minister of Mines, 8 February 1887, Mines Department, MD 1, 87/226, ANZ-W.

were shown to several people, who after examining them for a moment, applied the nitric acid test, when - lo and behold! - the metal disappeared. The explanation is simple. What the miners believed to be gold was merely the flattened particles of the percussion cap, which had been driven by the force of the explosion into the softer portions of the stone.<sup>83</sup>

Even experienced prospectors and miners could not determine the true value of ore. For example, in 1911 Thomas Gavin, a mine manager whose experience had started at Thames and who had mined at Waiorongomai since the opening of that field,<sup>84</sup> had 500 tons from the new Bendigo mine ready for treatment. He informed the warden that he could not 'say if the stone is payable - I think it is payable'. The less experienced battery superintendent also said he could not 'say if payable ore - made no assays'.<sup>85</sup> As this ore failed to meet expenses, the mine closed after a few months.<sup>86</sup> When one Te Aroha claim crushed ten tons in May 1881 for a nil return, a newspaper commented that it seemed 'strange the men who have been years on the goldfields should know so little of the business they profess to know all about. Some of the stone sent to the mill ought still to be in the hills'.<sup>87</sup> In 1892, another very experienced mine manager, John McCombie,<sup>88</sup> wrote that the more he saw of the mines at Karangahake,

the more am I convinced of the fact that mineowners, and miners generally, have not yet mastered the alphabet of their business. By far the greater proportion of the rich ore here affords none of the old time indications of wealth, in either gold or silver, and the ancient mining phraseology, "colours of gold" or "dish prospects," are no longer to be relied upon as infallible guides. In fact the richest ore is apparently the most utter rubbish, and, so far as appearances go, it undoubtedly would be case over the "tip-head" as being of no value by fully 90 per cent of miners.

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<sup>83</sup> *Mining Standard*, n.d., reprinted in *Thames Advertiser*, 2 April 1897, p. 2.

<sup>84</sup> See paper on his life.

<sup>85</sup> Te Aroha Warden's Court, Plaints 1911, 1/1911, BBAV 11572/3a, ANZ-A.

<sup>86</sup> John Henderson, assisted by John Arthur Bartrum, *The Geology of the Aroha Subdivision, Hauraki, New Zealand: Geological Survey Bulletin No. 16 (New Series)* (Wellington, 1913), p. 15.

<sup>87</sup> *Thames Star*, 9 May 1881, p. 2.

<sup>88</sup> See *Cyclopedia of New Zealand*, vol. 2, pp. 471-472; *New Zealand Herald*, 4 September 1926, p. 12.

Its value could 'only be ascertained by subjecting it to a fire assay test'. He cited several men 'who were then looked upon as authorities of the first water upon everything appertaining to gold mining' who had condemned the Martha lode at Waihi, when it was first discovered, as being worthless. All the experts condemned the Crown mine at Karangahake before it was developed, yet it turned out to be highly profitable, although the ore 'capsizes all one's preconceived notions in regard to gold-bearing lodes generally'. Not much gold showed in the stone, and he defied 'the most experienced stranger to distinguish the difference between ore samples valued at £5 per ton, and those whose value has been proved by assay to be £50 per ton'.

We are now beginning to learn that there is no recognised law, either as to the general character of gold and silver-bearing lodes, or to the distribution of their coveted product. A man may with some degree of certainty proclaim a future for that portion of a mine disclosed to view in the workings, but no man, no matter what his experience may have been elsewhere, is justified in expressing an opinion on things that do not come within the scope of his vision, and of which he must as a natural sequence be entirely ignorant. Prior to actual development there is no law written or unwritten enabling a man to determine either the extent or value of an auriferous deposit. Reefs may have an east or west course, or a north and south course; or they may strike through the intermediate points of the compass, and yet all be very rich, or absolutely barren, as the case may be. The payable ore may be confined to a "rib" on either of the walls, or it may be scattered through the lode from side to side, or it may occur in "shoots," but all this can only be ascertained as ordinary mining operations are advanced upon the lode. There are reefs in some places where the presence of what is termed "good mineral indications" mean fortunes, and then, again, there are similar reefs in other places, where such indications mean failure... Prospectors in these parts have a strong liking for "reefs" with streaks of "sulphide" running through them, but I never yet saw the man who could distinguish the difference between "sulphide of iron" which has no commercial value, and "sulphide of silver," which is capable of being converted into current coin of the realm - without invoking the aid of an assayer. A "splendid class of country" is often hailed as the advance agent of gold deposits, but I have seen hundreds of feet of tunnelling done along the line of likely-looking lodes travelling through such country, and "nary" a colour of gold discerned therein. On the other hand I have seen reefs running through country rock, which in some districts is looked upon as being very unfavourable to the existence of the

precious metals, carrying rich deposits of both gold and silver, much to the surprise of those who are fond of drawing comparisons, and theorising on this question.<sup>89</sup>

In 1891 the *Observer* published a story set on a steamer trip between Auckland and 'Quartzopolis', otherwise Thames:

The day was fine and the wind bracing. A little knot of men stood in the lee of the galley, discussing the prospects of May Queens, Saxons, etc. This little party consisted of a well-known mine manager, an expert from the other side [England], and two or three leading lights in the mining line. Conversation had somewhat flagged, when a certain well-known figure on 'Change remarked:-

"By the way, have you seen the specimen taken from the steamer's boiler the last time it was cleaned out?"

All pricked up their ears, and the "massy" pendant being borrowed for exhibition, was passed round. Great was the discussion thereon, its history being as follows:

The last time the boiler was inspected, it was discovered that a large amount of sediment had gathered in the bottom near where the steam is blown off, and was accounted for by the fact that as the boat often takes in water from the Thames foreshore, a considerable amount of tailings had accumulated, the fine gold of which had gradually formed a kind of quartz, in which the gold was distinctly visible, the oxide of iron being very distinct on one side, that side being of course next to the boiler. The fineness of the gold was pointed out and the dark fine nature of the cement of stone. The Eldorado was struck and the riddle solved of how to treat the Thames tailings.

Thomas informed them that he had a large lease already pegged out of the said foreshore. A bright smile beamed on every face. A nice £50 was to be given for the specimen, the "expert" was to take the specimen to the other side and float a Company; but, alas! for the credulity even of mine managers and experts, the news spread to the jovial captain, the engineer and a few others who were "in the know," and the joke having gone far enough, the projected Thames Foreshore Boiling Down Tailings and Amalgamating Co. came to a sudden and untimely end....

The party had been informed that it was all a little joke. Dozens had swallowed it, but when a Company was about to be formed, the joker thought it had ... had a good run and had better be blown. But what a swindle might have been worked!

So much for "experts."<sup>90</sup>

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<sup>89</sup> 'Aboriginal', 'The Occurrence of Gold and Silver', *Auckland Weekly News*, 15 October 1892, p. 20.

## UNSKILLED PROSPECTORS

‘Experts’ might be mocked, but untrained, amateur and often part-time miners also spent much time and resources discovering and extracting worthless ore. Anyone could become a prospector if the mood took them, and tried to make up for lack of skills by enthusiasm and optimism. John McCombie was scathing:

The first gold find at Te Aroha affords strong evidence of the fact that you can as easily manufacture a silk purse out of a sow’s ear as to make a competent prospector out of an ordinary individual. In support of this contention there is not a single instance on record where either geologists or organized prospecting parties have ever made a gold discovery worthy of mention. All the “Big Finds” throughout Australasia have been made by individual prospectors – not by rule of thumb methods – but by skillfully, patiently and consistently following up traces of the precious metal until the source, or matrix of the floating particles, was located.

At Te Aroha, after ‘surface scratching by amateur prospectors’ did not produce ‘any tangible results’, an expert prospector was employed who ‘located the lode within 68 hours’.<sup>91</sup> One English mining engineer noted the same phenomenon:

From the great value of gold, the fact that it is easily recognizable, and that it is found in a marketable state in river and other sands, there is probably no other industry in which so many incompetent persons have engaged as in searching for and attempting to get gold. Most of these people have never done any manual labour, neither had they capital or experience, and it is not surprising under these circumstances that there were more blanks than prizes.<sup>92</sup>

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<sup>90</sup> ‘The Boiling-Down Gold-Saving Process: A Tale for Mining Experts’, *Observer*, 15 August 1891, p. 15.

<sup>91</sup> John McCombie, ‘Random Recollections: Te Aroha Goldfield’, p. 1, MS 838, Alexander Turnbull Library; variant published in *Auckland Weekly News*, 8 December 1910, p. 17.

<sup>92</sup> William S. Welton, *Practical Gold-Mining: Its commercial aspects: A collection of statistics and data relating to gold-mining and gold-mining finance companies* (London, 1902), p. viii.

The *Observer* mocked over-enthusiastic amateurs,<sup>93</sup> for lacking the necessary skills they failed dismally.<sup>94</sup> Several examples can be found of such enthusiasts briefly at work in the Te Aroha district. Edwin Barnes Walker, a farmer involved with Waiorongomai mining,<sup>95</sup> in 1895 prospected Maungatautari, believing that gold would be found there because ‘one side of the hill’ was ‘in a direct line with some of the reefs at Te Aroha’.<sup>96</sup> This logic did not lead to any discoveries. John Williams, a Te Aroha storekeeper earlier involved in South Island mining,<sup>97</sup> shared this concept of the local geography, writing in 1914 that he could show that Waiorongomai was connected ‘with the Waihi reefing system’, although he did not do so. He insisted that large amounts of payable ore remained to be extracted, quoting as proof the views of prominent local miners.<sup>98</sup> His level of understanding was revealed by the only sample he sent to the Thames School of Mines for assay giving a nil value.<sup>99</sup> In 1897, a trench dug near the No. 2 bathhouse exposed ‘a nice looking vein of quartz’ which ‘several of our local experts who have carefully examined it’ pronounced ‘to be a good class of dirt’.<sup>100</sup> These self-proclaimed experts were wrong, this vein was never heard of again, and the trench was used for piping hot water, not mining.

In 1884, the *Waikato Times* regaled its readers with the tale of a cattle speyer causing excitement at Cambridge by producing an ore sample from a Waitoa creek. Having completed his professional duties on a farm, he had gone to spear some eels:

He had barely entered on this pursuit, however, if at all, when, on passing a piece of the bank, which seemed of cement formation, his eye was attracted by a slight metallic outcrop, which he immediately proceeded to investigate. He soon unearthed what

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<sup>93</sup> For example, ‘From Drawing-Room to Goldfields: An Everyday Sketch of Colonial Life’ (cartoon), *Observer*, Christmas Annual 1895, p. 13.

<sup>94</sup> See paper on prospectors’ working lives.

<sup>95</sup> *New Zealand Gazette*, 28 April 1881, p. 476; Te Aroha Warden’s Court, *Plaint Book* 1880-1898, 7/1889, BBAV 11547/1a; *Mining Applications* 1895-1896, 16/1895, 112/1896, BBAV 11582/4a, ANZ-A.

<sup>96</sup> *Waikato Times*, 14 September 1895, p. 6.

<sup>97</sup> See *Cyclopedia of New Zealand*, vol. 2, pp. 831-832.

<sup>98</sup> Letter from John Williams, *Te Aroha News*, 31 August 1914, p. 3.

<sup>99</sup> Thames School of Mines, *Assay Book* 1895-1897, entry for 20 November 1895, School of Mines Archives, Thames.

<sup>100</sup> ‘Twinker’, ‘Te Aroha Notes’, *Thames Advertiser*, 17 August 1897, p. 3.

appeared to him to be a compact nugget of the precious metal, and thus encouraged he renewed his efforts, and by breaking down a piece of the bank, another nugget of an equally encouraging appearance revealed itself. Mr [Charles] Langstone became startled, and at once gave vent to his feelings, by announcing to his companion (for he had a companion on the expedition): "Lor', if this ain't an alluvial flat I'm a \_\_\_\_\_ well not a veterinary surgeon anyhow." The situation was a novel and exceedingly startling one, and there being no spectators, it is not recorded what shape the excitement of the two next assumed - whether they stood erect on their heads, threw their hats sky high, jumped frantically or were dumbfounded, we have not been able to ascertain; but one thing is certain, however, - having carefully wrapped up the metallic jewels like a thief in the night, if we may be allowed to speak metaphorically, Mr Langstone made a speedy exit from Campbelltown [a surveyed settlement on the Waitoa River], and lost no time in making his way to Cambridge, the bearer of the happy intelligence. Here was an event, a veritable red-letter day for the colony. Mr Langstone, a member of the Royal College of Veterinary Surgeons of London, while engaged in the aboriginal pursuit of catching eels had struck a goldfield, a poor man's diggings, where nuggets were to be had by stooping to lift them; here was an event in which the name of Langstone would be heralded forth to the world with unrivalled effulgence; an event, in short, which should cause the portly figure of Langstone to be set forth in the illustrated periodicals of the day as "The lucky digger." When Mr Langstone arrived at the Criterion hotel at Cambridge he revealed his discovery to a few prominent gentlemen of the district, including the owner of the estate on which the supposed gold had been unearthed. The revelation had the desired effect; the sensation was great - unprecedented. There was the discoverer, and there on the table lay the discovered sure enough. It was nugget of gold beyond doubt, for all examined it, and with few exceptions, all concurred in the verdict of "genuine." A bee-line was immediately made in the direction of the premises of the local jeweller, whose verdict was not altogether what it ought to have been; but then, what do common jewellers know of these matters? Some excited mind suggested the chemist, so the party immediately betook themselves to the premises of that functionary. Tests were applied, but no more encouraging result. As a last resort the smith's forge of Mr T[homas] Gemmill<sup>101</sup> was next besieged, and that gentleman submitted the "precious metal" to a flattening-out process, with a most encouraging result. The party then invested in sundry vials of sulphuric acid and nitric acid, and retired to the above named hotel to renew the test. The two vials of the latter

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<sup>101</sup> See *Waikato Electoral Roll, 1882*, p. 8; *Waikato Times*, 1 September 1883, p. 2.

acid were placed on the table, a piece of brass was put into one, and a piece of the “precious” into the other. They party drew their chairs up close, and watched with bated breath the denouement. The acid was fast telling a similar tale in each case. One gentleman was holding one of the vials, which by-the-bye was tightly corked up, when all at once, Crack! and the contents, consisting of nitric acid and dissolving brass, were distributed in the faces and over the clothes of the eager spectators. We are sorry we cannot conclude this article in the same humorous spirit in which it has been dictated so far. While two of the gentlemen engaged in the investigation suffered somewhat severely, and one is now under the doctor’s care, the acid having got into his eyes, it is not expected, however, that the injuries will prove serious. Mr Langstone will possibly insist on another test, as we understand he is still of the opinion that some gold was left in the bottle.<sup>102</sup>

Langstone soon gained a poor reputation and his find was viewed as a fraud.<sup>103</sup> As another example of an unsuccessful amateur prospector, John Henry Emmett, a tramway brakesman, timber merchant and general contractor at Waiorongomai,<sup>104</sup> who had mined at Thames for three years in the early 1870s,<sup>105</sup> in November 1889, ‘whilst shooting some heavy timber down a spur discovered a ‘considerable quantity’ of ironstone ‘in the ruts made by the timber’. He sought advice from the experts of the Te Aroha Silver and Gold Mining Company, who assured him it was ‘a valuable flux, and just the thing they had been requiring at the smelter, unluckily, however, at that particular time the smelter was being closed down’. Nevertheless, Emmett pegged off the ground.<sup>106</sup> He prospected his find to determine its extent and value,<sup>107</sup> but as nothing further was heard of the discovery it must be assumed that the experts had exaggerated its worth. Six years later, he announced discovering a reef from 15 to 20 feet wide on the range behind Wairakau. A parcel of quartz from it was shown to the *Te*

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<sup>102</sup> *Waikato Times*, 14 February 1884, p. 2.

<sup>103</sup> See *Waikato Times*, 15 December 1883, p. 2, 2 October 1884, p. 2, ‘Boots’, ‘About the Taproom’, 9 May 1885, p. 3, 16 September 1886, p. 2, 28 October 1886, p. 2, 4 November 1886, p. 2.

<sup>104</sup> See *Waikato Times*, Te Aroha Correspondent, 17 January 1885, p. 2, Piako County Council, 11 August 1888, p. 2, Piako County Council, 9 July 1889, p. 3, advertisement, 28 December 1889, p. 3; *Thames Advertiser*, 14 January 1889, p. 2.

<sup>105</sup> See *Ohinemuri Gazette*, 14 March 1906, p. 2.

<sup>106</sup> *Waikato Times*, 10 December 1889, p. 2.

<sup>107</sup> *Te Aroha News*, 11 December 1889, p. 2.

*Aroha News*, which considered it was ‘very likely stone’ which ‘no doubt’ would ‘assay well. A small parcel has been sent away for assay’.<sup>108</sup> A month later the find was reported to be a duffer.<sup>109</sup>

#### AN AMATEUR PROSPECTOR: ROBERT AXEL FORSMAN

Amateurs continued to prospect in the twentieth century, the depression producing a rash of unemployed or under-employed trying to find gold.<sup>110</sup> In 1927, when farming at Gordonton, near Hamilton,<sup>111</sup> Robert Axel Forsman<sup>112</sup> sent two samples of quartz from an unstated location to the Thames School of Mines: one was of nil value, the other was worth 2d.<sup>113</sup> Then, in April 1932, he applied for a prospecting license at the head of Manaia Creek, near Coromandel, which was granted.<sup>114</sup> Of the five samples tested, two had a nil value, and the highest value was 5s 1d.<sup>115</sup> In a letter to the Thames mining registrar at in July 1933, he described his work and, in passing, revealed the skills that he had as well as the skills he lacked:

During the past year I have blazed & cut about 18 miles of bush tracks leading from Waikawau to Manaia, put in three months prospecting the main creek area with pestle & mortar & dish, & later done 120 feet of trenching on several reefs, also mined between 80 & 100 tons of quartz from different parts of reefs discovered, to do this I found it necessary to entirely divert the whole of the creek at one point this alone took nearly two months to complete....

