

Halfway Round the World and Back: The Most Travelled Cornish Pumping Engine?

The story of a New Zealand copper mining fiasco

Kenneth Brown

That massive beam pumping engines were moved from site to site in Cornwall and even sent to faraway lands is well documented. However it is doubtful if any example travelled further than the Kawau 36-inch engine, which might well have escaped notice had it not been for a lucky break.

Some years ago Frank Woodall, the noted model maker and author of the recently republished 'Steam Engines and Waterwheels' sent me a copy of an old picture postcard. It show distantly a Cornish enginehouse with a tall, gracefully tapered chimney stack, standing close to water at the end of a promontory on what appeared to be the edge of a lake. He said he thought it was somewhere 'down under,' was I able to identify it?

I puzzled over it for years. During a visit to Australia and Tasmania in 1984 I made inquiries from people who knew the local mining scene, but always drew a blank.

Two years ago, out of the blue, came an inquiry from a Mrs. Maureen Pantall in New Zealand who was busy at the time researching 'The Cornish in New Zealand in the 19th century' for her Ph.D thesis at Victoria University in Wellington. She had come across a copy of a report by the celebrated mining engineers John Taylor & Sons on the Kawau copper mine in NZ dated 1853 and held in the Mitchell Library at Sydney. At that time the mine was idle. It was owned by a London-based concern called the North British Australasian Company¹, who also had a one third interest in the Bon Accord mine in South Australia. The mine had been worked in 1845-52 by the Kawau Mining Company but had closed due to flooding.

The Taylor report of 1853 contained the following passages:

"We propose to send out immediately a Cornish steam engine of sufficient power to drain the mine with facility to the depth of 60 fathoms at least, and keep it clear of water even if the present quantity should be doubled; and we shall also send a complete set of pitwork (pumps and apparatus connected therewith) of the most improved construction.

"We shall at the same time sent out a mining captain, selected from our own staff in Cornwall, in whose qualifications for the superintendence of such a mine we have the greatest confidence. He will be accompanied by other persons competent to erect the machinery, and to place the plant already existing on the property in good working order. We shall likewise send a number of skilful miners as may be necessary ... further detachments following as the extension of the underground operations may require them ..."

... record that the 330 ton barque "Baltasara" was purchased by the North British

Australasian Company and despatched from Falmouth in late 1853 or early 1854 with the engine and personnel on board; and that the engine was erected in its house and ready for work at Kawau by 15 July 1854.²

Maureen Pantall's original letter also mentioned that the mine was situated on Kawau Island, about 30 miles along the west coast north of Auckland, and was worked from 1845 to 1855. The big question now was, could *this* be the site of the mystery enginehouse in the old photograph? I sent her a copy of the Woodall postcard and, to my delight, her reply was in the affirmative. Not only that, but part of the enginehouse was believed still to survive. She was planning to take her family on a visit to the island, would I like any measurements of what remained of it?

Wildest expectations

The photographs and measurements she sent me exceeded my wildest expectations! Some of the photographs are reproduced here, from which it will be seen that the front part of the house, including the thick 'bob wall' on which the beam rested, has either collapsed or been dynamited, to fill the shaft perhaps. The rear half of the house has been stabilised in recent years by an internal frame and the chimney stack, with its typical red brick upper part, either repointed or rebuilt. The cylinder size of the engine was not directly obtainable but longitudinal measurements from the 'cylinder plat' to the shaft indicated equal strokes indoors and outdoors of between 8ft and 8ft 6in.³

A colour brochure describes what there is to see on Kawau island⁴. It refers briefly to the ruin of the enginehouse which is said to have contained a 50 horsepower engine. This implies a cylinder size of about 36 inches, fully compatible with the cylinder doorway width of 65 inches and other dimensions recorded by Maureen Pantall. The island's principal tourist attraction is not the enginehouse, however, but a waterside mansion some half an hour's walk away. It was formerly occupied by Governor George Grey who added tasteful extensions to what had been the mine manager's house. The original occupants were Capt Ninnis, a Cornish mine captain of whom more anon, and his wife Priscilla.

