NEW ZEALAND GEOCHEMICAL GROUP

Newsletter

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Incorporating The Mineralogical Society of New Zealand

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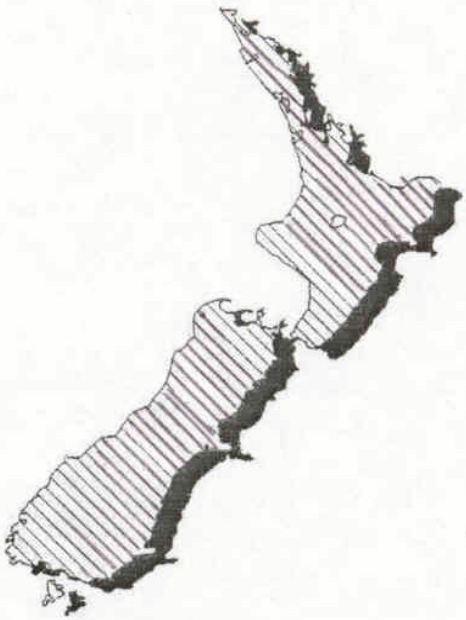
The NZ Geochemical Group web page (thanks to Dave Craw and Otago University) is at:
http://www.otago.ac.nz/geology/nzgg/nzgg.html

"I see the Geochemical Group as part of the New Zealand scientific community, that is the scientists of the Universities, Government and private enterprise. The prime purpose of this newsletter is to foster communication between members of this community who have an interest in geochemical work in common.
Success of the Newsletter depends on all members being contributors. ***Let us hear, therefore, about your research and your views of the development and aims of the group****. There should be plenty of material, as studies in applied, compositional, isotope, mineral phase equilibria, organic and solution geochemistry are in progress and New Zealand is an excellent natural laboratory for such investigations."*
J. Rogers, first Chairman of the New Zealand Geochemical Group, in his Introduction to the first issue of the Newsletter, November 1965.



c/o R. B. Glover, 33C Brandon Road, Glen Eden, Waitakere 0602, New Zealand

NEW ZEALAND GEOCHEMICAL GROUP
2005 - 2007

OFFICE HOLDERS :

President: Jonathon Kim, Chemistry Dept, Otago University, P.O Box 56, Dunedin.
Phone: (03) 479-5377, Fax: (03) 479-7906, jkim@alkali.otago.ac.nz

Secretary : Graeme Lyon, 32 Britannia St, Petone. Phone 04 938 4583, g.lyon@paradise.net.nz

Treasurer : Dick Glover, Glover Geothermal Geochemistry, address below
Phone: (09) 818 8984, fax: (09) 818 8984, ggg@ak.planet.gen.nz

Committee : Jenny Webster, School of Environmental and Marine Science, University of Auckland, Private Bag 92019, Auckland. Phone: (09) 373 7599 ext 7374, fax: (09) 373 7042, j.webster@auckland.ac.nz

Eddie Mroczek, Institute of Geological and Nuclear Sciences, P O Box 2000, Taupo, Phone (07) 376 0135, fax (07) 374 8199, e.mroczek@gns.cri.nz

Dave Craw, Geology Department, Otago University, PO Box 56, Dunedin. dave.craw@stonebow.otago.ac.nz

Chris Hendy, University of Waikato, Private Bag 3105, Hamilton. Phone (07) 838 4381, fax (07) 838 4219. chendy@waikato.ac.nz

James Pope, CRL Energy, PO Box 29415, Christchurch. j.pope@crl.co.nz

Rod Martin, 5 Odette Road, Glenfield, North Shore City, Auckland. pincha@ihug.co.nz

NEWSLETTER EDITOR :

Editor-in-Chief and Distribution Organiser: Dick Glover. Contact above as for Treasurer

NEXT ISSUE: Contributions please to: **Dick Glover**

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2005 – 2007 S U B S C R I P T I O N S

NOW DUE ! ! ***NOW DUE ! !***

The Group welcomes anyone with an interest in geochemistry.

Subscriptions for 2005-2007 are NOW DUE as follows

New Zealand members	NZ $ 8.00 for 2 years
or	NZ $60.00 life membership
Overseas members	NZ $12.00 for 2 years
or	NZ $90.00 life membership
New Zealand libraries	NZ $10.00 for 2 years
Overseas libraries	NZ $14.00 for 2 years

[Overseas payments should be in NEW ZEALAND DOLLARS by bank cheque, postal note or international money order.]