The cost of testing this area (which has been subscribed by a few friends, my family & myself) is £95-7-6 to date no wages being paid. I have now considerable equipment on the ground which is included in the cost a complete camp & outfit, drills, picks,

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<sup>108</sup> *Te Aroha News*, 16 October 1895, p. 2.

<sup>109</sup> *Te Aroha News*, 16 November 1895, p. 2.

<sup>110</sup> See paper on prospectors and investors in the 1930s.

<sup>111</sup> *Waikato Times*, 20 August 1940, p. 4.

<sup>112</sup> See paper on the Roycroft brothers and their two brothers-in-law.

<sup>113</sup> Thames School of Mines, Assay Book 1919-1927, entry for 18 February 1927, School of Mines Archives, Thames.

<sup>114</sup> Coromandel Warden’s Court, Mining Applications 1932, 25/1932, BACL 14391/15a, ANZ-A.

<sup>115</sup> Thames School of Mines, Assay Book 1932-1933, entries for 21 March 1932, 26 April 1932, 17 May 1932, 6 February 1933, School of Mines Archives, Thames.

shovils, hammers, gads, pinch bars, dishes, pestle & mortar, portable forge, coal & explosives.... The transport of provisions & equipment has taken up at least one quarter of the time & has to be intirely done by manuel labour, the natural obsticles are so great that any other means cannot be used at present....

I would heartly welcome a mining expert & geoligist to visit the area to furnish me with a complete explanation re the surrounding country formation. I have been trying for some time to get such a man to assist me but without success so far.<sup>116</sup>

The amount of effort was considerable, but in this as in so many other cases did not lead to success.

### ANOTHER AMATEUR PROSPECTOR: JOHN WOULDES

One feature of the amateur gold seeker was persistence in the face of failure. This can be seen most clearly in the case of John Wouldes, who prospected at Waiorongomai in 1925<sup>117</sup> and intended to again in 1950, when he applied to prospect 100 acres. He withdrew this application,<sup>118</sup> almost certainly because he was aged 83.<sup>119</sup> His father had been at the Thames goldfield in 1868,<sup>120</sup> Wouldes claimed to have prospected on the West Coast of the South Island in the 1880s,<sup>121</sup> and both father and son had claims at Puhipuhi, near Whangarei, between 1890 and 1892.<sup>122</sup> They were unsuccessful, his father, Matthew, a labourer, being declared bankrupt in May 1894, his only assets being book debts and wages due from a mining

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<sup>116</sup> R.A. Forsman to Mining Registrar, Thames, July 1933 [no date], Coromandel Warden's Court, Mining Applications 1933, 79/1933, BACL 14391/16a, ANZ-A.

<sup>117</sup> John Wouldes to Minister of Mines, 26 September 1925, Inspector of Mines, BBDO 18634, A902, MM146, ANZ-A.

<sup>118</sup> Te Aroha Warden's Court, Mining Applications 1950, 7/1950, BCDG 11289/4a, ANZ-A.

<sup>119</sup> Death Certificate of John Wouldes, 21 October 1953, 1953/32817, BDM.

<sup>120</sup> Thames Warden's Court, Register of Miners' Rights 1868, no. 11961, BACL 14358/2a, ANZ-A.

<sup>121</sup> John Wouldes to Minister of Mines, 26 September 1935, Inspector of Mines, BBDO 18634, A902, box 47, MM146, ANZ-A.

<sup>122</sup> Whangarei Warden's Court, Register of Plaints, Puhipuhi Mining District, 1890-1897, folio 9, BADF 10406/1; Applications under Mining Acts 1891-1896, folios 69-70, nos. 151, 156, BADF 10410/1; Mining Registrations 1890-1911, no. 33307, BADF 14028/1a, ANZ-A; *Te Aroha News*, 21 May 1890, p. 5.

company.<sup>123</sup> John Wouldes' only sample from this district that was tested at the Thames School of Mines, in 1896, had a nil value.<sup>124</sup> At that time he was a labourer, who in 1903 was forced into bankruptcy, paying only 2s 1 1/2d in the £.<sup>125</sup> His liabilities were £702 17s 11d, his assets £13 10s. 'The bankrupt gave as the cause of his insolvency an unsuccessful contract to work out and deliver at the Hukeranui railway station 1,800,000ft of kauri timber'.<sup>126</sup>

Even before his discharge as a bankrupt in 1904, both Wouldes and his wife Sarah obtained land at Kiritehere, the valley to the south of Marokopa, under the Bush and Swamp Crown Lands Act of 1903.<sup>127</sup> Their farm comprised 640 acres, and was subject to a mortgage to the State Advances Superintendent.<sup>128</sup> According to his own account, 'we took up this land in June 1904, and have resided on it continuous since a fortnight after the ballot. We have had to contend with a good deal of hardships through the district being isolated and roadless, also through the loss of sheep in new bush country'.<sup>129</sup> His family suffered '8 years of hardships' before 'just beginning to feel our feet'.<sup>130</sup> By 1911, the swamp was 'coming into condition fast, and sheep and cattle are grazing where, a few years ago, was nothing but a raupo swamp'.<sup>131</sup> He was shipping bales of wool out of Marokopa, and advertising timber for sale.<sup>132</sup> Wouldes had dairy cattle and was a leader in

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<sup>123</sup> *Mercantile and Bankruptcy Gazette*, 24 May 1894, p. 238.

<sup>124</sup> Thames School of Mines, Assay Book 1895-1897, entry for 7 September 1896, School of Mines Archives, Thames.

<sup>125</sup> *New Zealand Gazette*, 15 October 1903, p. 2212, 3 November 1904, p. 2688.

<sup>126</sup> *Auckland Weekly News*, 8 October 1903, p. 40.

<sup>127</sup> *Auckland Weekly News*, 16 June 1904, p. 41, 7 July 1904, p. 19; Auckland Land Registry, Nominal Primary Indexes, vol. 1 folio 158, vol. 3, folio 126, Land Information New Zealand, Auckland.

<sup>128</sup> Bankruptcy Files, 1927/57, BBAE 5828/30, ANZ-A.

<sup>129</sup> For John and Sarah Wouldes and their slab hut with, at first, a nikau roof, see *Kawhia South: The districts of Kinohaku, Te Anga, Marokopa, Kiritehere*, compiled by Colleen Neal and Ken Shaw (Te Kuiti, 1996), p. 335 and photograph on p. 313; for photographs of his eight children, see pp. 355, 366; for map of his land, blocks 5 and 14, see p. 314.

<sup>130</sup> Lands Committee, Petition 339, heard on 5 November 1912, Legislative Department, LE 1, 1912/7, ANZ-W.

<sup>131</sup> 'Kiritehere News', *King Country Chronicle*, 11 January 1911, p. 3.

<sup>132</sup> *Kawhia Settler*, reprinted in *Kawhia South*, pp. 310, 311.

improving the transportation of cream to the Marokopa Dairy Factory, mainly by constructing better wharves.<sup>133</sup>

The previous year, he had been on the committee that established this factory.<sup>134</sup> A prominent local figure, he was the first chairman of the Marokopa school committee in 1908, when six of his children were pupils.<sup>135</sup> Sarah ran a small post office and telephone exchange in their home from its opening in 1905 until they left the district.<sup>136</sup> By January 1911, he had a square plunge dip built, and most of the settlers used it to dip their sheep.<sup>137</sup>

In May 1911, his home was totally destroyed by fire, and property valued at over £300 was lost; the residents of the district assisted his family by providing goods and money.<sup>138</sup> In 1915 he bought the Marokopa Milling Company's plant along with its flax and timber cutting rights.<sup>139</sup> Another disaster struck a few years later, leading to his filing as a bankrupt in 1923. He estimated his liabilities as £488 6s 9d and assets as £24, whereas in fact the liabilities were £365 15s 2d and the assets were valueless.<sup>140</sup> His creditors were told that he had had several road metalling contracts, but with the war he 'lost heavily upon them',

the last of which, a £500 metalling contract for the Kawhia County Council, ended disastrously. The war was on, prices went up beyond all expectations, and the council changed its engineers no less than four times during the progress of the work. The engineers disagreed with one another, and in the end, bankrupt lost about £800 on the contract. During the progress of this contract in November, 1918, the camp was struck by influenza. After all the men had left, and while bankrupt himself was lying ill in bed at his home, a Maori entered the camp and died there.

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<sup>133</sup> *King Country Chronicle*, 12 April 1911, p. 7, 24 May 1911, p. 6, 12 July 1911, p. 5, 10 July 1912, p. 6, 14 August 1912, p. 3, 16 October 1912, p. 3.

<sup>134</sup> *Kawhia South*, p. 241.

<sup>135</sup> *Kawhia South*, p. 244.

<sup>136</sup> *Kawhia South*, p. 313.

<sup>137</sup> *Kawhia Settler*, n.d., reprinted in *Kawhia South*, p. 311.

<sup>138</sup> *King Country Chronicle*, 25 May 1911, p. 5, 5 June 1912, p. 5; see also Lands Committee, Petition 339, heard on 5 November 1912, Legislative Department, LE 1, 1912/7, ANZ-W.

<sup>139</sup> *Kawhia South*, p. 335.

<sup>140</sup> *New Zealand Herald*, 10 March 1923, p. 7; Bankruptcy Files, 1927/57, BBAE 5628/30, ANZ-A.

The authorities heard of this and by their direction the body was buried and the entire camp burnt, including all bankrupt's gear. The damage amounted to £130. Law proceedings were twice instituted by bankrupt, but only resulted in a further loss of £120 in law costs.<sup>141</sup>

An attempt to obtain compensation from the government was made in 1920,<sup>142</sup> but failed. Stock prices fell greatly in 1921, when auctioneers pressed for payment and he also had to pay off a bank overdraft of over £4,000. To survive, he sold stock at a heavy loss and mortgaged the farm, while his wife sold her land so she could lend him money. He told his bankruptcy hearing 'I can stand it no longer. I'm done. I'm down and out. If I had to go to gaol, I couldn't do any better for my creditors than I've tried to do. I am digging gum down on the Barrier now, and my wife is scraping it. We have nothing left'.<sup>143</sup> He had transferred his farm to his sons 'because he had no money to carry on'.<sup>144</sup> According to the assignee, at the creditors' meeting he 'gave the impression of being an impractical individual, but nothing was alleged by creditors against his conduct'.<sup>145</sup> He was discharged eight months after filing, and continued gum digging at Whangaparapara, Great Barrier Island.<sup>146</sup>

Even before his second bankruptcy, Wouldes had turned to prospecting to restore his fortunes. In October 1922, his first samples were sent to the Thames School of Mines, the accompanying letter being written by another person but signed by Wouldes, who added his own postscript: 'Pleas to let me have results soon as Possable as I am Prospecting anchous to know results'.<sup>147</sup> Being an undischarged bankrupt, his 1923 application for a prospecting license over 100 acres in the White Cliffs area of Great Barrier

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<sup>141</sup> *New Zealand Herald*, 24 March 1923, p.7; Bankruptcy Files, 1927/57, BBAE 5628/30, ANZ-A.

<sup>142</sup> Public Petitions M to Z Committee, *AJHR*, 1920, I-2, p. 5.

<sup>143</sup> *New Zealand Herald*, 24 March 1923, p. 7; Bankruptcy Files, 1927/57, BBAE 5628/30, ANZ-A.

<sup>144</sup> *New Zealand Herald*, 29 March 1923, p. 9.

<sup>145</sup> Bankruptcy Files, 1927/57, BBAE 5628/30, ANZ-A.

<sup>146</sup> Bankruptcy Register 1884-1927, folio 248, BBAE A803/1, ANZ-A.

<sup>147</sup> John Wouldes to Hugh Crawford (Director, Thames School of Mines), 17 October 1922, Inwards Correspondence on Assays 1921-1922, School of Mines Archives, Thames; see also John Wouldes to Matthew Paul, 29 May 1923, Inspector of Mines, BBDO 18634, A902, box 6, S171, ANZ-A.

Island was made in his wife's name. It was refused because a woman was 'unable to prospect that is to say; unable to vigorously and continuously prosecute prospecting operations'.<sup>148</sup> This rejection prompted an immediate letter from Wouldes seeking an explanation and pointing out that nobody else was prospecting or mining on the island:

I have been Prospecting for the Past 8 months chiefly exploring for new lodes. I have now found 2 lodes wich gives fair assayes it is now nassy to Prove the extent of theas lodes, and value for this Purpose it is nassy to git a lattle govemnt help wich con only be done by gitting a Prospecting license So any help you can give will be appesatied the School of Mines is giving evey assistonce also the Mines department has granted Permissin to have assaying don free of Costs. I will be glad of your help as it is too expencive for me to come down to the Thames to attend Cort and expencive to employ lawere's.<sup>149</sup>

In later letters, he stated that he had been 'vigorously' prospecting since March and had obtained good results. His wife's application was only temporary and 'she is finding the money to carrie on'.<sup>150</sup> Because of this explanation, she was granted the license in September.<sup>151</sup>

Hugh Crawford, director of the Thames School of Mines, informed Wouldes that his quartz was 'very deceptive giving one the opinion that it is rich in silver sulphide'.<sup>152</sup> When applying for free assays, Wouldes told Matthew Paul, the mining inspector, that the cost of assays was 'a considerable hardship against me as an exploring prospector as I have to have ores continually assayed, further more it is necessary to have considerable experiental work carried out to find out and prove the form the silver exists in and means of treating same'. He claimed to have found a

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<sup>148</sup> Matthew Paul to Warden, 22 May 1923; Mining Registrar, Thames, to Sarah Charlotte Wouldes, 15 June 1923, Thames Warden's Court, Mining Applications 1923, 36/1923, BACL 14350/7a, ANZ-A.

<sup>149</sup> John Wouldes to Mining Register, Thames, 20 June 1923, Thames Warden's Court, Mining Applications 1923, 36/1923, BACL 144350/7a, ANZ-A.

<sup>150</sup> John Wouldes to Mining Registrar, Thames, 12 August 1923, 15 August 1923, Thames Warden's Court, Mining Applications 1923, BACL 14350/7a, ANZ-A.

<sup>151</sup> Mining Registrar, Thames, to S.H. Wouldes, 11 October 1923, Thames Warden's Court, Mining Applications 1923, BACL 14350/7a, ANZ-A.

<sup>152</sup> Hugh Crawford to John Wouldes, 4 May 1923, Inspector of Mines, BBDO 18634, A902, box 6, S171, ANZ-A.

‘fresh belt of silver’ in new country.<sup>153</sup> Accordingly, he was granted free assays of samples.<sup>154</sup> When writing to the minister in July, giving his occupation as prospector, Wouldes claimed to have ‘located the reef on the top of a hill, and tried to sink on it, but it made too much water, so I had to give up sinking and start tunnelling’. He appealed for a subsidy to drive 150 feet. James Alexander Pond,<sup>155</sup> ‘who is a clever assayer, told me that the silver could not be saved in New Zealand’, prompting him to ask the Mines Department to discover the correct process.

I have had past experience in mining, and understand Geology as well as being a first-class bushmen, my intention is to thoroughly explore the Barrier, also the Thames Peninsula from Colville to Thames back country, also from Golden Bay, Nelson to Reefton, this will take 5 years to do and cost a bit of money.<sup>156</sup>

After examining his mine in December, Paul reported that, from the assay results and ‘careful examination of the ore in sight’ he was ‘convinced’ there was ‘very little, if any, gold in this ore and the silver values are also low’. He ‘made it quite clear’ to Wouldes that he was ‘only wasting his time and money’. As Paul could not recommend the granting of a prospecting subsidy, it was refused.<sup>157</sup>

Despite Wouldes informing the minister that assays gave an average of £3 15s 9d per ton, two made at the Dominion Laboratory in Wellington produced low values, seven grains of gold being the highest value.<sup>158</sup> Later assays were equally discouraging to everyone except Wouldes. Seven samples sent to the Thames School of Mines in 1922 had only traces of

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<sup>153</sup> John Wouldes to Matthew Paul (Inspector of Mines), 29 May 1923, Inspector of Mines, BBDO 18634, A902, box 5, S171, ANZ-A.

<sup>154</sup> Matthew Paul to John Wouldes, 5 June 1923, Inspector of Mines, BBDO 18634, A902, box 5, S171, ANZ-A.

<sup>155</sup> See paper on his life.

<sup>156</sup> John Wouldes to Minister of Mines, 30 July 1923, Inspector of Mines, BBDO 18634, A902, box 6, S171, ANZ-A.

<sup>157</sup> Matthew Paul to Under-Secretary, Mines Department, 17 December 1923; Under-Secretary, Mines Department, to Matthew Paul, 20 December 1923, Inspector of Mines, BBDO 18634, A902, box 6, S171, ANZ-A.