While this dialogue with Maureen Pantall was going on, I contacted another friend in NZ, Mike Lawton, whom I'd first met some years ago at Kew Bridge Steam Museum. I also consulted the *Mining Journal*, a weekly newspaper of the period, of which a set exists in Redruth local studies library, and found to my delight that the shareholder's meetings of the company in London were quite fulsomely reported. They reveal a sorry tale of failure of the mine after little more than a year's activity. In the ensuing recriminations John Taylor resigned, but the charges of mismanagement appear to have lain more on the side of the directors and the company's local manager Mr Begher than of their illustrious consultants! It was said that the company had lost £30,000 on the venture, in addition to a £45,000 loss on the mine by a previous company — substantial sums for those days!

In one of the meeting reports it was stated that the engine had been sent back to England for sale — clearly a desperate move to get some money back as there would have been no secondhand market for it in NZ at that time. But before this, it is worth a glance at the earlier history of the mine, for which I am indebted to both my NZ correspondents.

Early history

Today Kawau Island (nowadays spelt with a 'u' at the end) is designated a historic reserve. Day trips by ferry are available from a place called Sandspit, north of Auckland, during

the tourist season. The name derives from a Maori chief called Kawaw (pronounced Kowwow) who at one time owned a large stretch of North Island territory, including the island and the land on which the city of Auckland stands.

Kawau Island was originally uninhabited but was bought by the Bon Accord Mining Company of Aberdeen, on the strength of its copper deposit, discovered in 1844. Mining was started using local labour but in January 1846 Capt James Ninnis and a party of miners arrived from Cornwall to lead operations. Capt Ninnis was from a well-known mining family and, by all accounts, was an able manager. He was also a strict teetotaler and founded a flourishing Kawau Total Abstinence Society.

For a time 200-300 people were living on the island in timber dwellings, all miners or surface workers and their families. At first, ore was shipped to Sydney with the intention of sending it to South Wales for smelting. Unfortunately the ore displayed a tendency to *spontaneous combustion — not healthy for a wooden ship — which led to the decision in 1848 to build a smelter on the island. Here would be produced a 'regulus' in which the copper concentration would be raised from about 6 per cent in the raw ore to 30 per cent, and which could be shipped to Swansea for final refining in safety. For topographical reasons the smelter was built in a cove some distance from the mine and linked to it by a cart track.

The lode itself lay within a steep ridge which formed a small headland jutting out into the sea from tall cliffs. It was found only 18ft below the surface. As the miners sank shafts and the workings went below sea level a 12hp rotative steam engine purchased in NZ was installed to work pumps in one of the shafts by flat rods and an angle bob. Doubtless this engine also drove a copper crusher, it being common practice in Cornwall at that time to use one engine for both duties.

A horizontal level, or adit, ran into the mine from an opening in the headland just above high tide. To provide a level working area the miners blasted the cliffs and used the rubble to form a narrow strip of reclaimed land, separated from the sea by timber piling. A wharf was incorporated for berthing vessels. A longitudinal section of the mine drawn by Capt Ninnis in 1848 shows four shafts, three of them inland and each equipped with a horse whim (or gin) for hoisting. The fourth, called Whitaker's, was in the reclaimed area at the end of the headland, only feet from the sea. The deepest level being worked at that time was 16 fathoms below adit.

How Whitaker's shaft came to be sited on the edge of the sea, rendering the workings liable to flooding, was the result of devious action by a lawyer called Frederick Whitaker. He managed to squeeze out of the NZ governor the right to mine beyond high-water mark which was the limit of the Kawau company's concession. Whitaker began to mine inland from his shaft on the part of the copper lode belonging to the company. It is said his men were caught red-handed in his tunnel by Capt Ninnis coming the other way! Legal battles ensued for two years and in the end the company had to buy Whitaker out for £5,000.⁵ It was on his shaft that the Cornish engine was to be placed, as we shall see.