Subscriptions should be sent to **Dr R.B. Glover,**
Hon. Treasurer, N Z Geochemical Group,
33c Brandon Road,
Glen Eden,
Waitakere 0602, NEW ZEALAND.

Editor's Note:

My **second issue** as editor.

Being the 120th edition of the Newsletter, this can also be described the "Double Diamond Edition". I have focused therefore on minerals and some information on diamonds. I print one article from the "Diamond Edition" in its entirety, " Geochemistry – What does it mean to you" by Bruce Utting. Whilst the context has changed since 1981 the questions he raises are still valid.

Dick Glover

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Letters to the Editor

8 Feb 2006

I have just skimmed through my collection and seem to be missing a few odd numbers, no doubt due to post having gone astray. Specifically:
No. 17 1970
No. 21 1971
No. 83 1989

But for some inexplicable reason there is a short run in the 1976-1977 era of Nos. 42 - 45 that I did not get.

I have had a couple of office moves in recent years but none of these missing numbers have turned up. I really would like to fill those gaps.

I do have duplicates of 78 & 79 that I would be happy to swap if anyone is interested.

Peter (Rickwood)

[My thanks to Graeme Lyon, Peter Ambler and Liz McKenzie who replied to my request for back numbers. I was able to fulfill the request. – Ed]

16 April 2006

Dear Dick
It was a delight to get your "parcel" of copies of the Newsletter. As a result of getting these Newsletter I have just spent Easter Sunday morning reading the 'new' copies to find out what I had missed, and interleaving them with my collection. At last the set is complete. At the same time I took the opportunity to read the Tables of Contents of all issues, to scan a few articles that struck a chord, and to reminisce about 40 years of geochemistry in NZ. (Peter writes about his many links with Robert Brooks, at Bristol and Cape Town). He continues…I can still vivdly recall the inaugural meeting in August 1965, even to the place where I sat to hear John Rogers moot the founding of the society. But I had forgotten that so few as 21 –people attended that meeting (37, p3), the list of attendees is in (55, p54). The remaining foundation members must surely all be retired by now but I wonder how many of them are still alive and

how many have maintained membership – it would be interesting to know. Also I have turned up your note of 28.5.85 attached to issue 72 stating: "You are now our first Life Member (signed) Dick Glover." I really appreciate the assistance you have given to enable me to complete my set of Newsletters – thank you.

Yours sincerely
Dr Peter C. Rickwood.

[Of the 21 present at the Inaugural Meeting there are six current NZGG members viz: Jim Ellis, Mel Carr, Doug Coombs, Dick Glover, Peter Rickwood and Graeme Lyon - Editor]

23 June 2006

Hi. Richard,
Glad you enjoy the MicroScope. I'm very happy for any of it to be quoted, and perhaps sometime you could make the note that the "Essence of MicroScope" CD is a compilation of all the NZ material, costs $10 from Rod Martin. We have written up a lot of NZ minerals, especially the zeolites, that are not noted elsewhere. It is updated each year. [Readers. Please note! – Ed]
Regards, Jocelyn

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NZ TO GET WORLD-CLASS ICE CORE FACILITY FOR CLIMATE RESEARCH
(Institute of Geological & Nuclear Sciences News Release, 28 February 2006)

New Zealand is to get a world-class research laboratory for studying climate history in the Southern Hemisphere. It will be used for storage and analysis of Antarctic and New Zealand glacial ice cores, which are indicators of climate change.

GNS Science will build and operate the facility in Lower Hutt after the organisation's Board of Directors approved an investment of $1.3 million in the facility and associated research laboratories

GNS Science Chief Executive, Alex Malahoff, said the facility had the backing of Antarctica New Zealand, Victoria University, and the National Institute of Water and Atmospheric Research (NIWA), who would work with GNS Science to ensure it was used optimally for the benefit of New Zealand.

" The facility will invigorate climate research not only in New Zealand, but internationally," Dr Malahoff said.

" It will provide information and interpretation for global climate modelling that will underpin international climate protocols. It will be one of the cornerstones of the Joint Antarctic Research Institute, recently set up between GNS Science and Victoria University."

" Through our work in Antarctica and on New Zealand's glaciers, GNS Science already has a strong track record in climate research."