<sup>158</sup> John Wouldes to Minister of Mines, 30 July 1923; Assays at Dominion Laboratory, 20 December 1923, Inspector of Mines, BBDO 18634, A902, box 6, S171, ANZ-A.

bullion.<sup>159</sup> During 1923, 37 small samples were assayed, most of which produced either no gold at all or had just a trace, containing mainly silver. All were of low value, apart from one result of £10 2s 7d. The results of a bulk sample were ‘much poorer’, the highest return being £2 10s 4d.<sup>160</sup> Seven 1924 samples produced samples too small to quantify.<sup>161</sup> For 1925, all seven Waiorongomai samples gave erratic but better results than at Great Barrier Island, but still only two had any reasonable values.<sup>162</sup> Eleven samples were taken in 1926 from an unspecified location and four from Great Barrier Island: all were of low value, eight having only a trace and one having nothing.<sup>163</sup> The last samples sent for assaying in the 1920s was in 1927, when ten samples, the majority with only a trace, were sent from the island.<sup>164</sup>

In 1929, when Wouldes was living at Pungarehu, in Taranaki, he reported discovering ‘Oil seepage of considerable extent’, and sought a prospecting license, advice about drilling, and a subsidy.<sup>165</sup> When he received the information, he complained that ‘the Law Seems to me to be a little hard and hostile to indivagules trying to develop the Oil in new Zealand’.<sup>166</sup> His samples, like those taken by the mining inspector, John Francis Downey, revealed no mineral oil. Downey reported that the find was

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<sup>159</sup> Thames School of Mines, Assay Book 1919-1927, entries for 17 October 1922, 26 October 1922, 26 November 1922, School of Mines Archives, Thames.

<sup>160</sup> Thames School of Mines, Assay Book 1919-1927, entries for 12 January 1923, 26 March 1923, 22 April 1923, 28 May 1923, 5 June 1923, 18 June 1923, 6 August 1923, 1 October 1923, 14 November 1923, School of Mines Archives, Thames.

<sup>161</sup> Thames School of Mines, Assay Book 1919-1927, entries for 4 April 1924, 2 June 1924, 2 September 1924, School of Mines, Thames.

<sup>162</sup> John Wouldes to Minister of Mines, 26 September 1925, Inspector of Mines, BBDO 18634, A902, MM146, ANZ-A; Thames School of Mines, Assay Book 1919-1927, entry for 2 September 1925, School of Mines Archives, Thames.

<sup>163</sup> Thames School of Mines, Assay Book 1919-1927, entries for 23 June 1926, 5 July 1926, 13 September 1926, School of Mines Archives, Thames.

<sup>164</sup> Thames School of Mines, Assay Book 1919-1927, entry for 3 March 1927; Assay Book 1927-1932, entries for 11 April 1927, 23 May 1927, 28 November 1927, School of Mines Archives, Thames.

<sup>165</sup> John Wouldes to Under-Secretary, Mines Department, 26 August 1929, Mines Department, MD 1, 5/4/86, ANZ-W.

<sup>166</sup> John Wouldes to Minister of Mines, 19 September 1929, Mines Department, MD 1, 5/4/86, ANZ-W.

in an area that consisted of 'a series of rough hummocks interlaced by small swamps; I saw no indication whatever of petroleum, the so-called seepage being merely the scum almost invariably found floating on the surface of swampy areas throughout the district'.<sup>167</sup>

Nothing further was heard from Wouldes until May 1932, when he was again living at Hukeranui near Whangarei and applied for more free assays at the Thames School of Mines.<sup>168</sup> Permission was granted, and he sent six samples in August and September, all but one from Great Barrier Island. 'I shall not send many samples for assay as I know nearly all about the value of hoers on the Barrier thees samples are from new finds'.<sup>169</sup> All were of nil or very low value, as were two sent in May, apart from one worth £1 5s per ton.<sup>170</sup> Results improved during 1933, although only a couple were payable.<sup>171</sup> In May he sent three samples from 'farely big reefs and No 1 looks Pretty good being rich in Silver No 2 is from a few Bolders and seems to carrie fair gold'; he had pegged out the ground where these had been found.<sup>172</sup> At the end of the month, when two samples more were forwarded, 'I trust the results will be better than the last samples I sent', for he was certain that they carried 'a fair amount of Silver Probaby som gold'.<sup>173</sup> These, taken from two tunnels, did produce two pennyweight in one case and six in the other, valued at £2 5s and £6 2s 5d respectively, a contrast to

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<sup>167</sup> J.F. Downey to Under-Secretary, Mines Department, 28 November 1929, Mines Department, MD 1, 5/4/86, ANZ-W.

<sup>168</sup> Hugh Crawford to John Wouldes, 24 May 1932, Outwards Correspondence 1932-1936, School of Mines Archives, Thames.

<sup>169</sup> John Wouldes to Hugh Crawford, 14 August 1932, 13 September 1932, Correspondence: Inwards 1932-1933, School of Mines Archives, Thames.

<sup>170</sup> Thames School of Mines, Assay Book 1932-1933, entries for 16 May 1932, 22 August 1932, 19 September 1932, School of Mines Archives, Thames.

<sup>171</sup> Thames School of Mines, Assay Book 1932-1933, entries for 21 January 1933, 22 February 1933, 3 May 1933, 5 June 1933, 14 August 1933; Assay Book 1933-1934, entry for 4 December 1933, School of Mines Archives, Thames.

<sup>172</sup> John Wouldes to Hugh Crawford, 2 May 1933, Correspondence: Inwards 1932-1933, School of Mines Archives, Thames.

<sup>173</sup> John Wouldes to Hugh Crawford, 30 May 1933, Correspondence: Inwards 1932-1933, School of Mines Archives, Thames.

the previous three of nil value.<sup>174</sup> Wouldes wanted several tons treated, which could not be done at the School of Mines.<sup>175</sup>

Only six samples were sent in 1934, the values being 16s, nil, 2s, 3s, nil, and nil.<sup>176</sup> The following year, all the samples came from Puriri, near Thames, but again almost all were extremely poor, and in one case Wouldes sent two stones of no value, presumably because he wanted to know what their black and brown colours meant.<sup>177</sup> He obtained a prospecting license over 100 acres there, not quite the same area he first sought because he had to avoid polluting a water supply scheme. His proposed mate was removed from the application because he had been dismissed from a prospecting scheme for the unemployed at Kuaotunu for being 'unsatisfactory'.<sup>178</sup> Whilst his application was being considered, Wouldes informed the minister that he was 'a prospector of fair knowledge of prospecting originally West Coast later Puhi Puhi 47 years ago. Recently within past 13 years Great Barrier silver sulphide, Coromandel, Waiorongomai.... I came here to Puriri ... last May to prospect for gold'. He claimed to have found a good lode in the Puriri Creek, and described the area as 'exceptionally good gold bearing country'.<sup>179</sup> The following month he sold gold valued at £12 16s 9d to the bank.<sup>180</sup> He produced eight samples during 1936, five of which were worth

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<sup>174</sup> Thames School of Mines, Assay Book 1932-1933, entries for 3 May 1933, 5 June 1933, School of Mines Archives, Thames.

<sup>175</sup> John Wouldes to Hugh Crawford, 3 July 1933 and 9 August 1933, Correspondence: Inwards 1932-1933, School of Mines Archives, Thames.

<sup>176</sup> Thames School of Mines, Assay Book 1933-1934, entries for 27 January 1934, 30 July 1934, School of Mines Archives, Thames.

<sup>177</sup> Thames School of Mines, Assay Book 1935-1936, entries for 2 August 1935, 16 September 1935, 16 October 1935, 21 October 1935, 24 October 1935, 30 October 1935, School of Mines Archives, Thames.

<sup>178</sup> Applications in Inspector of Mines, BBDO 18634, A902, box 47, MM146, box 48, MM148G; J.F. Downey to Under-Secretary, Mines Department, 19 October 1935 [two letters], Inspector of Mines, BBDO 18634, A902, box 47, MM146, ANZ-A.

<sup>179</sup> John Wouldes to Minister of Mines, 26 September 1935, Inspector of Mines, BBDO 18634, A902, box 47, MM146, ANZ-A.

<sup>180</sup> Bank of New Zealand, Thames Branch, Statement of Daily Gold Purchases at Thames 1916-1954, entries for 24 October 1935, 26 October 1935, Bank of New Zealand Archives, Thames.

nothing, the others having a little gold.<sup>181</sup> His last sale of gold to the bank, in September that year, earned him £3 18s 6d.<sup>182</sup> The five samples assayed in 1937 were no improvement,<sup>183</sup> and the 12 tested in 1938 remained low in value, the highest being worth £1 4s.<sup>184</sup> Only two tests were done in 1939, for low results once more.<sup>185</sup> For most of the years until December 1950, samples from Puriri continued to be tested, all the results being extremely low or negligible apart from one in 1944, when he obtained an ounce of bullion valued at £8.<sup>186</sup>

Wouldes persisted without any success over several decades, the lack of success reflecting the absence of good ore in the areas he prospected, for nobody else, then or later, found anything payable either. For example, James Henry Fleming, a former draper, sharebroker and farmer,<sup>187</sup> who in the 1890s invested in Waiorongomai mines,<sup>188</sup> took 30 samples on Great Barrier Island between August and October 1932, almost all with no

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<sup>181</sup> Thames School of Mines, Assay Book 1935-1936, entry for 10 February 1936; Assay Book May-December 1936, entry for 14 September 1936, School of Mines Archives, Thames.

<sup>182</sup> Bank of New Zealand, Thames Branch, Statement of Daily Gold Purchases at Thames 1916-1954, entry for 12 September 1936, Bank of New Zealand Archives, Thames.

<sup>183</sup> Thames School of Mines, Assay Book 1936-1938, entries for 8 January 1937, 15 October 1937, School of Mines Archives, Thames.

<sup>184</sup> Thames School of Mines, Assay Book 1936-1938, entries for 25 March 1938, 3 May 1938, 21 June 1938, School of Mines Archives, Thames.

<sup>185</sup> Thames School of Mines, Assay Book 1938-1941, entry for 19 November 1939, School of Mines Archives, Thames.

<sup>186</sup> Thames School of Mines, Assay Book 1941-1952, entries for 26 February 1941, 15 February 1943, 31 January 1944, 11 April 1944, 7 August 1944, 31 August 1944, 7 September 1944, 5 September 1945, 13 June 1946, 21 January 1947, 4 July 1947, 4 August 1947, 9 October 1947, 26 January 1949, 21 February 1950, 20 December 1950, School of Mines Archives, Thames.

<sup>187</sup> See *Ohinemuri Gazette*, 7 December 1892, p. 5, 4 November 1896, p. 2; *Thames Advertiser*, 25 July 1895, p. 2, 25 August 1896, p. 2; *Auckland Weekly News*, 23 July 1903, p. 23; *Observer*, 25 July 1903, p. 17.

<sup>188</sup> See Te Aroha Warden's Court, Plaintiff Book 1880-1898, 2/1896, BBAV 11547/1a; Letterbook 1883-1900, p. 341, BBAV 11534/1a; Mining Applications 1895, 1, 6, 9, 10, 17, 19, 78/1895, BBAV 11582/4a, ANZ-A; *Te Aroha News*, 23 February 1895, p. 2.

value.<sup>189</sup> With these results, Fleming immediately abandoned the search and did not waste his time as Wouldes did. That Fleming's optimism greatly exceeded his skills was revealed when he prospected near Opotiki on behalf of a syndicate in 1918. Claiming to have found payable bullion and copper, he told the minister that his find appeared 'to be a much bigger thing than the Waihi Gold Mining Company: anyway it is of equal importance and should prove to be a second Mount Lyell'.<sup>190</sup> Both statements were soon proved to be wrong, and the company planned to exploit the deposits was never formed.<sup>191</sup>

### EXPERIENCED PROSPECTORS

Turning from examples of amateurs who prospected part-time to men who were full-time miners or prospectors, more instances can be traced of the difficulties encountered when attempting to detect payable ore. This was hardly surprising, as only a limited number of rich discoveries were possible. Sometimes finds came as a total surprise and involved no skill on the part of the discoverer, as when James Sprague Jobe found good gold at Thames.<sup>192</sup> Even skilled prospectors such as Hone Werahiko and William Nicholl only made one good find, and their claims about other discoveries were soon shown to be over-optimistic.<sup>193</sup>

Even in likely claims, the value of the ore varied. An experienced man would take samples of all the ore, as when Joseph Cookson,<sup>194</sup> who had prospected the King Country in the early 1880s,<sup>195</sup> later sampled the 'general dirt' in the Grand Junction at Stoney Creek from a leader, the

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<sup>189</sup> Thames School of Mines, Assay Book 1932-1933, entries for 30 August 1932, 10 September 1932, 24 October 1932, 25 October 1932, School of Mines Archives, Thames.

<sup>190</sup> J.H. Fleming to Minister of Mines, 16 April 1918, Mines Department, MD 1A, 10/13/66, ANZ-W.

<sup>191</sup> See in particular J.H. Fleming to Minister of Mines, 28 May 1918, Mines Department, MD 1A, 10/13/66, ANZ-W.

<sup>192</sup> See paper on Hardy's Mines.

<sup>193</sup> See papers on these two men.

<sup>194</sup> See *Waikato Times*, 30 September 1886, p. 2, Waikato Charitable Aid Board, 8 December 1892, p. 2; *Thames Advertiser*, 10 August 1896, p. 2.

<sup>195</sup> *Thames Star*, 19 February 1881, p. 2.

footwall, the hanging wall, and the reef.<sup>196</sup> Sometimes they were mistaken when looking for minerals they were not familiar with, as when one of the Shakespeare brothers claimed to have found diamonds near Raglan,<sup>197</sup> or in new districts, as when William Shakespeare found gold at Makara near Wellington. He was an experienced miner, having worked at Coromandel before moving to Te Aroha in December 1880 and becoming a partner in claims there, Tui, and Waiorongomai.<sup>198</sup> What he produced at Makara was indeed gold, but not from that district, which needed an even more experienced miner, John Watson Walker, to point out. Possibly Shakespeare was involved in that attempted fraud, although there was no suggestion of that at the time, instead the vendors receiving the blame.<sup>199</sup>

Amateur prospectors often considered that they knew better than the experts, as indicated by those at Te Aroha, like Malcolm Hardy,<sup>200</sup> who persistently challenged the views of the mining inspectors and the director of the Thames School of Mines during the 1930s.<sup>201</sup> Even experienced miners sometimes challenged the results of assays, as when Robert Worth, who had mined for many years,<sup>202</sup> was briefly interested in the Tui mines in 1910.<sup>203</sup> He wrote to the Thames School of Mines in 1915 to express his

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<sup>196</sup> Thames School of Mines, Assay Book 1886-1887, Assays for Joseph Cookson, n.d., School of Mines Archives, Thames.

<sup>197</sup> *Waikato Times*, 6 February 1883, p. 2.

<sup>198</sup> For Coromandel, see Thames Warden's Court, Thames Claims Register 1869, nos. 1539, 1655, 1673, BACL 14397/4a; Coromandel Warden's Court, Register of Licensed Holdings 1872-1882, folio 88, ZAAN 14044/1a, ANZ-A; *Coromandel Mail*, 1 October 1881, p. 5; *Bay of Plenty Times*, 10 November 1881, p. 2. For Te Aroha district, see Te Aroha Warden's Court, Register of Te Aroha Claims 1880-1888, folios 189, 201, BBAV 11567/1a; Register of Licensed Holdings 1881-1887, folio 122, BBAV 11500/9a; Register of Applications 1880-1882, folio 134, BBAV 11505/3a, ANZ-A.

<sup>199</sup> *New Zealand Gazette*, 27 September 1883, p. 1369; James Brodie, *Terawhiti and the Goldfields* (Wellington, 1986), p. 274.

<sup>200</sup> See paper on his life.

<sup>201</sup> See paper on the Depression years.

<sup>202</sup> See *Thames Advertiser*, Warden's Court, 8 September 1891, p. 2, 5 February 1892, p. 2, 30 May 1893, p. 2, 29 January 1895, p. 3, 5 September 1899, p. 3; *Ohinemuri Gazette*, 23 January 1892, p. p. 5, 4 June 1892, p. 5, 29 May 1901, p. 3; N.S. Climie, 'Pre Borough Times', *Waihi Borough Council: Diamond Jubilee 1902-1962*, ed. Climie (Paeroa, 1962), pp. 10-11.

<sup>203</sup> Te Aroha Warden's Court, Mining Applications 1910, 76/1910, BBAV 11289/20a, ANZ-A.

disappointment at the results. 'I had several assays made from heap before starting to bag and the lowest was much higher than your bulk assay. I was wondering if by some chance there may have been a mistake made in it'.<sup>204</sup> Edward Kersey Cooper,<sup>205</sup> a mine manager who had been in charge of mines at Waiorongomai in the early 1880s,<sup>206</sup> with another experienced manager floated his Royal Standard mine at Wharekeraupunga, near Whangamata, in London in 1896.<sup>207</sup> He told the directors that he believed it 'would rival the famous Waihi mine',<sup>208</sup> and informed a London gathering that in his 16 years of mining experience in New Zealand it 'was the finest property on which he had ever set his foot'. He knew the property well, and he emphasized that the vendors had shown their faith in it by not asking for cash, taking shares instead.<sup>209</sup> Cooper himself had been so impressed that he purchased 18,050 shares, only 1,950 of which he sold to his friends, retaining his faith because he had seen 'big dabs of gold' in the creek, despite increasing evidence that the mine was a failure.<sup>210</sup> In this example, he had misled himself, just as he had wrongly assessed the value of the lodes in his Jubilee at Waitekauri and his Fame and Fortune at Thames. He had been forced into bankruptcy in 1892 because, as he admitted, 'the results were disastrous' when the first crushings were made in the former, and another reef that had been expected to return an ounce to the ton gave only two pennyweights, and despite further expensive work became 'small and poor' and was 'a great loss'.<sup>211</sup>

#### A NEW METHOD OF DETECTING ORE

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<sup>204</sup> Robert Worth to Director, Thames School of Mines, 10 November 1915, Inward Correspondence File 1907-1929, School of Mines Archives, Thames.