Sometime later Capt Ninnis' contract expired and his place was taken by Mr. Begher.⁶ He was a German metallurgist with experience of smelting but not, unfortunately, of mining. As the mine went deeper the amounts of water seeping into the workings became ominous.

***Editors footnote**

Stockpiles of ore with high sulphide content (especially pyrite) are at risk to spontaneously combust, due to exothermic reactions (heat producing chemical reactions). There have been occurrences of this at Wheal Jane, Neves Corvo and at several other high sulphide ore bodies.

There was a plan to boost the power of the small engine which is, unfortunately, not described. It is believed to have involved rebuilding the chimney which served the boiler high up on the ridge with a flue leading to it to increase the draught, and there is photographic evidence of a stack up there.

Flooding

In 1852, with work in progress at the 24 fathom level, the water began to increase so rapidly that it overcame the pumps, flooding the mine and bringing work to a halt. Mr Begher's response was to set sail for England and persuade the company to put up the cash for increased pumping power. It was about this time that the company was reformed as the North British Australasian and the management transferred to London.

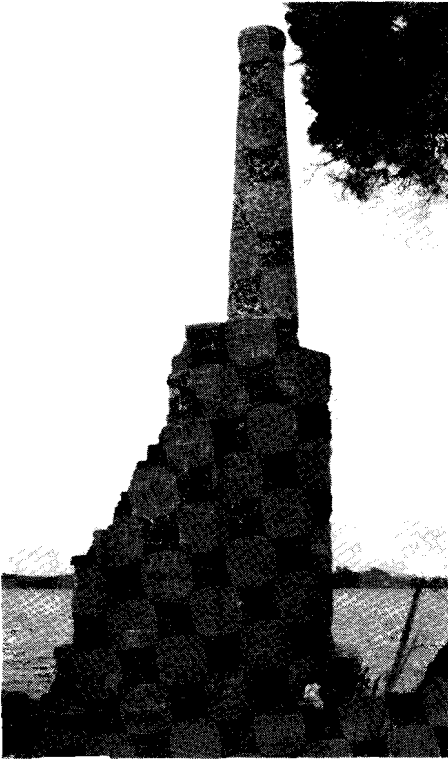
Thus came about the company's decision to appoint John Taylor & Sons, the discovery of whose report in Sydney sparked off the research for this article. The larger engine that was sent out was erected on the shaft that had caused the trouble, Whitaker's, in the reclaimed area lying between the former high and low water marks. The decision may also have been influenced by an expectation that the lode continued out under the sea, as often happened in Cornwall. We are told that by August 1854 the new engine had succeeded in forking the water down to the 24fm level where work had been brought to a dramatic halt three years earlier.

Mr Begher was back in charge but a Cornishman, Capt Anthony Bray, had been appointed to oversee the underground operations. Shaft sinking then began in earnest, but alas, the deeper the miners went, the harder the rock became and costs began to escalate. The 34 fathom level was finally reached in September 1855, only to find that the hard rock had completely impoverished the lode. Not only that, but Mr Begher had grossly over-estimated the quantity of easily workable ore left standing at the 24 fathom level.

Soon afterwards the Sydney agent began refusing to honour Begher's heavy drafts on