The facility would be adjacent to GNS Science's National Isotope Centre at Gracefield, Lower Hutt, to take advantage of the NIC's specialist chemical, mineralogical, and isotopic analysis capabilities used in climate research.

Frank Bruhn, General Manager and Director of the NIC, said construction of the purpose-built facility, the only one of its type in New Zealand, would start immediately and it would be commissioned at the end of this calendar year.

" The facility is designed to ensure the safe, long-term storage of hundreds of metres of ice core retrieved from Antarctica and New Zealand glaciers for climate research," Dr Bruhn said.

The facility would be able to store ice cores down to minus 30degC. This would ensure they could be held for long periods without the risk of deterioration.

" Development of the facility is timely as we have climate research programmes underway that will retrieve hundreds of metres of ice cores during the next five years."

Dr Bruhn said ice cores stored chronological records that enabled scientists to study climatic changes in the past, particularly changes in temperature, rainfall, and atmospheric circulation.

" These are basic inputs into any projection and modelling of future climate change, both in New Zealand and on a global scale."

Dr Bruhn said the new facility would enable GNS Science to expand its collaborative research and offer analysis and scientific expertise in the environment and groundwater areas on a commercial basis to a range of clients such as territorial authorities and other research organisations.

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Still gold in them thar hills

BY NICK SQUIRES

The beam of a miner's lamp picks out a tiny yellow dot embedded in a freshly blasted white quartz. "That's a little ripper," ays the engineer Mark Shannon, as colleagues working in ankle-high grey sludge, 250m below the surface, prepare to set more explosives.

More than 150 years after the discovery of gold sparked a digging frenzy in Victoria, prospectors are again striking it rich as another gold rush takes hold.

Better equipment and sophisticated geological mapping are enabling mining companies to find deposits which were beyond the reach of their 19th century forerunners.

Back breaking work with picks and shovels has been replaced by huge drilling machines, powerful bulldozers known as boggers, and monster trucks capable of hauling 40-tonne loads of ore to the surface.

Victoria once produced 40 per cent of the world's gold, and eight companies have now returned to the golden triangle by Ballarat and bendigo.

About $6 billion of gold was mined in Victoria between the 1850s and World War I, when a lack of manpower and coal made it impossible to keep mines pumped free of water and mining leases became so fragmented that they no longer justified the capital investment.

The latest generation of mining companies believes that as much gold is beneath the surface as was extracted during the first gold rush – and hope to extract $770 million of the metal each year. "The old workings went to a depth of about 200m, but we'll go underneath them down to 800m," says geologist Jeol Forwood, of Ballarat Goldfields, which poured its first ingot in December.

The company plans to mine 200,000 ounces of gold a year - $154 million at today's record price – which is the result of declining production in South Africa and increasing demand from the burgeoning middle-classes of India and China.

The discovery of gold in 1851 attracted tens of thousands of prospectors , from Cornish and Welsh miners to Chinese coolies and veterans of the Californian gold rush.

Ballarat and Bendigo started as shanty towns where the lucky few who found gold spent their money in tented brothels, dingy gambling and opium dens and makeshift bars that sold illegal grog.
Bullion was taken to Melbourne by coaches which were often plundered by bushrangers, despite their escort of troopers. In one of the few links with that era, a dedicated goldfields detective has been appointed to combat theft and fraud.
One of the new mines will tunnel beneath Sovereign Hill, a replica 19th-century town which attracts half a million tourists a year.
In the 1860s, 50,000 miners were in Ballarat. Now a mining company employs a couple of hundred people. Although the brawls, brothels and bushrangers have gone, Victoria is reconnecting with its past.
“We have always had a reputation as a gold twon so this gives us back our authenticity,” says Ballarat mayor David Vendy.
“Miners here became so rich that they imported ice from Canada and drank more champagne than anywhere else in the world. Now we’ve got a second gold rush. The buzz is back.”

[from the New Zealand Herald, Saturday February 18 2006]

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GEOCHEMISTRY -- WHAT DOES IT MEAN TO YOU?

by B.S. Utting,
Minzimp Exploration Ltd,
Wellington.

I have been a member of the Geochemical Group for some years now, and attend conferences regularly. Very occasionally I meet another mineral exploration geologist at such events, but more often than not, I am alone - the only representative of a large geological faction interested in applied mineral exploration geochemistry.