<sup>205</sup> See paper on his life.

<sup>206</sup> Te Aroha Warden's Court, Register of Licensed Holdings 1881-1887, folios 2, 5, 6, 36, 41, 97, 103, BBAV 11500/9a; Mining Applications 1884, 32/776, BBAV 11289/10a, ANZ-A; *Te Aroha News*, 30 August 1883, p. 2; E.K. Cooper to Minister of Mines, 8 July 1891, Mines Department, MD 1, 91/566, ANZ-W.

<sup>207</sup> *Thames Advertiser*, 14 September 1896, p. 3; *Cyclopedia of New Zealand*, vol. 7 (Christchurch, 1898), p. 27.

<sup>208</sup> *Thames Advertiser*, 18 January 1897, p. 2.

<sup>209</sup> *Thames Advertiser*, 19 January 1897, p. 4.

<sup>210</sup> *Auckland Weekly News*, 23 December 1898, pp. 37-38.

<sup>211</sup> *Thames Advertiser*, 12 October 1892, p. 2.

Being trained at Schools of Mines was not always a guarantee that the miner was immune to unscientific solutions to the problems faced when searching for payable ore. The clearest example of this was William Francis MacWilliams (earlier McWilliams), known to all as ‘Daldy’, who at the age of 19 had participated in the Te Aroha rush.<sup>212</sup> By 1904, when he was the Waihi bailiff,<sup>213</sup> he claimed to have been involved in all branches of mining for 25 years; he certainly had studied for five years at the Thames School of Mines.<sup>214</sup> In 1906 a mining engineer used divining rods to trace the course of the Waihi reefs,<sup>215</sup> which may have given him ideas. Also in that year, William Wallnutt, a sharebroker and land agent, became the secretary and treasurer of the Waihi Spiritualist Association.<sup>216</sup> Wallnutt, who was to be mayor of Waihi from 1923 to 1947, had been a miner for three years at the end of the nineteenth century, and MacWilliams became his ‘close friend and prospecting mate’.<sup>217</sup>

After retiring as bailiff in August 1927, MacWilliams started prospecting at Waihi, Karangahake, and Waitekauri, having ‘great faith in the gold mining potentialities’ of Ohinemuri and being a provisional director of the Waihi Prospecting and Mining Association. He was ‘of a genial and optimistic disposition’,<sup>218</sup> the latter being a feature of all prospectors, both successful and unsuccessful. In October 1927, he requested government aid for his ‘extensive prospecting operations’ at Karangahake. He was investigating virgin ground, expecting to trace a valuable vein parallel ‘to that of famous Talisman mine, which my brothers and self discovered about 47 years ago’. They had discovered only a small patch, and the lode had not been traced. ‘During the whole of the intervening years, right up to the present, my mind has been concentrated upon the problem’ of locating this:

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<sup>212</sup> Te Aroha Warden’s Court, Register of Te Aroha Claims 1880-1888, folio 167, BBAV 11567/1a, ANZ-A.

<sup>213</sup> See *Thames Star*, 3 September 1903, p. 2, 14 September 1903, p. 2.

<sup>214</sup> W.F. MacWilliams to Minister of Mines, 7 July 1904, Mines Department, MD 1, 06/458, ANZ-W.

<sup>215</sup> *Auckland Weekly News*, 2 August 1906, p. 22.

<sup>216</sup> *Waihi Daily Telegraph*, 20 February 1906, p. 2, 1 July 1906, p. 3; *Observer*, 30 June 1906, p. 7, 7 July 1906, p. 5.

<sup>217</sup> W.F. Wallnutt, ‘Random History Around Waihi’, *Ohinemuri Regional History Journal*, no. 30 (September 1986), pp. 38, 41.

<sup>218</sup> *Waihi Daily Telegraph*, 20 January 1931, p.2.

Mr Wallnutt Mayor of Waihi and I have been experimenting for fully sixteen years on a science which is now known as the geophysical method of metal location; we have practically proved our case in Waitekauri, where the position of four lodes were indicated on the surface, prior to the driving of a cross cut, a distance of close upon 1000 feet - the lodes were duly intersected at the distances indicated - their value contents, strength of vein matter, underlie, and bearing were all determined prior to the work being undertaking - with considerable accuracy. The stupendous principle of this great science from our first insight, into the mineral field, revealed what might be termed inconceivable wonders opening up as it has, a vast field of magnetic knowledge - that in the near future should yield abundant evidence to demonstrate that the prospecting efforts of the past, and the great expenditure involved at that time to establish the mining industry, can now be conducted at a minimum cost compared with the conditions pertaining at that remote and recent period.

MacWilliams hoped that the minister would 'not think it a mere figment of imagination, or think it antagonistical to the principles of geology' that they had located the lode in this manner, and asked for a subsidy.<sup>219</sup> Asked for his opinion, the mining inspector, Matthew Paul, expressed his total lack of faith in these 'geophysical experiments', but, as gold might be found, he recommended a smaller subsidy than that asked for, which was granted. A syndicate had subscribed £500 to assist with the work.<sup>220</sup> By February 1929, when no reef had been found, the new mining inspector, John Francis Downey, recommended that no further money be granted. There was no outcrop, and the '332 feet of driving and 30 feet of winzing from the end of the drive, has not revealed any sign of reef, nor do I see any reason for thinking the future work proposed' was 'likely to reveal any'. MacWilliams and Wallnutt were 'experimenting in the divining of reefs, and, I am now satisfied, the reef being sought for at this place is one that they have divined from surface'. He considered that if they had faith in their system they would spend their own or their supporters' money.<sup>221</sup> The

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<sup>219</sup> W.F. MacWilliams to Minister of Mines, 19 October 1927, Mines Department, MD 1A, 23/4/82, ANZ-W.

<sup>220</sup> Matthew Paul to Under-Secretary, Mines Department, 12 November 1927, Mines Department, MD 1A, 23/4/82, ANZ-W.

<sup>221</sup> J.F. Downey to Under-Secretary, Mines Department, 2 February 1929, Mines Department, MD 1A, 23/4/82, ANZ-W.

under-secretary agreed that the 'blind stabbing' revealed by Downey 'should not be encouraged'.<sup>222</sup>

MacWilliams protested at losing the subsidy, for at the age of 66 he was 'still climbing 800 feet up the Karangahake mountain daily driving and sinking' in virgin ground. They were sure to find rich gold, and all they asked for was 'a SQUARE DEAL.... We claim to be experienced prospectors who are also stickers - we are not shirkers'.<sup>223</sup> Two months later, he outlined 'that great and wonderful science known as GEOPHYSICS - or commonly known as the Tortion balance which undoubtedly indicates the position of lodes and mineral fields in all parts of the world,' as well as the 'wonders of the human physical system'. He had

been operating a human instrument for close upon 18 years in geophysics, and found it to be more sensitive, and covering a much wider area than that accomplished by the renound "TORTIAN BALANCE" - My instrument, through the palms of his hands, indicates the position of an ore body - no matter what dimensions - and determine[s] its approximate value - if payable or not - the velocity of vibration enable him to show wether the lode is of any commercial value.

Unlike Wallnutt, he was unable in this way to determine the value, but

we are however a kindred combination, and have located the position of many orebodies - exposed some - others remain to receive the attention of capital not at our disposal just yet a while:- My friend is able to take any piece of ore into the palms of his hand and tell any one the approximate value of it per ton.

Although the Waihi Company claimed their lode did not go beyond their ground, they had 'proved beyond all doubt that the Edward, Martha, Empire, and Royal extend for miles outside their boundary, but are unfortunately hidden from human view - We know the positions of all those lodes', having traced them 'for many miles, and know exactly where boreholes should be put down'. There was 'no use sending geologists out to

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<sup>222</sup> Under-Secretary, Mines Department, to Minister of Mines, 18 February 1929, Mines Department, MD 1A, 23/4/82, ANZ-W.

<sup>223</sup> W.F. MacWilliams to Premier, 15 March 1929, Mines Department, MD 1A, 23/4/82, ANZ-W.

search for gold - they have already carried out that search and miserably failed'; geologists 'cannot reveal to us anything'.<sup>224</sup>

Downey repeated that there was no reef in sight or likely to be found in their Macwall Claim, and his advice not to pay any more subsidy was accepted.<sup>225</sup> MacWilliams then claimed that Downey had not properly inspected either the drive or the stone.<sup>226</sup> Downey responded that he had done so, there were no signs of quartz, and he did not expect to find any; it was 'extremely questionable' whether a subsidy 'should ever have been granted'. If he had 'known as much at the time as I subsequently learned regarding the work and those who were carrying it out', the earlier recommendation that the balance of the subsidy be used for sinking the winze would not have been made.<sup>227</sup>

MacWilliams sent a sample to the Thames School of Mines, informing the director that he wanted to know how much copper, lead and tin it contained. At first he asked for a quick result, but then for a thorough test, 'for much depends upon the analysis.... Trusting you will take your time over the work so that nothing reflectory can be thrown back at your valued School and your reputable ability as Director'.<sup>228</sup> The implication of the latter sentence was that a low value would reveal incompetence. Despite this prompt, the assay revealed a nil value.<sup>229</sup> MacWilliams responded that the result was quite a surprise, and wondered why tests had not been made for tin, gold, or silver.

When a man explores in the mountainous country with heavy timber upon it and carries out extensive prospecting - one naturally is keen and eager to get an idea of the metal content of the ore.... It would not be necessary for me to be present with you

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<sup>224</sup> W.F. MacWilliams to Minister of Mines, 6 May 1929, Mines Department, MD 1A, 23/4/82, ANZ-W.

<sup>225</sup> J.F. Downey to Under-Secretary, Mines Department, 23 May 1929, Mines Department, MD 1A, 23/4/82, ANZ-W.

<sup>226</sup> A.M. Samuel to Minister of Mines, 28 July 1929, Mines Department, MD 1A, 23/4/82, ANZ-W.

<sup>227</sup> J.F. Downey to Under-Secretary, Mines Department, 20 August 1929, Inspector of Mines, BBDO 18634, A902, box 3, S56, ANZ-A.

<sup>228</sup> W.F. MacWilliams to Hugh Crawford, 3 November 1929, 9 November 1929, Correspondence: Inwards 1928-1931, School of Mines Archives, Thames.

<sup>229</sup> Thames School of Mines, Assay Book 1927-1932, entry for 5 November 1929, School of Mines Archives, Thames.

in your research - it is too costly for me to negotiate a run to Thames - because I am too poor in finance.

Prospectors are worthy of more than ordinary consideration due to their strenuous effort to make a discovery - I get no govt. assistance and have to work of my own bat for tucker and necessities so you will see that I look for only a small recognition to compensate me for my efforts - especially when that work is in the interests of mankind.<sup>230</sup>

Through his local Member of Parliament, MacWilliams sent samples he claimed contained lead, tin, copper, silver and gold to the Dominion Laboratory in Wellington.<sup>231</sup> Of the six samples, five had no gold, and the one that contained this metal had less than five grains; only four contained silver.<sup>232</sup> There were no further requests for government money. According to the *Observer*, the Macwall Claim was known as the 'ghost mine', for the ground was taken up on the basis of 'information received from occult sources'.<sup>233</sup> Certainly the returns were ethereal, but the government had been milked of £173 6s 8d.<sup>234</sup> MacWilliams' prospecting days were over, and 13 months later he died, at the age of 68, of miners' complaint, his final illness lasting for three years.<sup>235</sup>

#### A SKILLED MINER IN ETHIOPIA

Skilled miners and prospectors could find work anywhere in the world; for instance, Billy Nicholl, discoverer of the Martha lode at Waihi, was employed later on to prospect in Fiji.<sup>236</sup> Henry Pierce Hornibrook, who managed several mines at Waiorongomai in the early 1880s, 'during which

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<sup>230</sup> W.F. MacWilliams to Hugh Crawford, 14 December 1929, Correspondence: Inwards 1928-1931, School of Mines Archives, Thames.

<sup>231</sup> A.M. Samuel to Minister of Mines, 28 November 1929, Mines Department, MD 1A, 23/4/82, ANZ-W.

<sup>232</sup> Assay by Dominion Laboratory, December 1929, Mines Department, MD 1A, 23/4/82, ANZ-W.

<sup>233</sup> *Observer*, 22 January 1931, p. 8.

<sup>234</sup> 'Assistance to Prospecting (General), Subsidies 1909-1929', Inspector of Mines, BBDO 10046, A902, MM174, ANZ-A.

<sup>235</sup> Death Certificate of William Francis MacWilliams, 18 January 1931, 1931/736, BDM.

<sup>236</sup> See paper on his life.

time there never was an accident of any description',<sup>237</sup> was a prominent mine manager at Coromandel.<sup>238</sup> In late 1896 he was employed by Lawrence David Nathan, the Auckland merchant,<sup>239</sup> as a mining 'expert',<sup>240</sup> and in this capacity was sent in December 1898 to prospect over 670 miles of the Eritrean coastline on the Red Sea on behalf of the Italian Government and a 'powerful syndicate' floated by 'both British and Italian capitalists'.<sup>241</sup> With one other man, he spent two years tracing some payable reefs.<sup>242</sup> One find, on the Queen of Sheba Road, convinced him 'he was on the track of King Solomon's Mines'.<sup>243</sup>

### SEEKING KNOWLEDGE

Whilst it is easy to find examples of misguided men who imagined they had skilled or had discovered new and revolutionary methods, it is not easy to trace the usually unrecorded success of those quietly mining in orthodox ways. The reason why most mines failed, on all goldfields, was not because of lack of skill but because of lack of payable ore, which meant that in one sense the level of skill was irrelevant. Men such as McCombie and Walker were genuinely competent, but were also lucky to manage mines that contained good ore. Even the most skilled and well-trained miner could not

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<sup>237</sup> Te Aroha Warden's Court, Register of Te Aroha Claims 1880-1888, folio 182, BBAV 11567/1a, ANZ-A; H.P. Hornibrook to James Mills, 12 May 1885, Mines Department, MD 1, 85/1072; H.P. Hornibrook to Minister of Mines, 19 November 1887, Mines Department, MD 1, 92/116, ANZ-W; Thames School of Mines, Assay Book 1886-1887, four entries for H.P. Hornibrook, n.d., no pagination, School of Mines Archives, Thames.

<sup>238</sup> See Mines Department, MD 1, 92/116, 95/132, 95/133, ANZ-W; *Observer*, 17 December 1898, p. 6; *New Zealand Herald*, 21 April 1919, p. 6; *Coromandel County News*, 13 December 1901, p. 3, 25 April 1919, p. 2; *Cyclopedia of New Zealand*, vol. 2, pp. 489-490; J.F. Downey, *Gold-Mines of the Hauraki District, New Zealand* (Wellington, 1935), pp. 29, 65.

<sup>239</sup> See *Cyclopedia of New Zealand*, vol. 2, pp. 129, 398-399.

<sup>240</sup> *Mining Standard and Financial News*, 18 September 1896, p. 7.

<sup>241</sup> *Observer*, 17 December 1898, p. 6; letter from H.P. Hornibrook, *Auckland Weekly News*, 15 June 1900, p. 38.

<sup>242</sup> Letters from H.P. Hornibrook, *Auckland Weekly News*, 30 June 1899, pp. 13-14, 15 June 1900, p. 38; interview with H.P. Hornibrook, *Auckland Weekly News*, 11 January 1901, p. 24.

<sup>243</sup> *Observer*, 10 May 1919, p. 4.

overcome low grade ore, and they could not be certain, at a time when diamond drilling was rare, how long the payable values would last. Skills in mining techniques were needed in addition to those of understanding what minerals were contained in the reefs, as had been recognised in other countries. Schools of Mines had opened in the United States of America in the 1860s and in the following decade in Australia, where universities also trained engineers and scientists to work in mines.<sup>244</sup> John Howell, once in charge of the Waiorongomai battery for the Te Aroha Silver and Gold Mining Company,<sup>245</sup> when general manager of the Broken Hill Proprietary in 1893 stated that, from his personal experience, ‘the want of practical and scientific knowledge in the management of mines, and the treatment of ores, has caused more failures, and surrounded mining enterprise with more doubt and distrust, than all other causes put together’.<sup>246</sup>

The author of an 1888 handbook of Hauraki mining wrote that as

until three years ago no steps had been taken to educate the mining community, it is not at all surprising that most of the diggers on the goldfield searched for nothing else than gold, and in testing a reef by the rough and ready method of crushing a few pieces and panning off. If no prospect of gold appeared round the edge of the dish, the reef was abandoned and looked upon as worthless.<sup>247</sup>

In 1884, the *Te Aroha News* described most of the country at Waiorongomai as being ‘strong, irregularly stratified “shooting” ground, and to break it to advantage the highest technical knowledge is required’.<sup>248</sup> In May the following year, a deputation of mine managers asked the minister to provide the same lectures for local miners that were given by Professor James Gow Black in the South Island.<sup>249</sup> Black, Professor of Chemistry, Metallurgy and Assaying at the University of Otago and School of Mines,

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<sup>244</sup> Blainey, p. 253; for details of Schools of Mines in Australia, see Jan Todd, *Colonial Technology: Science and the transfer of innovation to Australia* (Cambridge, 1995), pp. 184-201.

<sup>245</sup> See paper on this company.

<sup>246</sup> Blainey, pp. 253-254.

<sup>247</sup> Thomas M. Humphreys, *Handbook of the Auckland Goldfields, New Zealand* (Auckland, 1888), p. 24.

<sup>248</sup> Editorial, *Te Aroha News*, 12 January 1884, p. 2.