The original postcard view of the Kawau Cornish enginehouse



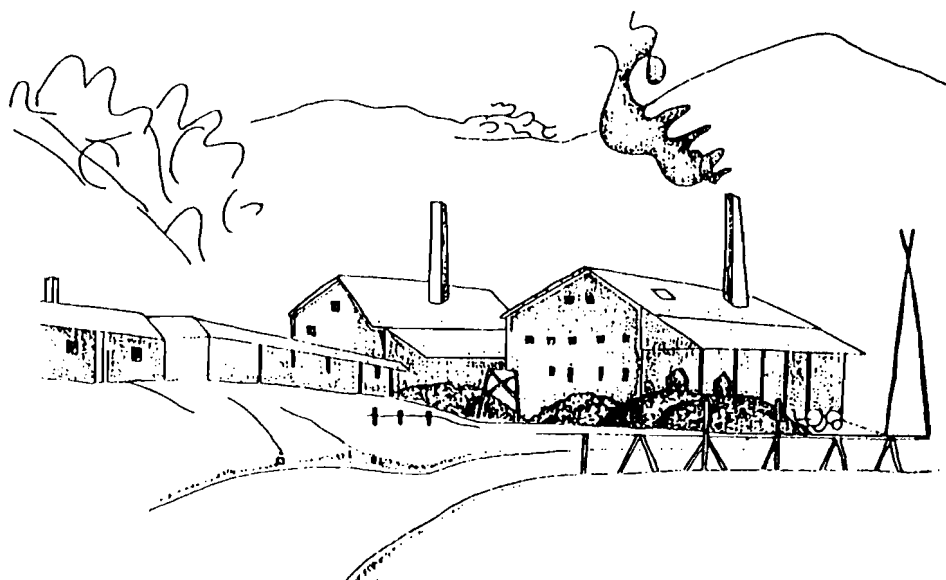
Two views of the surviving rear portion of the Kawau enginehouse (Maureen Pantall)



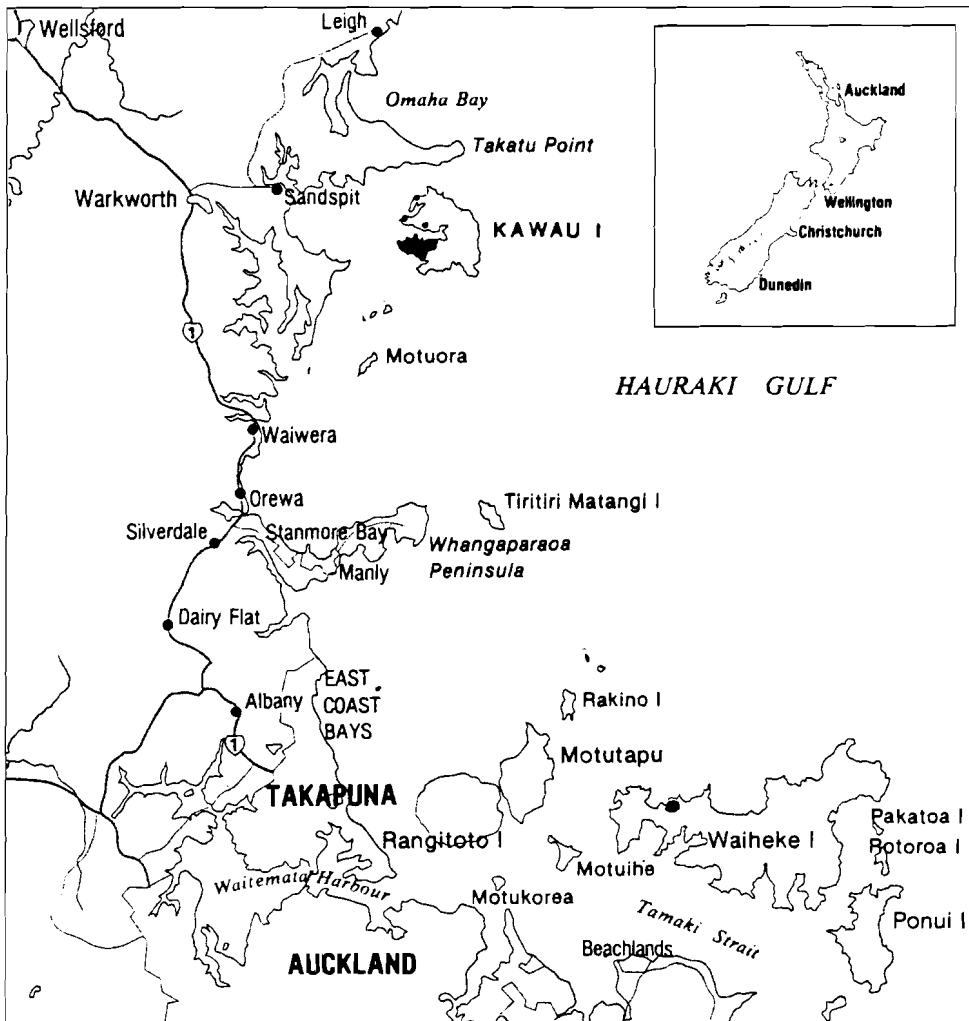
Rusty boiler from the 1898-1900 reworking of Kawau mine (Mike Lawton)