I read every article in the Newsletter, and avidly listen to every paper presented at Conference, in the hope of gleaning some germ of relevance to my particular field of interest. I imagine that many others do the same in respect of their narrow field of interest, whether this be the geochemistry of thermal waters - a major concern of the Geochemical Group, the obscure trace element geochemistry of igneous rocks, active volcanicity, 'Mossbauer Spectroscopy', 'Typomorphism' or even '...the effects of vibronic interactions on laevo-dextro rotatory polytypic nucleation', which sounds like a research project on side effects of the massage parlour industry.

As you will have gathered, geochemistry to me represents a tool which can be used to help discover mineable minerals. At the risk of attracting a storm of abuse, I would suggest that a far greater proportion of NZ's geochemists ought also to be preoccupied with this problem, rather than devoting their working lives to purely theoretical scientific studies, or areas whose application extends only as far as supplying data for a chapter in an obscure textbook.

New Zealand desperately needs minerals and oil. In fact, the very economic survival of the country depends on the eventual discovery of either large orebodies, small oilfields, or both. Pure research has its place, but when a country is fighting for survival and the preservation of our unique way of life, should we not ask ourselves how much pure research we can afford?

The old counter to this argument is that it is often difficult to predict the areas in which apparently pure research data will prove to have a practical application. While this is true, it is not hard to demonstrate the relevance of mineral exploration geochemistry, as the orebodies that have been found overseas by geochemists can be seen being mined today.

So how about it geochemists? Join the select few in NZ and turn your minds to the problems of finding the vast gold orebodies which must yet underlie the Coromandel, the base-metal ores perhaps awaiting discovery in the Taupo-Reporoa graben, the uranium 'roll front' deposits possibly hidden beneath the Canterbury Plains. or, dare I say it, the tin ores of Stewart Island.

If the thought of mining in any of NZ's beautiful unspoiled areas is anathema to you, ponder on the following. Our economy is so depressed at the moment that most people can't afford to take a holiday to see our scenic wonders. A few, very few, mines, hidden from the public eye, and occupying a minute fraction of the thousands of square kilometres of parklands, could drastically improve the standard of living of every one of us. Who knows, it might mean that you'll still have a job as a scientist in ten years time....

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Change in colour in Lake Vui on Mt Manaro, Ambae Island, Vanuatu.

In Dec 2005 a cone grew in the lake to be about 250m across and 70-80m high and at that time the lake was agitated and coloured grey by sediment disturbed by activity in the lake. Once the eruption ceased the sediment settled and it returned to its typical blue tones. However, in May 2006, during an over flight, the lake was observed to be "quite a spectacular red," according to Brad Scott. A sample has been sent to Alain Bernard in Belgium and he reports :

"I've analyzed the material in suspension in the lake waters (pH 2.6) collected Esline on May 26 and received this morning in Brussels.The composition is essentially jarosite (hydronium/K variety) mixed with amorphous silica and some silicate ash fragments …..This material is yellow with a colour rather different from current lake pictures suggesting an evolution(?) of a red iron (sulfate?) precipitate to the more stable jarosite between Vanuatu and Belgium. I have also filtered the 27 February 2006 lake waters collected by IRD. The February sample show no trace of iron precipitates only fragments of silicate pyroclasts. In February, Fe (350-440mg/l) was still soluble (suggesting that Fe was still as Fe2+ in the lake waters) for the same pH (2.6). Jarosite is very typical of acid sulfate (pH2-3) environments where you have Fe3+ instead of Fe2+.What is the origin of the change in redox of Iron last May?"

Has anyone comments or suggestions? [Letters to the Editor please]

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Diamonds - Formation

Diamonds are formed by prolonged exposure of carbon bearing materials to high pressure and temperature. On Earth, the formation of diamonds is possible because there are regions deep within the Earth that are at a high enough pressure and temperature that the formation of diamonds is thermodynamically favorable. Under continental crust, diamonds form starting at depths of about 150 kilometers (90 miles), where pressure is roughly 5 gigapascals and the temperature is around 1200 degrees Celsius (2200 degrees Fahrenheit). Diamond formation under oceanic crust takes place at greater depths because of higher temperatures, which require higher pressure for diamond formation. Long periods of exposure to these high pressures and temperatures allow diamond crystals to grow larger.