<sup>249</sup> *Te Aroha News*, 30 May 1885, p. 7.

was a leading force in the formation of schools of mines throughout New Zealand.<sup>250</sup> In August, James Mills, a carpenter who was to be the first mayor of Te Aroha,<sup>251</sup> and who at that time held interests in two Waiorongomai claims,<sup>252</sup> wanted debates at Te Aroha on geology and battery methods:

Perhaps they would be able to establish a branch mining school in a small way.... Perhaps they would be able to erect a small furnace, and provide blow pipes, etc, so that they can experiment and test their quartz. If such had been done during the last few years, no doubt much valuable information would have resulted.<sup>253</sup>

One week later, it was announced that the Social Club and Debating Society would hold 'lectures and mutual assistance in useful knowledge such as Mechanics, Mineralogy, Chemistry and other sciences'.<sup>254</sup> The following month, Alexander McKay, who was helping to install the new process in Ferguson's battery, demonstrated methods of testing silver ore to a small gathering of the debating club.<sup>255</sup> Reflecting the awakened desire for scientific knowledge, in December one Waiorongomai miner asked how to obtain *Mining and Scientific Press*, an American publication.<sup>256</sup>

In August 1885, 'the popular excitement' at Te Aroha was searching for silver:

The indications of silver are as yet very little understood, as few of our miners claim to be experts in working silver lodes.... In lieu of the old-fashioned custom of spitting on stone to show its value as a gold specimen, our silver prospectors adopt the method of

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<sup>250</sup> See *Cyclopedia of New Zealand*, vol. 4 (Christchurch, 1905), p. 154; A.G. Hocken, *Geology at the University of Otago: The first hundred years* (Dunedin, 2003), pp. 13-15; S.H. Jenkinson, *New Zealanders and Science* (Wellington, 1940), pp. 84-87; Elaine E. Bolitho, *Reefton School of Mines 1886-1970: Stories of Jim Bolitho* (Reefton, 1999), pp. 33-37.

<sup>251</sup> See paper on his life.

<sup>252</sup> Te Aroha Warden's Court, Register of Licensed Holdings 1881-1887, folio 28, BBAV 11500/9a; Register of Te Aroha Claims 1880-1888, folio 324, BBAV 11567/1a, ANZ-A.

<sup>253</sup> *Te Aroha News*, 8 August 1885, p. 7.

<sup>254</sup> *Te Aroha News*, 15 August 1885, p. 2.

<sup>255</sup> *Te Aroha News*, 19 September 1885, p. 2.

<sup>256</sup> *Auckland Weekly News*, 2 January 1886, p. 15.

comparing portions of their lodes with silver procured from Karangahake.<sup>257</sup>

The following month, a reporter wrote about the formation of the Rosemont Company at Waihi to work a new ore body that was permeated with dark bands and veins of sulphide and chloride of silver. 'It was very amusing yesterday to see the puzzled expression on the faces of a number of well-known miners, who had only been accustomed to look and judge golden stone. One remarked, "If that is silver, then I have more to learn than I ever dreamt of"'.<sup>258</sup> According to a correspondent, the population of Karangahake went 'silver-mad' during that year, without the necessary skills to turn their enthusiasm to advantage. 'Amateur assayers gave returns of thousands of ounces to the ton, [and] claims were pegged out that were rich in road metal'.<sup>259</sup> Then, in September, Clem Cornes discovered gold and silver ore in the Tui saddle,<sup>260</sup> starting a new rush.<sup>261</sup>

In November and December, Black gave classes at Thames, Karangahake, Te Aroha, Waiorongomai, Tapu, and Coromandel, assisted by four others. Alexander Montgomery, a graduate of both these institutions, had assisted Black for two years in the chemistry classes at the university. Thomas Frederick Fenton had formerly been a mine and battery manager who, after mining at Waiorongomai,<sup>262</sup> especially in the Eureka,<sup>263</sup> had done a year's study at the same institutions, and would in following years lecture at the Reefton School of Mines.<sup>264</sup> Victor McLymont was a student and assistant in Black's chemistry classes, and William Goodlet was his laboratory assistant.<sup>265</sup> When Black showed samples of the different ores,

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<sup>257</sup> Te Aroha Correspondent, *Thames Advertiser*, 25 August 1885, p. 3.

<sup>258</sup> *New Zealand Herald*, 12 September 1885, p. 5.

<sup>259</sup> Own Correspondent, 'Ohinemuri Goldfield', *Waikato Times*, 9 January 1886, p. 3.

<sup>260</sup> Te Aroha Correspondent, *Thames Advertiser*, 25 September 1885, p. 3.

<sup>261</sup> See papers on Clement Augustus Cornes, and the Tui district.

<sup>262</sup> Te Aroha Warden's Court, Register of Licensed Holdings 1881-1887, folios 14, 26, 39, 76-78, BBAV 11500/9a, ANZ-A; *New Zealand Gazette*, 23 March 1882, p. 490, 27 April 1882, p. 647, 18 May 1882, p. 728, 22 June 1882, p. 895, 17 August 1882, p. 1132, 19 October 1882, p. 1522; note also *Te Aroha News*, 17 November 1883, p. 3.

<sup>263</sup> See paper on this claim.

<sup>264</sup> *The Handbook of New Zealand Mines* (Wellington, 1887), Appendix, p. 4.

<sup>265</sup> *Handbook of New Zealand Mines*, Appendix, pp. 3-4.

the diggers set to work to pick up the new knowledge with an energy which was astonishing. The most enthusiastic of all the audiences at Professor Black's lectures assembled in the furnace house at Karangahake, and numbers of men walked many miles, and so large was the attendance that many had to climb up to the beams of the roof to find a resting place in hearing distance of the Professor, who delighted as well as instructed his most eager and attentive audience.

Experienced prospectors then went out on what they facetiously called the 'silver racket' searching for the ore they had previously failed to recognize.<sup>266</sup> An Ohinemuri correspondent wrote that 'quartz-miners as a rule have very little faith in geology or geologists', but they were interested in Black's talks because he explained how to find silver, 'of which they know little or nothing'.<sup>267</sup> Another Ohinemuri correspondent described Black as

an old man with a face full of solemn humour, and a heathery accent, that bespoke Northern Britain and Southern New Zealand. He came, was seen and conquered. The miner took to him as his affinity.... The miner ... says, "Don't talk to me of science and geology, I want to know something about mining," and so Black drops the shop and talks to the miner in his own dialect, using such quaint word pictures and homely similes as the digger delighteth in. The result of the professor's visit was that miners who previously had but considered the word "science" in its relation to the noble art of self-defence were able to talk glibly of bases and salts and back up their ipse dixits ['dogmatic statement resting on bare authority']<sup>268</sup> by blow pipe and chemical tests reduced to the hieroglyphic symbols that the chemists pop up. In a word Professor Black was the right man in the right place. He proved without doubt that precious metal existed in payable quantity on the field, and he showed the digger how to use his brains in connection with the prospecting dish in finding out where the metal was.<sup>269</sup>

Warden Kenrick noted that Black's 'happy manner of imparting information, simplifying science so as to bring it within the comprehension of all, aroused the deepest possible interest, amounting to enthusiasm, amongst crowds of eager listeners and learners from Te Aroha to

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<sup>266</sup> Humphreys, p. 24.

<sup>267</sup> Own Correspondent, 'Ohinemuri Goldfield', *Thames Advertiser*, 21 November 1885, p. 3.

<sup>268</sup> *Concise Oxford Dictionary of Current English*, 5 ed. (Oxford, 1964), p. 642.

<sup>269</sup> Own Correspondent, 'Ohinemuri Goldfield', *Waikato Times*, 9 January 1886, p. 3.

Coromandel'. He agreed with George Wilson that discoveries of new ore at Tui and elsewhere were due largely to the 'intelligent interest awakened and information imparted' by Black. Miners had been 'thrust out of the groove they have been content to work in during the past. Stone that would have gone over the mullock-tip is now carefully examined before being thrown aside'.<sup>270</sup>

Classes were given at Te Aroha and Waiorongomai over six days.<sup>271</sup> Black gave two lectures at Waiorongomai, attended by 150 people, and one at Te Aroha, attended by 120, and Montgomery gave one at Waiorongomai and two at Te Aroha, the average attendance, as elsewhere, being from 90 to 150. Black, McLymont, and Goodlet gave two testing classes at Waiorongomai and one at Te Aroha, up to 150 attending at both places. Montgomery gave classes on 'Testing and Blowpipe' to from 30 to 60 in one class at Waiorongomai and two at Te Aroha, and Fenton's classes on assaying attracted from 30 to 90 to two classes at Waiorongomai and from 30 to 100 at one at Te Aroha.<sup>272</sup> At Montgomery's lecture series in the Waiorongomai hall, 'the audience was composed chiefly of miners, of whom a goodly number were present, and the lecturer was listened to throughout with much attention'.<sup>273</sup>

Black informed the minister that Montgomery and McLymont had conducted testing and blowpipe classes for three days before he arrived at Waiorongomai and Te Aroha. 'At Waiorongomai I delivered two lectures to an audience of about 150 men; and with Messrs Montgomery and McLymont conducted a testing class for two hours each evening, Mr Fenton meantime carrying on his assaying operations on the blacksmith's forge during the day'. After his Te Aroha lecture, Black 'showed for two hours in the evening the process for testing metallic ores. The attendance was large and, as usual, eagerly attentive', but 'little could be done with so large a subject in the course of one day'. Most of the audience came from Waiorongomai.<sup>274</sup> Black's Te Aroha lectures attracted a 'very large' attendance, and were 'greatly appreciated, as was evinced by the frequent

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<sup>270</sup> George Wilson to Harry Kenrick, 10 April 1886, *AJHR*, 1886, C-4A, p. 6; Harry Kenrick to Under-Secretary, Mines Department, 24 April 1886, *AJHR*, 1886, C-4A, p. 4.

<sup>271</sup> J.G. Black to Minister of Mines, 24 May 1886, *AJHR*, 1886, C-4B, p. 1.

<sup>272</sup> *AJHR*, 1886, C-4B, p. 3.

<sup>273</sup> *Waikato Times*, 3 December 1885, p. 2.

<sup>274</sup> J.G. Black to Minister of Mines, 24 May 1886, *AJHR*, 1886, C-4B, p. 7.

and hearty applause'.<sup>275</sup> The local newspaper gave a detailed summary of Montgomery's lectures on how to detect minerals and of Black's explanations of how quartz reefs were formed.<sup>276</sup> For three hours on the Saturday afternoon and two in the evening, all four men used the Te Aroha hall for 'experimenting and giving instruction respecting the liquid and fire assay tests for ores, to a most appreciative audience.... In the evening the hall was crowded, representatives being present from all the surrounding districts'. At 9 o'clock, a lecture on 'the roasting process in the extraction of gold' was delivered.<sup>277</sup> Whilst in the district, Black visited the principal mines, and at the new Tui field 'Cornes and the other members of the party were of course intensely interested in the simple tests' by which the metals in the complex ores could be distinguished.<sup>278</sup>

Montgomery taught miners how to use a blowpipe, the different kinds of flames used, and how to blow beads 'in the loop of a platinum wire, from the powdered ores of different metals, showing them how to identify the metal from the colour of the bead with the various fluxes'. He also showed them how to heat metallic compounds and fluxes 'in dry glass tubes and on charcoal, and showed them how to distinguish the substance under trial by the results obtained'. Fenton assayed gold, silver, lead and tin:

In Mr Fenton's classes, as in all the others, the men themselves took a practical part in the work. He had them engaged in grinding and sifting the ores, weighing them, weighing out the proper fluxes for the different kinds of ore, mixing the fluxes with the ground ore, charging the crucibles, heating them in the melting-furnace to the required temperature and for the proper time, pouring out the molten metal into the ingot-moulds, detaching the slag, hammering and cupelling the resultant buttons of metal, weighing the bullion, and finally separating the silver from the gold, washing, drying, and weighing the latter, and calculating the results.

Black and his assistants showed how to test for metals in solution, and the various methods of analysing ore. 'When the stone contained ... more than one metal the processes for identifying these in each other's presence were gone through'. Black lectured on the formation of gold-bearing quartz

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<sup>275</sup> *Te Aroha News*, 5 December 1885, p. 2.

<sup>276</sup> *Te Aroha News*, 5 December 1885, pp. 2, 7.

<sup>277</sup> *Te Aroha News*, 12 December 1885, p. 2.

<sup>278</sup> J.G. Black to Minister of Mines, 24 May 1886, *AJHR*, 1886, C-4B, p. 8.

reefs and methods of testing stone and treating both royal and base metals. At every place Black visited, the testing of ore attracted an increasing attendance:

The men are not only most intelligent and very well-informed - in many cases, on subjects altogether outside their own pursuits - but are, as a rule, to which I have not found any exceptions, of a genial, straightforward, and kindly disposition, which makes it a positive pleasure in having any dealings with them.

He was 'often astonished at the patience with which the miners would sit for three or four or sometimes five hours' listening to his lectures. 'They were always freely illustrated by experiments; but it was not evidently these, but their intelligent interest in the subject ... and their ability to follow it clearly in all its essential details, that kept the men on their seats to its close'. The miners provided 'a practical, well-informed, very particular, and very critical audience'.<sup>279</sup>

Black's examination of the Tui ores reinforced his belief that a School of Mines was needed to provide miners with the education needed for successful mining:

It is the abundance of such complex minerals on the whole of the Coromandel Peninsula that makes the establishment of a thorough-going and properly-equipped school of mines so great a necessity on the Thames. Without some technical instruction in the methods of testing these minerals, and of extracting the useful metals from them, the miners and prospectors are working in the dark, as the metals cannot be seen by the naked eye and cannot be saved by the usual battery processes....

It would be one of the chief functions of a colonial school of mines to investigate the character and composition of our gold- and silver-bearing stone and other valuable minerals; to procure and disseminate among those concerned the most recent information about their treatment elsewhere; and to guide the miner in the application of sound and scientific principles in their development and metallurgy. There will thus be saved to the colony the useless expenditure of much money and a great deal of energy in hopeless directions, and the country will be in a position to profit by whatever mineral wealth our mountains contain.<sup>280</sup>

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<sup>279</sup> J.G. Black to Minister of Mines, 24 May 1886, *AJHR*, 1886, C-4B, pp. 6-7.

<sup>280</sup> J.G. Black to Minister of Mines, 24 May 1886, *AJHR*, 1886, C-4B, p. 8.

When visiting Waihi, Karangahake, and Waiorongomai, he was 'strongly impressed with the necessity of getting for the miners of these silver-bearing districts early and reliable information about the details of the various processes now in use in ... silver-producing regions of North America'.<sup>281</sup>

In late November, after one of Black's Thames lectures, a public meeting at which the first speaker was Kenrick agreed to form a school of mines.<sup>282</sup> After Black visited Waiorongomai and Te Aroha, miners there elected 'a local joint committee to co-operate with the Thames central committee in their efforts to form a strong comprehensive school of mines for the Hauraki'.<sup>283</sup> Interest in the concept of such a school had existed even before his visit. After his lectures at Karangahake in November, one of the leading Waiorongomai mine managers, Gavin, 'in an admirable speech' proposed that the residents of Karangahake form themselves into a branch of the school.<sup>284</sup> Immediately after the subsequent lectures at Te Aroha and Waiorongomai, there was considerable interest in forming a school. Names were 'being daily added to the list of members', which was 'sufficiently large to form a strong branch'. When residents learnt that each mining centre would benefit, not just Thames, 'the popularity of the institute increased amazingly'. A Te Aroha correspondent believed that having branches utilizing the same teachers had 'imparted to the movement a vast amount of strength' and would 'add immensely to its usefulness'. He believed that 'a new era in the mining industry' was about to start 'for the fuller development of the mineral resources' of the districts in which schools were established.<sup>285</sup> The *Te Aroha News* hoped that 'every resident in the district' and especially every miner would enrol.<sup>286</sup> After Black's Saturday night lecture at Te Aroha, Kenrick spoke in support of forming the school, and suggested the names of Peter Ferguson,<sup>287</sup> Henry Hopper Adams,<sup>288</sup> and George Wilson as three of the four representatives of the district on the provisional committee. John Allan Dobson, a former mine manager at

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<sup>281</sup> J.G. Black to Minister of Mines, 24 May 1886, *AJHR*, 1886, C-4B, p. 16.

<sup>282</sup> *Thames Advertiser*, 21 November 1885, p. 3.

<sup>283</sup> J.G. Black to Minister of Mines, 24 May 1886, *AJHR*, 1886, C-4B, p. 7.

<sup>284</sup> *Thames Advertiser*, 27 November 1885, p. 3.

<sup>285</sup> Te Aroha Correspondent, *Waikato Times*, 17 December 1885, p. 2.

<sup>286</sup> Editorial, *Te Aroha News*, 12 December 1885, p. 2.

<sup>287</sup> See paper on his Peter Ferguson and his New Era.

<sup>288</sup> See paper on his life.

Coromandel,<sup>289</sup> and owner or part owner of five claims in the district,<sup>290</sup> became the fourth member, and the motion to establish the school was 'carried with acclamation'.<sup>291</sup> Black informed the minister that, to establish a permanent school of mines at Thames,

a powerful organization was formed, with a strong committee, on which every district from Coromandel to Waiorongomai is represented. They succeeded in raising in three weeks by subscription upwards of £500, which they are devoting to the erection of lecture-rooms, laboratory, and museum, on a site which they have purchased. The membership of the school now reaches the splendid number of 507, at an annual subscription of 10s each.