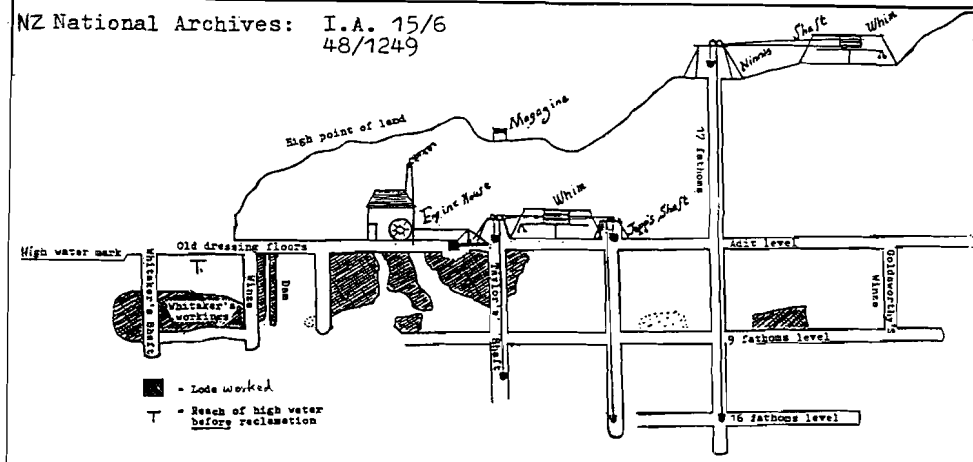
All that remains of Whitaker's Shaft —
base of bob-wall in foreground
(Maureen Pantall)



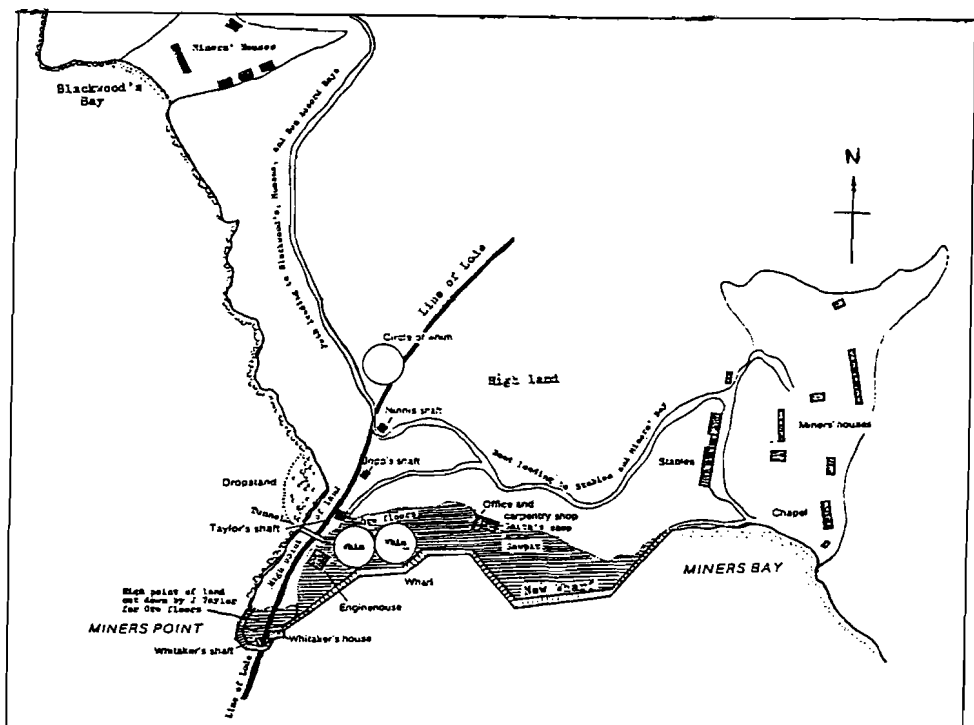
Smelter as sketched by Heaphy in 1850 (Auckland Institute and Museum)