Through studies of carbon isotope ratios (similar to the methodology used in carbon dating) except using the stable isotopes C-12 and C-13, it has been shown that the carbon found in diamonds comes from both inorganic and organic sources. Some diamonds, known as harzburgitic, are formed from inorganic carbon originally found deep in the Earth's mantle. In contrast, eclogitic diamonds contain organic carbon from organic detritus that has been pushed down from the surface of the Earth's crust through subduction (see plate tectonics) before transforming into diamond. These two different source carbons have measurably different 13C:12C ratios. Diamonds that have come to the Earth's surface are generally very old, ranging from under 1 billion to 3.3 billion years old.

Diamonds occur most often as euhedral or rounded octahedra and twinned octahedra known as macles or maccles. As diamond's crystal structure has a cubic arrangement of the atoms, they have many facets that belong to a cube, octahedron, rhombicosidodecahedron, tetrakis hexahedron or disdyakis dodecahedron. The crystals can have rounded off and unexpressive edges and can be elongated. Sometimes they are found grown together or form double "twinned" crystals grown together at the surfaces of the octahedron. This is all due to the conditions in which they form. Diamonds (especially those from secondary deposits) are commonly found coated in nyf, an opaque gum-like skin.

Diamonds can also form in other natural high-pressure, high-temperature events. Very small diamonds, known as microdiamonds or nanodiamonds, have been found in impact craters where meteors strike the Earth and create shock zones of high pressure and temperature where diamond formation can occur. Microdiamonds are now used as one indicator of ancient meteorite impact sites.

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Diamonds - Symbolism in the Occult

Historically, and in occultist myths, it has been claimed that diamonds possess several supernatural powers (mainly quoted by Pliny the Elder – [1]):

* A diamond gives victory to he who carries it bound on his left arm, no matter the number of enemies.
* Panics, Pestilences, enchantments, all fly before it; hence, it is good for sleepwalkers and the insane.
* It deprives lodestone and magnets of their virtue (i.e., ability to attract iron).[1]
* Arabic diamonds are said to attract iron greater than a magnet.[1]
* A diamond's hardiness can only be broken by smearing it with fresh goat's blood.[1]

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***A magazine recently ran a "Dilbert Quotes" contest. They were looking for people to submit quotes from their real-life Dilbert-type managers.

Here are the second four of the top ten finalists:

5. Doing it right is no excuse for not meeting the schedule. (Plant Manager, Delco Corporation)

6. No one will believe you solved this problem in one day! We've been working on it for months. Now, go act busy for a few weeks and I'll let you know when it's time to tell them. (R&D supervisor, Minnesota Mining and Manufacturing, 3M Corp.)

7. Quote from the Boss: "Teamwork is a lot of people doing what I say." (Marketing executive, Citrix Corporation)

8. My sister passed away and her funeral was scheduled for Monday. When I told my Boss, he said she died on purpose so that I would have to miss work on the busiest day of the year. He then asked if we could change her burial to Friday. He said, "That would be better for me." (Shipping executive, FTD Florists)

[provided by G L Lyon]

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Bon Mots

"Chaos theory is a new theory invented by scientists panicked by the thought that the public were beginning to understand the old ones" – Mike Barfiel

Consult - v. t. To seek another's approval of a course already decided on.
---Ambrose Bierce The Devil's Dictionary

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William Goodlet and the discovery of goodletite

(from MicroScope No 58, June 2006 – with permission)

Jocelyn Thomton

Last September Dr W. A. Watters sent me a letter enclosing an article about James Gow Black, William Goodlet and the discovery of goodletite, which he had written for the Historical Studies Group of the New Zealand Geological Society, published in September 1995. Dr Watters vaguely remembers talk about Goodlet when he was a student in Dunedin. With his permission, the following artcle is mostly a direct quote from his history.

James Gow Black was one of the foundation teaching staff at Otago University, and as early as 1872 he had started lectures and practical work there in mining subjects, and later he taught metallurgy and assaying at the Otago School of Mines after it was founded in 1878. In 1884, he gave a series of lectures at Lawrence, the centre of the Tuapeka goldfield, on the application of chemistry to mining problems. After this he gained. government support for lectures as other places in Central Otago. This eventually led to the establishment of mining schools in various parts of the country, to give technical instruction to working miners, and Black was recognised as having played a crucial part in their foundation. Black himself toured extensively during university long vacations to lecture at the various gold-mining centres. He had a long-lasting interest in metallurgy and worked particularly on a process for recovering traces of gold from ore.