There were 44 members at Te Aroha and 43 at Waiorongomai; Thames had 301, Coromandel 66, Karangahake 38, and Waihi 15.<sup>292</sup>

In its first editorial for 1886, the *Te Aroha News* urged miners to study how to recognize minerals to enable them to make valuable discoveries. Miners 'should be acquainted with such tests that shall enable them to take a piece of ore and prove for themselves its contents and value'. It 'hoped the time will soon have gone by when a miner could carry about a piece of silver ore for weeks in his pocket, not knowing what it was, because it was not gold'.<sup>293</sup> In early 1886, Montgomery toured the mining districts again, in May being at Waiorongomai and Te Aroha, where he spent ten days at each place instructing miners in practical chemistry and assaying.<sup>294</sup> His annual report stated that when at Waiorongomai he taught

the use of the blowpipe and wet tests for recognizing various minerals, and also the methods of making quantitative fire-assays

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<sup>289</sup> Robert Somerville to J.A. Dobson, 1 November 1875, Mines Department, MD 1, 96/53; J.A. Dobson to Minister of Mines, 20 May 1891, Mines Department, MD 1, 91/447, ANZ-W; *Coromandel Mail*, 19 March 1881, p. 5, 2 April 1881, p. 5.

<sup>290</sup> Te Aroha Warden's Court, Register of Te Aroha Claims 1880-1888, folios 317, 326, 326, BBAV 11567/1a; Register of Licensed Holdings 1881-1887, folios 192, 193, BBAV 11500/9a, ANZ-A; *Handbook of New Zealand Mining*, p. 341; note *Te Aroha News*, 6 December 1884, p. 2.

<sup>291</sup> *Te Aroha News*, 12 December 1885, p. 2.

<sup>292</sup> J.G. Black to Minister of Mines, 7 June 1886, *AJHR*, 1886, C-4B, p. 17.

<sup>293</sup> Editorial, *Te Aroha News*, 2 January 1886, p. 2.

<sup>294</sup> A. Montgomery to J.G. Black, 17 May 1886, *AJHR*, 1886, C-4B, p. 21.

of gold- and silver-bearing quartz. The classes for instruction were held in the evening, while practice in assaying was carried on all day. There was a good attendance, averaging thirteen, nearly all miners.

An average of 22 attended each day when this teaching was repeated at Te Aroha.<sup>295</sup> A correspondent agreed that the Waiorongomai lectures were well attended, and wrote that they were, 'from interest taken in the subject, highly appreciated'. Montgomery was 'an excellent instructor and his discourses on metals and metalliferous ores and the various methods of testing them cannot fail to be productive of a large amount of good'.<sup>296</sup> An abandoned store was used for the lectures, and in addition to those attending full-time others dropped in during the day, several bringing ore to be tested. That the store and not the public hall was used caused an odd reaction, the *Te Aroha News* reporting that 'a furtive attempt, almost amounting to "boycotting," has been made to end all the good work, by some who, from their position, ought to know better'. The implication of this statement was that some mine managers were involved. Whoever the unnamed people were, they were 'using their influence and power to deter from attending the classes some who would otherwise gladly go'. These oppositionists 'from the first have shown an antipathy to the movement', and had succeeded in preventing a larger attendance.<sup>297</sup> At Te Aroha, an auction mart was used for teaching practical assaying. From 20 to 30 attended each evening, and a much smaller number was present during the day.<sup>298</sup> By comparison, 16 attended at Karangahake, 14 at Waihi, and 20 at Coromandel; the highest attendance at any class at Thames was 17.<sup>299</sup>

After Montgomery's 1886 tour of mining districts, the committee of the Thames School of Mines decided that he should confine his work to Thames because of the 'futility of short trips to the out-districts unless the work could be carried on in them between times'. As there were no funds available to establish small laboratories in these places,<sup>300</sup> this continued tuition was not possible. The *Te Aroha News* called for a government

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<sup>295</sup> A. Montgomery to Minister of Mines, 19 April 1887, *AJHR*, 1887, C-9, p. 1.

<sup>296</sup> Te Aroha Correspondent, *Waikato Times*, 3 June 1886, p. 3.

<sup>297</sup> *Te Aroha News*, 22 May 1886, p. 2.

<sup>298</sup> *Te Aroha News*, 5 June 1886, p. 2.

<sup>299</sup> *Te Aroha News*, 6 February 1887, p. 2.

<sup>300</sup> A. Montgomery to Minister of Mines, 19 April 1887, *AJHR*, 1887, C-9, p. 1.

subsidy to establish small laboratories at each mining centre, with local committees conducting classes between the annual visits,<sup>301</sup> but this did not eventuate. The desire for a school at Waiorongomai resurfaced in 1897, when ‘a man in need of a billet’ was ‘strongly advocating the establishment of a School of Mines’ there.<sup>302</sup>

The practical value of this education was quickly seen. In 1889, Montgomery reported that some of his students from the Thames School of Mines were employed at reduction works at Waiorongomai and elsewhere. They had ‘given satisfaction to their employers, although none of them had been long enough at the class to go through anything like the whole course of study’.<sup>303</sup> In later years, this school won many plaudits for successfully training miners and battery hands.<sup>304</sup> Despite this, there continued to be concern that it and its equivalents turned out potential mine managers with theoretical knowledge but insufficient practical experience.<sup>305</sup>

#### INVENTIONS TO AID THE MINING INDUSTRY

One feature of the Te Aroha mining community, as with others, was the number of residents, including many non-miners, who invented new techniques or machinery for treating ore. Some of these people are noted in the case studies of them or their mines and companies: notably members of the Firth family, Lockwood, Campbell, Adams, Ferguson, and Hardy. Most of the inventions were modifications of existing ideas, although Edmund Healy came up with the ultimate machine. A bushman and labourer who did some mining and was briefly a shareholder in one Waiorongomai mine,<sup>306</sup> in 1884 he wrote to the ‘Answers to Correspondents’ column in the *Auckland Weekly News* under the pseudonym ‘Perpetual Motion’. He cannot have been pleased with the reply:

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<sup>301</sup> *Te Aroha News*, 5 June 1886, p. 2.

<sup>302</sup> *Ohinemuri Gazette*, 9 June 1897, p. 3.

<sup>303</sup> H.A. Gordon to Under-Secretary, Mines Department, 8 June 1889, *AJHR*, 1889, C-2, p. 18.

<sup>304</sup> For example, Special Correspondent, *Auckland Weekly News*, 26 October 1895, p. 28; poem in *Thames Star*, 14 February 1896, p. 2.

<sup>305</sup> For example, letters in *New Zealand Herald*, 12 May 1891, p. 3, 30 December 1907, p. 7.

<sup>306</sup> See Te Aroha Warden’s Court, Register of Te Aroha Claims 1880-1888, folio 280, BBAV 11567/1a, ANZ-A; *Waikato Times*, 29 April 1880, p. 3; *Thames Advertiser*, 8 January 1897, p. 2.

“1. I can make a machine put it in motion, it will keep in motion as long as the parts (steel) hold together without any motor but its own. Would you call it a perpetual motion machine? 2. What would be the probable money value of such an invention?”- 1. We had thought that the schoolmaster had sufficiently done his work towards the end of the nineteenth century to have driven all idea of making a self-acting perpetual motion machine out of every sensible person’s head. Our correspondent may take it as a fact that no effective force can be employed without the expenditure of an equivalent of energy in some form. The law of conservation of force is sufficiently familiar to most engineers now-a-days to prevent any repetition of the delusions of the past respecting perpetual motion. 2. The money value of a perpetual motion invention would be absolutely nothing. The history of mechanics teems with such absurdities.<sup>307</sup>

Undaunted, in 1886 Healy asked Price Bros of Thames to construct his ‘self creating motor’. The firm more diplomatically claimed to be ‘sorry that we cannot make you an offer to hold out any inducement in the matter of carrying it out. You have found what should be an immense fortune to you, should your Statement be correct’.<sup>308</sup> Nothing further was heard of this invention, Healy being wise enough not to reveal it to a disbelieving world. The same fate happened to most of the other local inventions, despite their desirability. One proposal that, if it had worked, would have been a great boon, was made by Thomas Williams, part owner of two claims and newly appointed mine manager for the Canadian Company:<sup>309</sup>

As we get further in with the drive it will be necessary for me to make a fanner at the mouth of the drive to carry air into the face to drive out the dynamite fumes, which are very injurious to the working men, and under existing circumstances are the cause of a great loss of time, the men having to wait for a quarter of an hour for the smoke to clear out of the drive. I have been thinking of carrying the air into the face with a tarred canvas hose hung on wooden plugs driven into the side of the drive, and using a length of iron pipe where the shots are likely to affect it; and as soon as the shot is fired the men, instead of waiting, turn the handle of

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<sup>307</sup> ‘Answers to Correspondents’, *Auckland Weekly News*, 29 March 1884, p. 15.

<sup>308</sup> John Watson to Edmund Healy, 3 March 1886, Letterbook 1885-1886, p. 339, A. & G. Price Archives, Thames.

<sup>309</sup> Te Aroha Warden’s Court, Register of Licensed Holdings 1881-1887, folios 132, 143, BBAV 11500/9a, ANZ-A; *Te Aroha News*, 6 October 1883, p. 3.

the fanner and clear the smoke out immediately. I have not seen anything of this kind at work here, but am confident that it will work well, and give good ventilation, which is necessary, and the expense will not be great, and will soon pay for itself in the extra amount of work that will be done in the time now spent in waiting about.<sup>310</sup>

No more was heard of this precursor of the compressed air later used for ventilation, and it was unlikely that a hand-operated pump would have been able to force sufficient air down a long air pipe to be effective. Had this operated, it would probably have been reported as an example of local initiative; the silence of all the newspapers suggests that it never got beyond the concept stage. Another concept that never got beyond that stage was mine manager Edward Kersey Cooper's plan 'in connection with self-acting wire trams, by which all claims through which trams pass can make use of it. The wear and tear is next to nothing. The motive power used is the quartz. Cost of plant small, and the carriage a little over the labour of filling boxes'.<sup>311</sup> This modification was never patented.

John James Broadbent, who was legal manager of the Thames Lead and Silver mine on the eastern side of the Tui saddle in the 1890s,<sup>312</sup> was an analytical chemist.<sup>313</sup> In 1886, he applied for a patent for 'an Invention for the Production of Hydrogen and Carbonic Oxide by injecting Steam into Red-hot Charcoal or other Carbonaceous Matter, to be called "Broadbent's Patent Gas-producer"'.<sup>314</sup> He was an example of the majority of inventors, who only had one idea that they refined to the point when a patent was sought. He was also an example of how these inventions, once patented, were neither produced nor ever heard of again. One mining engineer working briefly at Waiorongomai in 1898, Jonathon Harrison, invented 'improvements in roasting and drying quartz and other mineral ores',<sup>315</sup> but this was one of hundreds of such alleged improvements, and disappeared without trace.

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<sup>310</sup> *New Zealand Herald*, 22 November 1883, p. 6.

<sup>311</sup> *Te Aroha News*, 8 September 1883, p. 2.

<sup>312</sup> *Thames Advertiser*, 27 April 1893, p. 2; *New Zealand Gazette*, 19 April 1894, pp. 621, 623; Te Aroha Warden's Court, Mining Applications 1895, 21, 69/1895, BBAV 11582/4a, ANZ-A.

<sup>313</sup> *Te Aroha News*, 11 December 1889, p. 4; Probates, BBAE 1569/18618, ANZ-A.

<sup>314</sup> *New Zealand Gazette*, 9 September 1886, p. 1101.

<sup>315</sup> *New Zealand Gazette*, 8 December 1898, p. 1975.

Andrew Tait Walker Allan obtained a great deal of publicity for his main invention through his association with a newspaper proprietor who stood to gain by its sale. Allan prospected and managed mines at Te Aroha in the late 1890s,<sup>316</sup> and first revealed his inventive abilities in March 1904, when living at Thames. In that month, he applied for a patent for an ‘improved gold-saving apparatus’.<sup>317</sup> That his interests were not restricted to gold was revealed in the following year, when specifications were accepted for a patent of ‘an improved iron standard and picket for either barbed or plain wire fencing’.<sup>318</sup> A year later, he applied for a patent for ‘an improved chimney top’,<sup>319</sup> as well as for a gas burner.<sup>320</sup> The patent for his most important invention was lodged both in his name and that of William McCullough, proprietor of the *Thames Star*.<sup>321</sup> In September 1905, provisional specifications were accepted for ‘improved portable tables plates and slides for saving gold from crushed ores or sands’, and the patent was sealed in December the following year.<sup>322</sup>

As early as February 1905, details were given in the *Thames Star* of the improvements he had made in his gold saver. This ‘clever’ invention ‘should soon be in good demand. For the black auriferous sands of the West Coast and the gold bearing sands of Waikara and other districts and beaches the use of the saver should be attended with most satisfactory results’.<sup>323</sup> A year later, the same newspaper reported that it had ‘undergone some difficult tests’ successfully. It was so cheap and effective that ‘wash dirt averaging 1dwt to the ton’ could be treated profitably. One of the improved versions was to be used on the West Coast, while the other was displayed in the International Exhibition in Christchurch.<sup>324</sup> ‘Allan’s Gold Saver’ was explained in detail two days later, with the claim that it

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<sup>316</sup> For example, Te Aroha Warden’s Court, Mining Applications 1898, 3, 12/1898, BBAV 11582/4a, ANZ-A; *Waikato Argus*, 5 June 1897, p. 3; *Te Aroha News*, n.d., reprinted in *Thames Advertiser*, 16 January 1899, p. 3.

<sup>317</sup> *New Zealand Gazette*, 18 March 1904, p. 883.

<sup>318</sup> Patent Office, Register of Patents 1902-1905, p. 473, PC 10/18, ANZ-W.

<sup>319</sup> Patent Office, Register of Patents 1905-1906, p. 290, no. 20781, PC 10/19, ANZ-W.

<sup>320</sup> *Waihi Daily Telegraph*, 26 November 1906, p. 2.

<sup>321</sup> See *Cyclopedia of New Zealand*, vol. 2, p. 96; *Ohinemuri Gazette*, 22 October 1892, p. 3; *Observer*, 1 August 1925, p. 4.

<sup>322</sup> Patent Office, Register of Patents 1905-1906, p. 127, no. 20115, PC 10/19, ANZ-W.

<sup>323</sup> *Thames Star*, 4 February 1905, p. 1.

<sup>324</sup> *Thames Star*, 10 March 1906, p. 2.

could treat the gold-bearing sands in the ‘excellent alluvial prospects’ at Waiorongomai,<sup>325</sup> and in mid-1906 details were given of how it would be tested in the Success mine at Te Aroha.<sup>326</sup> One month later, the newspaper reported ‘most satisfactory results’ from this trial, which Allan had supervised; had exceeded his expectations.<sup>327</sup> In October, it was displayed in Thames before going to the exhibition. Under the headline ‘A Splendid Machine’, it was claimed that there was ‘no doubt that for the saving of the gold in the black sands of the South Island’ it would be superior to any similar machine because it saved a much higher percentage of gold. Allan had ‘already achieved more than a local reputation as an inventor’.<sup>328</sup> Two months later, he sought permission to work his machine in a claim on the Moanataiari Creek at Thames.<sup>329</sup>

Allan continued to improve his invention, in December 1908 having complete specifications accepted for a patent he sought with an Auckland contractor for ‘an improved portable roller mill for the treatment of tailings, gold bearing sand and the like’.<sup>330</sup> His last patents were granted in 1912: for a gold-saving table and, revealing again his wider inventive interests, a combination cradle and perambulator.<sup>331</sup> As his inventions did not bring him any money, during the First World War he prospected in the Hikurangi district, near Whangarei. He had been a drunkard for years,<sup>332</sup> and during another drinking bout lasting several weeks he fell into a river and drowned, aged 55.<sup>333</sup>

The most useful and successful invention devised at Waiorongomai for miners, a pick, was made by a blacksmith, David McLean Wallace.<sup>334</sup>

Not only miners or skilled craftsmen invented new devices for mines or batteries. John Featon, who lived at Te Aroha from 1896-1907,<sup>335</sup> was a

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<sup>325</sup> *Thames Star*, 12 March 1906, p. 2.

<sup>326</sup> *Thames Star*, 12 June 1906, p. 2.

<sup>327</sup> *Thames Star*, 13 July 1906, p. 2.

<sup>328</sup> *Thames Star*, 13 October 1906, p. 2.

<sup>329</sup> Thames Warden’s Court, Mining Applications 1906, 261/1906, BACL 14350/53a, ANZ-A.

<sup>330</sup> Patent Office, Register of Patents 1906-1908, p. 448, no. 25370, PC 10/20, ANZ-W.

<sup>331</sup> *AJHR*, 1912, H-10, p. 18.

<sup>332</sup> See Thames Resident Magistrate’s Court, Criminal Cases 1903-1906, 84, 85/1905, BACL 13736/5a; Criminal Cases 1906-1908, 300/1906, BACL 13736/6a, ANZ-A.

<sup>333</sup> Death Certificate of Andrew Tait Walker Allan, c. 6 April 1918, 1918/3064, BDM; Inquests, Justice Department, J 46, 1918/620, ANZ-W.