Map showing the location of Kawau Island, with the area of the mine in solid black. Distance from Auckland is about 30 miles



Elevation of Kawau Mine in 1848, six years before erection of the Cornish engine on Whitaker's Shaft (extreme left). It is taken from a drawing by Capt James Ninnis



Plan of Kawau Mine, drawn by Capt Ninnis in 1848. The reclaimed area of foreshore is shown shaded

the company. The decision to strip the assets and try to get some money back on the equipment seems to have taken the shareholders back in England by surprise. Certainly by December 1855 all mining had ceased and the engine either had been, or was being, taken down again after little more than a year's work. The only output from this short-lived activity was a batch of 32 tons of copper regulus shipped back to Britain, and another 50 tons said to be ready for shipment from the smelter. Soon after this setback the company also sold its interest in the Bon Accord mine in South Australia which, it seems, was scarcely more successful. Thereafter they concentrated on sheep — let us hope with better luck!

Now comes the strangest twist of all. At one of the company's meetings in the aftermath of Kawau mine's abandonment, it was stated that the engine had been returned to England for sale. This appears to explain the following intriguing advertisement which appeared in *Mining Journal* 4 October 1856:

FOR SALE

“Mr. Little will sell by auction at Devoran, in the port of Truro, on Monday 13th October next at Twelve o'clock, the undermentioned materials, all of which will be found in excellent condition (some of the pitwork quite new) and lying on the wharf convenient for shipment:

“A steam engine, 36in cylinder, 8½ft stroke, equal beam

Large iron angle bob, with plummer blocks and brasses, about 3 tons

31 9ft 13in pumps (i.e. sections of rising main)

Then all the pitwork in detail, including 12 and 14 in brass plunger poles, 10 and 12in iron buckets, 6 and 7in brass buckets and clacks.

“May be viewed on application to the Redruth and Chacewater Railway Company's offices at Devoran — Dated Sept 29, 1856”

The list of items appears to include some pitwork from the earlier engine but is fully compatible with machinery recovered from Kawau. Of course, the evidence is purely circumstantial, but the combination of engine dimensions and unusual selling position, probably just as the machinery had been off-loaded from a vessel, strongly suggests that this was the Kawau engine. Unfortunately, I've not been able to trace its disposal — it may have been sold in parts — and nor do we know whether the engine was new or secondhand when it was sent out. Any further information would be welcomed, to complete the story.

I have a theory — it is only that — that the engine had been built new for Kawau by the Perran Foundry, and that by sending it to Devoran the company were hoping that the builder might buy it back. If so, they were clearly unsuccessful!

Rusty boiler

This was not quite the end of Kawau mine however. In some photos of the ruined enginehouse a rusty loco-type boiler appears lying on its side on what is left of the man-made foreshore. I queried this and was sent a copy of a photograph taken at the time of a short-lived attempt to rework the mine by a Capt Holgate in 1898-1900.⁷ The original is held at the Auckland Institute and Museum with no explanation, but details on it are

clear. There is a staging erected over Whitaker's shaft in front of the ruined Cornish enginehouse, then still intact. A lean-to shed against the enginehouse contains a small boiler. Its iron or steel chimney stack can be seen protruding. It supplied Cameron and Tangye steam jet pumps in the shaft, so the rusty boiler is explained. Today, all that can be seen of Whitaker's shaft in front of the enginehouse is the top of its concrete pipe collar surmounted by a precast circular cap.