His main publication was a book, *"Chemistry for the gold fields ",* in 1885, a textbook on inorganic chemistry with a good deal of information on the properties and methods of identification of common minerals. An outdoor man, he visited the site of the tin prospect on Stewart Island, after identifying the tin from a sample brought in by a prospector. Eventually he retired to Stewart Island.

For much of his career at Otago University, Black had an assistant for help during his lectures, particularly with lab work. The first of these was William ("Wullie") Goodlet (1863 -1940), who joined Black's department at the age of 16 and who was to become a well known university figure. Little is known of his early life except that he was born in Mataura, Southland. He was clearly able and versatile, and over the years he developed considerable talents as a speaker and singer, in addition to his practical skills. Besides his work in Dunedin, he accompanied Black on his lecturing visits. I noted in an earlier *MicroScope* from a note in the Appendices to the Journals of the House of Representative that Goodlet had been teaching courses on the West Coast on his own in the summer of 1892. It was at that time that he obtained samples of the striking ruby-rich rock to which his name was later given.

However, he was not the actual discoverer of the rock. Instead, this was apparently an unknown miner who pointed out to Alexander McKay late in 1891 a boulder of a very unusual hard rock present in a mining claim in gravels near Rimu. McKay's visit there was during an extended examination of north Westland as part of his work for the N.Z. Geological Survey under the directorship of Sir James Hector. McKay later took two small specimens from the boulder to Wellington where the abundant red mineral in it was identified by the Government analyst, William Skey, as ruby. According to McKay, no record of this identification was made by Skey.

A few months after McKay's visit to Rimu, Goodlet also obtained samples of the ruby rock and on his return to Dunedin submitted them to Professor G.H.F. Ulrich, Director of the Otago School of Mines, who described the mineralogy of the rock in a short paper in the Mineralogical Magazine and pointed out the potential value of the discovery. At the time of writing his long West Coast report in 1893, McKay was aware of Ulrich's work, but Ulrich and Goodlet had presumably not heard of the identification of ruby by Skey.

How the name "goodletite came to be given to the rock is uncertain. Ulrich made no mention of it in his paper, but it seems likely that Black suggested it. A clue to this is found in a long humorous poem in blank verse, entitled "Chemistry, '94", published in the Otago University Review. An extract from this:

> Turn we now to speak of Wullie,
> Indispensable assistant,
> The professor tells of his great deeds,
> His remarkable achievements,
> With a manner patronising,
> "He's the boy who found out rubies
> On the west coast of this island,
> Found the new stone,
> The green matrix
> *Goodletite* WE'll always call it.
> From Tasmanian exhibitions
> Came gold medals to our Wullie,
> For his minerals awarded."

This indicates that Black may be the likely proposer of the name. The emphasis given in the printing of the fourth last line suggests that another name may have been put forward, although no evidence to support this - apart from the descriptive name “ruby rock” - has been seen. What is certain is that goodletite came to be used in a number of New Zealand publications. This usage continues to the present time, although the name has been generally applied informally and is little if at all recognised beyond New Zealand.

The "Tasmanian Exhibitions" mentioned in the verse refers to the Tasmanian International Exhibition held in Hobart late in 1894, which included a display on minerals. Goodlet could well have submitted a specimen of the West Coast rock with Black's encouragement, although there is a difficulty about the timing of the award reportedly given to him. The exhibition opened to the public on 15 November 1894, whereas the date of the verses was a month earlier. Possibly the awards were decided well before the public opening.

By this time Goodlet was a well-known personality in the university. He demonstrated experiments to the public after capping ceremonies, and there are several references to his appearances at other functions as a speaker and singer. The Review for August 1898 writes "Mr Goodlet - the genial Wullie - entranced the room with his rendering of "Louise" and "The Prince Imperial", two songs known, by his exertions, in every miner's hut from Cape Reinga to the Bluff."

In 1898 Goodlet resigned from the university after a disagreement with Black, and for the next 12 years he worked for the Otago Daily Times. However in 1911 he returned to work for the university, as janitor in the Otago Museum. He was obviously more than that, as he became familiar to museum visitors with talks on some of the more interesting exhibits. He retired from the museum in 1929 at the age of 67, and died in Dunedin in 1940.

Dr Watters ends his history with the tribute. "His retirement brought to an end a long and at times colourful period in the history of the university and links to the early development of geological and mining education in New Zealand, and I believe it is appropriate that his name should be linked to the striking ruby-rich rock from the West Coast."