<sup>334</sup> See paper on his life.

publican who became a mining and land agent as well as a historian of the New Zealand wars, in which he had fought.<sup>336</sup> He had shareholdings and directorships in several Hauraki goldfields,<sup>337</sup> participated in the Te Aroha rush,<sup>338</sup> and acquired interests in seven Te Aroha and Waiorongomai claims.<sup>339</sup> In 1893 he sought a patent for ‘the automatic mine-ventilator’.<sup>340</sup>

Joshua Cuff, a solicitor at Te Aroha from 1882 until 1885, invested heavily in Waiorongomai mining.<sup>341</sup> In January 1888, he applied to patent ‘an invention for milling gold-bearing quartz so that no quicksilver need be used in saving the gold; also for doing away with berdans or other unnecessary processes in saving gold, to be called “J. Cuff’s Flour of Quartz Mill and Gold-saving Apparatus”’.<sup>342</sup> At the end of that month, Price Bros

<sup>335</sup> See Te Aroha Warden’s Court, Register of Mining Privileges 1894-1910, folio 75, BBAV 11500/2a; Mining Applications 1900, 1/1900, BBAV 11582/4b; Plaints 1903, 9/1903, BBAV 11572/3a, ANZ-A; *Cyclopedia of New Zealand*, vol. 2, p. 828; *Ohinemuri Electoral Roll, 1899*, p. 36; *Te Aroha News*, 22 February 1900, p. 2, 16 March 1907, p. 2.

<sup>336</sup> See *Auckland Provincial Government Gazette*, 28 July 1867, p. 639; *New Zealand Gazette*, 20 September 1883, p. 1345, 10 December 1885, p. 1436; *Auckland Free Press*, 12 July 1879, p. 2; *Observer*, 18 September 1897, p. 11.

<sup>337</sup> For example, Thames Warden’s Court, Claims Register 1868-1869, nos. 393, 750, BACL 14397/3a; Register of Licensed Holdings 1875-1882, nos. 98, 176, BACL 14397/10a; Register of Applications for Licensed Holdings 1878-1886, folios 75, 116, 135, BACL 14452/1a; *New Zealand Gazette*, 24 October 1895, p. 1704, 12 December 1895, p. 1926, 9 July 1896, p. 1097, 26 November 1896, p. 1992. For directorships, see Company Files, BADZ 5181, box 30 no. 184, box 90 no. 589, ANZ-A.

<sup>338</sup> Te Aroha Warden’s Court, Miner’s Right no. 322, issued 25 November 1880, Miners’ Rights Butt Book 1880, BBAV 11533/1a; Register of Applications 1880-1882, folios 69-70, no. 184, BBAV 11505/3a, ANZ-A; *Waikato Times*, 25 January 1881, p. 2.

<sup>339</sup> Te Aroha Warden’s Court, Complaint Book 1880-1898, 7/1880, BBAV 11547/1a; Register of Te Aroha Claims 1880-1888, folios 84, 202, 208, BBAV 11567/1a; Mining Applications 1896, 20/1896, BBAV 11582/4a; Mining Applications 1900, 1/1900, BBAV 11582/4b; Plaints 1903, 9/1903, BBAV 11572/3a, ANZ-A.

<sup>340</sup> *New Zealand Gazette*, 20 July 1893, p. 1138.

<sup>341</sup> Te Aroha Warden’s Court, Register of Te Aroha Claims 1880-1888, folio 267, BBAV 11567/1a; Register of Licensed Holdings 1881-1887, folios 18, 20, 21, 48, 132, 142, 144, 161, 162, BBAV 11500/9a, ANZ-A; *New Zealand Gazette*, 23 March 1882, p. 490, 27 April 1882, p. 646, 18 October 1883, p. 1518, 29 November 1883, p. 1703.

<sup>342</sup> *New Zealand Gazette*, 12 January 1888, p. 51.

declined to make his Flour of Quartz Mill ‘for the terms offered’.<sup>343</sup> Early in March, the Thames Harbour Board considered his letter stating that ‘he had invented a simple method of extracting gold from ordinary battery tailings, and that he was anxious if possible to obtain the right to use so much of the beach tailings at the Thames as he could use with his tailings machines’. Although permitted to lease portions of the foreshore,<sup>344</sup> he did not take up a lease. Later that month he wrote to Edwin Mitchelson, the Minister of Public Works, concerning reports of a gold discovery in the Ruahine Ranges:

I having been in Thames, Ohinemuri, and Te Aroha for about 5 years deem myself a fair judge of the bona fides of any alleged discovery therefore have no compunction on behalf of public order and the welfare of the Colony to suggest that you at once should empower me as your authorized agent to make all enquiries and to visit all places where gold is said to have been discovered,

and report thereon. He did not ‘ask this as a matter of business directly but being the patentee of a novel method of treating quartz by crushing to a powder’ wanted to use this to prove all discoveries.<sup>345</sup> Mitchelson declared he was ‘unable at present to avail himself of your offer’.<sup>346</sup>

Also in January 1888, Cuff applied to patent

an invention for a scheme or application of a principle for pumping mines free from water-drainage by means of a water-wheel or lift at the bottom of the shaft of the mine connected with driving-gear on the surface of the ground, to be called “J. Cuff’s Patent Method of draining Mines by means of a water-wheel or Lift.”<sup>347</sup>

One journalist understood it to operate

on the perpetual motion principle. The lift would be at the bottom of the shaft, and connected with a drum on the surface, which in

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<sup>343</sup> John Watson to Joshua Cuff, 26 January 1888, Letterbook 1886-1888, p. 619, A. & G. Price Archives, Thames.

<sup>344</sup> Harbour Board, *Thames Advertiser*, 7 March 1888, p. 2.

<sup>345</sup> Joshua Cuff to Minister of Public Works, 23 March 1888, Mines Department, MD 1, 88/233, ANZ-W.

<sup>346</sup> Under-Secretary, Mines Department, to Joshua Cuff, 27 March 1888, Mines Department, MD 1, 88/233, ANZ-W.

<sup>347</sup> *New Zealand Gazette*, 27 January 1888, p. 85.

turn is connected by shafting with a Pelton wheel, which wheel is driven by a down-put pipe from a tank, say of three thousand gallons capacity, so that there is a fall of forty feet directly upon the wheel, and the power and the pump work together. The pump can be first started by a steam engine and the tank will thus be well filled from the water pumped from the shaft, after which the pump will work the Pelton wheel and the wheel will work the pump.<sup>348</sup>

Cuff unsuccessfully offered to sell this patent to the Thames Drainage Board for £5,000. A member of this sent his letter to the press, commenting that the proposal was ‘of a somewhat unique nature, and the offer such a liberal (?) one that the matter may interest your readers’.<sup>349</sup> The following month, Cuff sent details to the ‘Government Engineer of schemes patented by writer in connection with the “Big Pump”, at the Thames’, which was filed and ignored.<sup>350</sup>

#### NON-MINING INVENTIONS

Cuff was another inventor who did not restrict himself to the mining industry. In March 1888, he applied for a patent for ‘the application of a principle for a novel method of propelling ships by means of water-power, and to be called “J. Cuff’s Water-power Ship-propeller” ’.<sup>351</sup> The following year, he applied for a patent for ‘an invention for the application of water-power by means of hydraulic pressure for all the purposes of motive-power as now applied by the use of steam to machinery of all descriptions, and to be called “J. Cuff’s Patent Hydraulic Motive-power” ’.<sup>352</sup> All the work that he spent developing these ideas was wasted, as with his mining inventions. As an example of his flawed judgment on matters technical, in 1885 he wrote that he had told an Auckland accountant, Richard Knibb Davis,<sup>353</sup> ‘that he would most likely make a fortune if he proceeded boldly & was not

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<sup>348</sup> *Auckland Weekly News*, 14 January 1888, p. 23.

<sup>349</sup> *Te Aroha News*, 14 January 1888, Supplement, p. 1.

<sup>350</sup> Joshua Cuff to Under-Secretary, Mines Department, 3 February 1888, Mines Department, MD 2/3, 88/127, ANZ-W.

<sup>351</sup> *New Zealand Gazette*, 29 March 1888, p. 398.

<sup>352</sup> *New Zealand Gazette*, 3 October 1889, p. 1030.

<sup>353</sup> See *Thames Advertiser*, 4 June 1885, p. 2, 9 June 1886, p. 2, 22 October 1888, p. 2; *Observer*, 16 February 1907, p. 5.

frightened at what croakers said' about the La Monte furnace.<sup>354</sup> The croakers were right, and Davis very quickly became bankrupt.<sup>355</sup>

Joseph James Macky was a shareholder, director, and legal manager of many mining companies from the 1880s onwards.<sup>356</sup> In the early twentieth century he was legal manager and then director of companies working in the range beyond Waiorongomai.<sup>357</sup> He was also an enthusiastic inventor; none were relevant to mining, but their range was remarkable. In the nineteenth century, the first patent he applied for was 'Macky's Improved Trouser Attachment'.<sup>358</sup> The second was an 'Invention for protecting Bank Cheques, so that the amounts cannot be altered after being drawn, to be called "Macky's Patent Bank Cheque" '.<sup>359</sup> This was applauded by one newspaper for being a

most ingenious contrivance to provide against tampering with cheques. There are three spaces for the figures, coloured differently, one for units, one for tens, and one for hundreds, with three similarly spaces for the signatures of the drawer, thus it will be practically impossible to change a one pound to ten pounds and so on.<sup>360</sup>

Four months later he wanted a patent for 'an Improved Form of Candlestick, as regards the Socket and Holder'.<sup>361</sup> Two years later, he invented 'an improved form of metal pen, to be called 'the Marriage Pen" '

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<sup>354</sup> Joshua Cuff to T.H. Smith, 13 October 1885, Te Aroha Warden's Court, Mining Applications 1885, BBAV 11591/1a, ANZ-A.

<sup>355</sup> *Thames Advertiser*, 9 June 1886, p. 2; *Te Aroha News*, 3 July 1886, p. 2; *Auckland Weekly News*, 22 September 1904, p. 19, 5 October 1905, p. 21; *Observer*, 16 February 1907, p. 5.

<sup>356</sup> See *Thames Star*, 2 December 1890, p. 2, letter from J.J. Macky, 9 August 1904, p. 1; *Thames Advertiser*, 2 May 1898, p. 3; *List of Companies Registered with the Auckland Chamber of Mines* (Auckland, 1896), pp. 3-4; J.J. Macky to Minister of Mines, 24 April 1911, Mines Department, MD 1, 14/1514, ANZ-W; *New Zealand Herald*, 31 August 1915, p. 1; Neil Lloyd Macky, *Macky Family in New Zealand 1845-1869*, vol. 1 (Auckland, 1969), pp. 45-47.

<sup>357</sup> Company Files, BADZ 5181, box 222 no. 1314, box 313 no. 1756, ANZ-A.

<sup>358</sup> *New Zealand Gazette*, 22 July 1886, p. 865.

<sup>359</sup> *New Zealand Gazette*, 10 March 1887, p. 340.

<sup>360</sup> *Waikato Times*, 28 April 1888, p. 2.

<sup>361</sup> *New Zealand Gazette*, 7 July 1886, p. 917.

along with ‘Super-corrugated Metal Sheeting’.<sup>362</sup> In 1889, he developed ‘an improved device for the prevention of fraud or mistakes in the issue or manipulation of cheques, receipts, promissary-notes, and the like’,<sup>363</sup> With an architect he devised ‘the Acme Nails’, and with a farmer invented ‘the Acme Heel-plate’ to protect the heels of boots and shoes.<sup>364</sup> The following year, he had made ‘improvements in the form and construction of metal screws for woodwork, leather, and other materials’.<sup>365</sup> In 1893, he applied for four patents: for ‘improvements in door-handles and fastenings’, for ‘improvements in door-handles and their fastenings on spindles’, for one (devised with a chemist) for ‘improvements in the making-ready of surface blocks for printing’, and for ‘improvements in metal cans for containing preserved food and other substances airtight’.<sup>366</sup> The following year, he invented an ‘improvement in vessels for straining milk of water’.<sup>367</sup> In the early twentieth century, a wide variety of inventions were produced. There were improvements in corn brooms, in ‘kettles or spouted vessels’, for holding collar studs more securely, and for nut-locks, button-holes, steam engines, and door handle fastenings.<sup>368</sup> He continued to invent in later years, a family member estimating that he had taken out over 30 patents, ‘many of which were humanitarian in conception, having as their object the saving of life’.<sup>369</sup>

Some Te Aroha residents had creative ideas connected with their occupations. Thomas Hood, a painter, invented ‘Hood’s Oil and Water Colour Paints’, a method of manufacturing pigments.<sup>370</sup> One of the many doctors who briefly lived there in the 1880s, Alfred Wright, invented ‘an

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<sup>362</sup> *New Zealand Gazette*, 9 August 1888, p. 855, 25 October 1888, p. 1136.

<sup>363</sup> *New Zealand Gazette*, 5 September 1889, p. 1015.

<sup>364</sup> *New Zealand Gazette*, 4 April 1889, p. 349, 26 September 1889, p. 1015.

<sup>365</sup> *New Zealand Gazette*, 16 October 1890, p. 1116.

<sup>366</sup> *New Zealand Gazette*, 13 April 1893, p. 482, 20 July 1893, p. 1138, 31 August 1893, p. 1320, 28 September 1893, p. 1414.

<sup>367</sup> *New Zealand Gazette*, 26 April 1894, p. 658.

<sup>368</sup> *New Zealand Gazette*, 27 June 1901, p. 1379, 24 January 1902, p. 150, 20 February 1902, p. 468, 6 March 1902, p. 577, 3 April 1902, p. 817, 15 May 1902, p. 1095, 4 September 1902, p. 1895, 6 August 1903, p. 1773, 21 January 1904, p. 258, 31 March 1904, p. 961.

<sup>369</sup> Macky, p. 46.

<sup>370</sup> *New Zealand Gazette*, 8 January 1885, p. 31.

Improved Manufacture of Medicated Candles and Night-lights'.<sup>371</sup> One tinsmith, plumber, and ironmonger, John Benjamin Johnson,<sup>372</sup> in 1895 patented 'the Combination Milk-strainer, Aerator, and Cooler', of which he was the sole manufacturer.<sup>373</sup> During the brief flax boom, an unnamed resident invented an entirely new way of dressing flax that would save all the fibres.<sup>374</sup>

Others were inspired to create inventions not directly related to their work. For example:

The automatic candle extinguisher (Beyer's patent), which is being manufactured at Te Aroha, is a most ingenious invention. The extinguisher, when placed on the candle, may be adjusted to any height required by the user, and then closes on the candle when the required length has been burned. It should prove valuable to persons in the habit of reading in bed, and give security from fire in various ways.<sup>375</sup>

In 1889, two Waiorongomai residents invented new ways of making butter. 'Graham's patent pressure butter-maker' was one, dreamt up by James William Graham,<sup>376</sup> while the other resident wrote to the press that he had 'discovered a better and much cleaner way of butter-making than burying it in the ground'. He recommended putting cream in a single calico cloth and hanging it in a cool place all night; 'in the morning the butter is made, exactly the same as when buried in the ground'.<sup>377</sup> George Gapes of Te Aroha, who gave his occupation as 'artist', sought a patent for 'the manufacture of the Golden Gem Infants' Food'.<sup>378</sup> It cannot have brought him any profit, for four and a half years later, when he was a painter in Wellington, he was declared bankrupt, his only assets being book debts of £44 0s 2d.<sup>379</sup>

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<sup>371</sup> *New Zealand Gazette*, 14 July 1887, p. 937.

<sup>372</sup> See *Te Aroha News*, 11 January 1940, p. 5.

<sup>373</sup> *New Zealand Gazette*, 10 January 1895, p. 73; advertisement, *Te Aroha News*, 2 November 1895, p. 3.

<sup>374</sup> *Te Aroha News*, 9 October 1889, p. 2.

<sup>375</sup> *Auckland Weekly News*, 18 October 1890, p. 17.

<sup>376</sup> *New Zealand Gazette*, 17 December 1889, p. 1360.

<sup>377</sup> *Waikato Times*, 5 December 1889, p. 2.

<sup>378</sup> *New Zealand Gazette*, 31 October 1889, p. 1124.

<sup>379</sup> *Mercantile and Bankruptcy Gazette*, 3 May 1894, p. 202.

Two Waiorongomai women sought patents. In 1890, Laura Graham invented ‘a scraper-attachment to brushes’,<sup>380</sup> while in 1896 Margaret Forsman, formerly of Waiorongomai but then of Gordon, sought a patent for ‘a new and improved lotion to be called “the Sufferers’ Friend” ’.<sup>381</sup> In the following two years, she applied for patents for two more lotions; no details were given to indicate what made them different.<sup>382</sup> Her husband, Axel Leonard Forsman, a former miner who was by then a farmer,<sup>383</sup> when living at Waiorongomai in 1887 had invented ‘Forsman’s Patent Compass-Lung Carriage’;<sup>384</sup> no details are available of whatever this was. Inventions ran in this family, for in 1912 Forsman and his son Robert Axel were granted a patent for a cot-attachment for a bedstead.<sup>385</sup>

## CONCLUSION

Some people associated as investors with mining in the Te Aroha district were inventors also, sometimes prolific ones, but have not been included because the emphasis of this chapter has been on the local community and its skills. Likewise, many miners who were involved with mining in this district only very briefly and revealed their skills or lack of them elsewhere have not been considered. To end by repeating a note of caution: there is more evidence available of lack of skill or failure to achieve what was claimed than of the day-to-day efficient working of mines and batteries, which can skew the impression gained of the competence of those involved with mining.

### *Appendix*

*Figure 1: ‘Blo’ [William Blomfield], ‘From Drawing-room to Goldfields: An Everyday Sketch of Colonial Life’, Observer, 1895 Christmas Edition, p. 13.*

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<sup>380</sup> *New Zealand Gazette*, 10 July 1890. p. 781.

<sup>381</sup> *New Zealand Gazette*, 11 June 1896, p. 946.