In very recent years some archaeological digging has taken place under the auspices of the NZ Department of Conservation, starting with the site of the smelter. Its ruins still stand and the site is rightly considered to be of technical importance. At first Capt Ninnis had employed a Welsh system with batteries of roasting furnaces, along with a Welsh works manager, a Mr Jones. Since it did not prove cost effective, Mr Begher had switched to a simpler German technique.

The building itself, built of soft local sandstone⁹, has begun to collapse and, like the enginehouse, is to be shored. Limited excavations carried out prior to the stabilisation work revealed large slag blocks, a casting floor of fine sand and pieces of 'matte' (a sulphidic product of the roasting process). Firebricks with the stamp 'COWEN' are reckoned to have been made at Stourbridge.

After the smelter, archaeologists' attention turned to the Miners' Bay settlement, a few minutes walk away from the shafts and Cornish enginehouse ruin. Nothing above ground here, as the houses were of timber, though small artefacts such as coins, silverware and pieces of china were found, apparently dating from the 1850s working. However, a deposit of mineral water bottles was identified as dating from the end of the 19th century, suggesting that Capt Holgate was as much a man of temperance as Capt Ninnis!

Also found at Miners' Bay was a large stone hearth, what may have been a wooden miners 'dry', and the remains of wooden stables bearing evidence of fire damage and subsequent rebuilding. From photographic evidence, the township in Capt Holgate's time consisted of tents. At the mine itself a horse whim plat has been unearthed but we are not told if anything survives of the earlier enginehouse. It is the Department's intention to continue the investigation work, so as to build up a picture of Cornish mining techniques and of everyday life in a mining community of 150 years ago. Against this background, the deafening silence which has greeted the fruits of my research is the more surprising.

Finally, another copy of the original Frank Woodall picture postcard showing the 36-inch enginehouse complete but roofless has come to light. It is dated 1926.

Footnotes

1. At least four of the company's directors had Cornish mining interests, for information on which I am indebted to Mr. Justin Brooke.
2. The history of the 1853-5 reopening and its aftermath is well covered in *Mining Journal* in a series of meeting reports down to the year 1857, all indexed.
3. This stroke deduction is based on the usual Cornish rules of thumb for deciding the angle of swing of the bob. Clearly the greater the angle, the shorter the bob for a given stroke. For an engine destined for overseas the angle was usually taken to its practical limit to minimise the length, and hence weight, of the bob for shipment. The 8ft 6in figure for the Kawau engine's strokes is therefore more likely, though not very common.
4. The brochure *Kawau Island Historic Reserve* is obtainable from the Hauraki Gulf Maritime Park, Department of Conservation, Hauraki District Office, PO Box 7061, Auckland, NZ.
5. History of the earlier working 1844-52 has been pieced together from various articles prepared by local researchers. The account of Capt. Ninnis' response to Whitaker's skulduggery is perhaps worth quoting in full: "... John Taylor ordered his men to dig towards the sea, and they reached within a few inches

of Whitaker's tunnel which was 12ft inside the Company boundary. Captain Ninnis came down the mine in person to knock down the last thin wall of rock with his own hands, and caught Whitaker's men red-handed in the act of removing the Kawau Company's ore". (In hindsight, this action must have greatly increased the risk of flooding which is why the Cornish engine was later put on Whitaker's Shaft).

6. Mr Begher's name is variously spelt 'Beeger' and 'Berger'. He is reported to have been an irascible gentleman who used to vent his frustrations by tearing up his shirts!
7. This photograph appears in the above-mentioned brochure but is not suitable for reproduction.
8. I am grateful to Mr Phillip Simpson of Sydney, NSW, for having sent me an unsourced article by Mr Rod Clough on the archaeological digs which have been taking place on Kawau Island since 1990.
9. Known locally as Mahurangi sandstone. The Cornish enginehouse is probably built of the same material.