<sup>382</sup> *New Zealand Gazette*, 15 April 1897, p. 908, 27 October 1898, p. 1767.

<sup>383</sup> See *Cyclopedia of New Zealand*, vol. 2, p. 790.

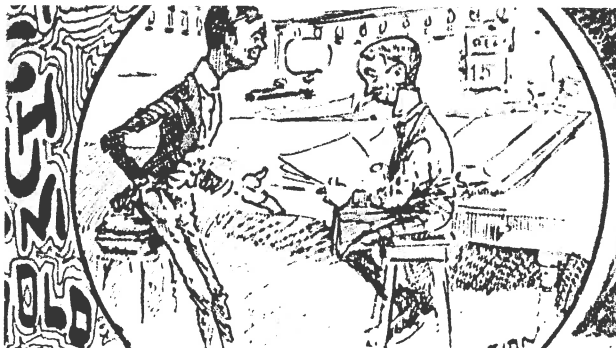
<sup>384</sup> *New Zealand Gazette*, 21 July 1887, p. 969.

<sup>385</sup> *AJHR*, 1912, H-10, p. 23.

*Figure 2: 'Basic Tools of the Early Miner', in J.B. McAra, *Gold Mining at Waihi 1878-1952* (Waihi, rev. ed., 1988), p. 38.*

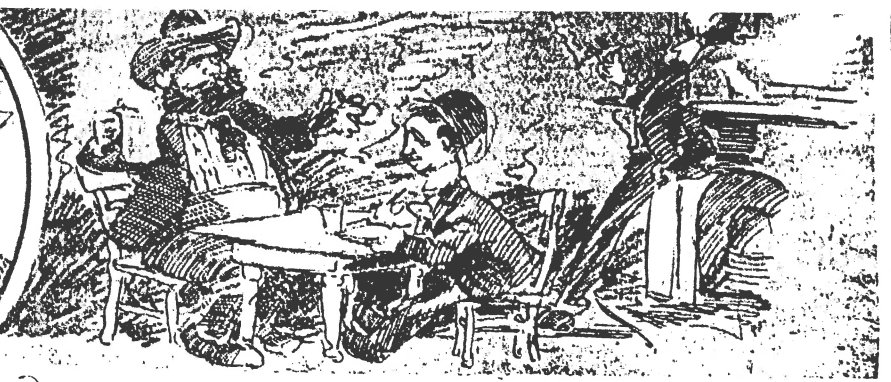
*Figure 3: Herbert E. Taylor, illustrations of mining in the Woodstock, Karangahake, *New Zealand Graphic*, 13 July 1895, pp. 28-29.*

*Figure 4: Herbert E. Taylor, illustrations of mining in the Talisman, Karangahake, *New Zealand Graphic*, 7 December 1895, p. 717.*



1 CHARLEY NOBBS MAKES A SUGGESTION

LOOK HERE TOM I'VE HAD ENOUGH OF THIS BLOOMIN' SLAVERY LETS CHUCK THIS GAME AT XMAS AND TURN DIGGERS, ILL BET WELL FIND GOLD IF ITS IN THE COUNTRY AND THEN WE'LL MAKE OUR FILE DONE SAYS TOM



2 THE KNOWING PAIR TAKE A COUSIN JACK INTO THEIR CONFIDENCE WHO IN RETURN FOR NUMEROUS BEERS INITIATES THEM INTO ALL THE MYSTERIES OF PROSPECTING AND PEGGING.



3 OFF TO THE GOLDFIELDS THEIR SWAG CAUSES MUCH AMUSEMENT TO THE PASSENGERS



4 THE PRERDA INHABITANTS ARE MORE AMUSED AT THE SWAGGER



5 ON THE FIELD LOOKING FOR A REEF



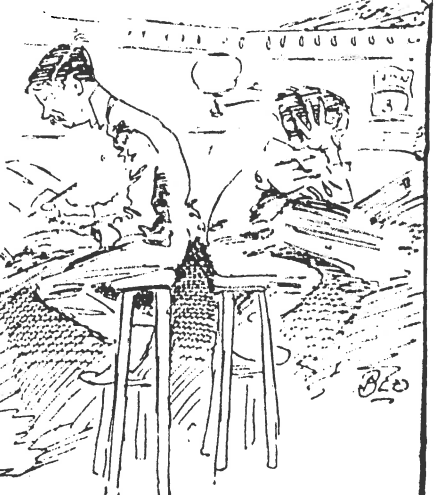
7 "STRUCK IT RICH" HURRAH! TOM HERE'S FOR ENGLAND, HOME AND BEAUTY, TAKES US TO FIND GOLD.



6 CHARLEY SUGGESTS PANNING THE CREEK

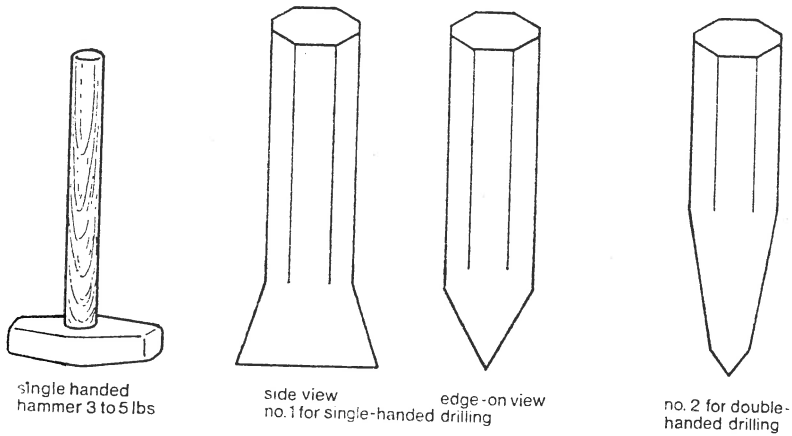


9 "IN TOWN AGAIN WANT TO FLOAT YOUR MINE ON THIS SPECIMEN EH BOYS ITS NEW GUM GOLD MUNDIC AHAM"

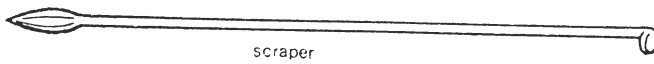
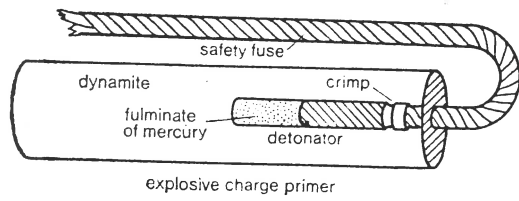
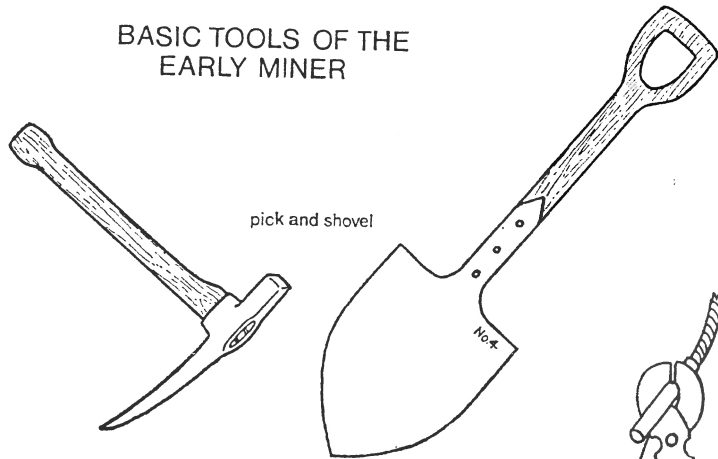


10 BACK TO SLAVERY

8 PEGGING OUT THE "JUGGERNAUT" NOW ID LIKE TO SEE WHOD JUMP US



### BASIC TOOLS OF THE EARLY MINER

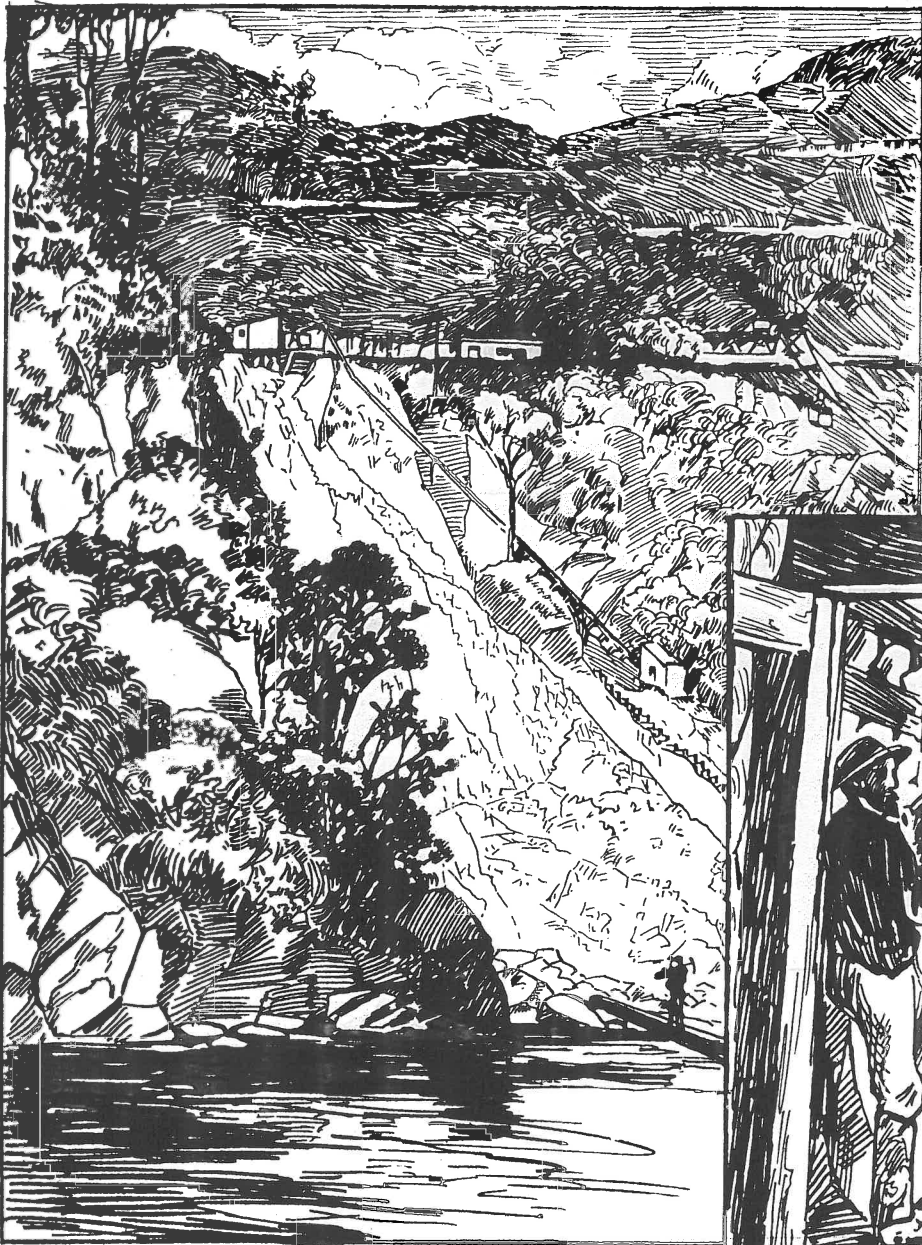


# THE WOODSTOCK MINE.

ON this and the following page appear some sketches of the famous Woodstock Mine made by our special artist at Karangahake. Number one shows the hydraulic tramway for trucks, and the next illustrates getting the fuse ready for blasting. In number three the operation of picking on the stopes is shown, and number five illustrates one of the functions. A wayman, going up the stopes, is illustrated in number five, and hand-drilling in the stopes is represented in number six. Number seven shows work proceeding on the reefs. In number eight is shown the unloading of one of the ariel cars. The bottom unhinges and the ore falls through into a big trough, whence it runs to the trucks which cart

it away to the battery. Number nine gives a really admirable idea of that much-patronised vehicle, the Karangahake coach. The scene represented in number ten is outside the Woodstock mine, where the timber is sawn for the props in the mine, etc.



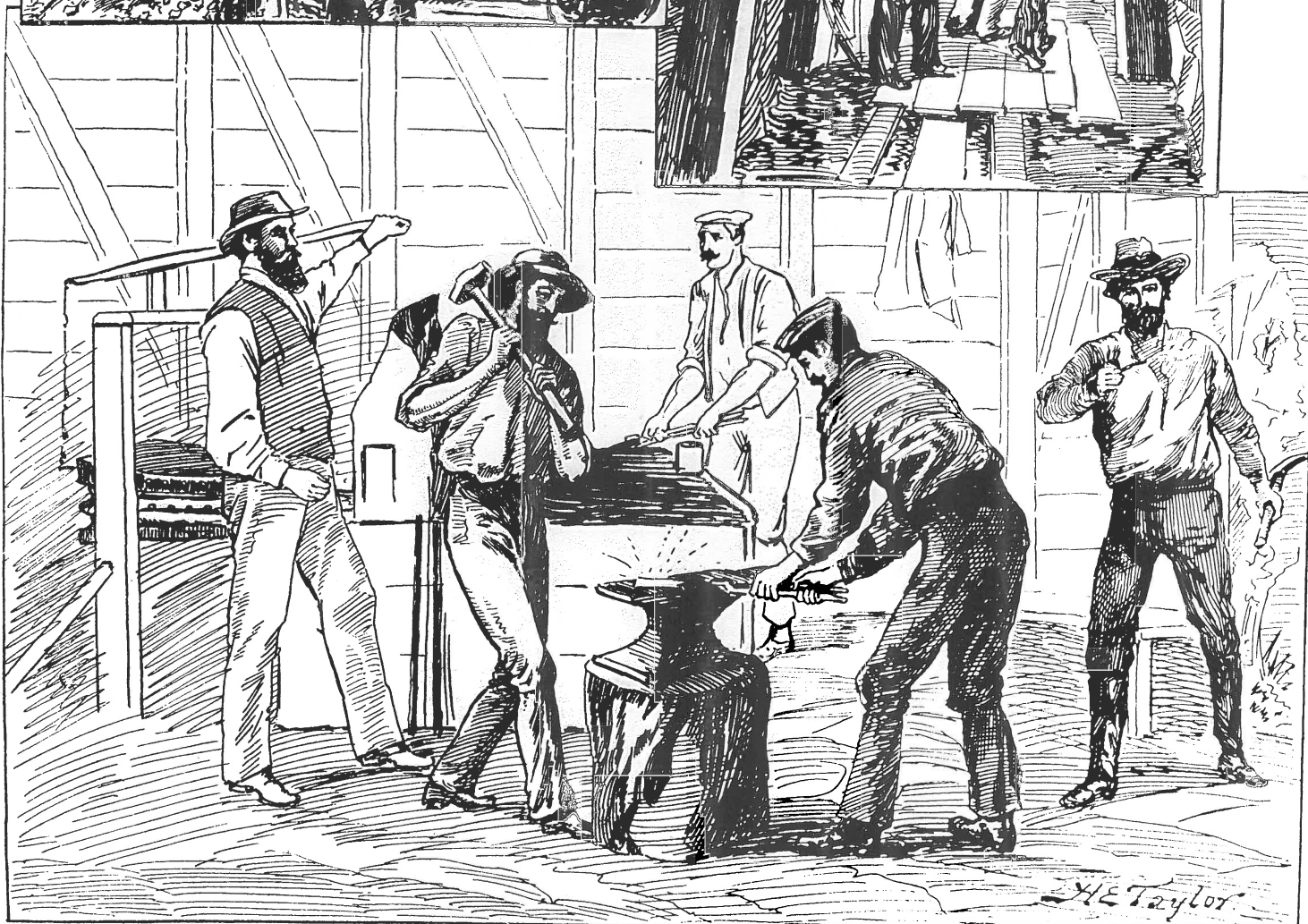
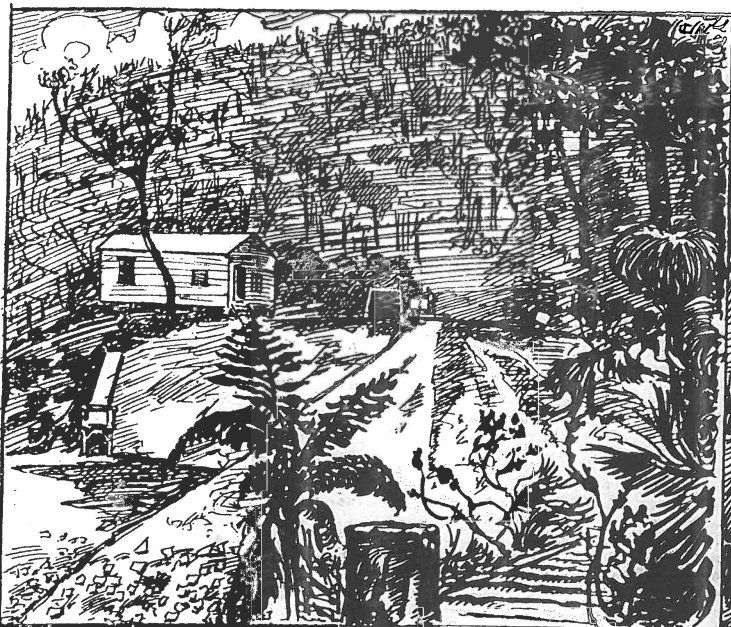


WOODSTOCK.

A GENERAL VIEW OF THE MINE.



A PASS IN THE WOODSTOCK



Talisman whare.

Talisman smithy.

Drive on Talisman reef.