AUSTRALIAN MINING HISTORY ASSOCIATION INC.
14th ANNUAL CONFERENCE
QUEENSTOWN, TAS 2008

PROGRAMME

Saturday 4 October

9.00 am	Bus pickup at Avis Rental depot, Hotel Grand Chancellor in CBD,
10.00 am	Bus pickup at Launceston Airport
12.00-12.15	Arrive Burnie and Emu Bay
1.15-3.30 pm	Lunch at Bischoff Hotel, Waratah and visit Mt Bischoff Mine
3.30-5.00 pm	Travel to Tullah and stop at Rosebery
6.00 pm	Arrive at Queenstown
6.30-8.00pm	Welcome reception hosted by West Coast Council at 'Penghana' Queenstown

Sunday 5 October

8.30-9.30 am	Registration at Silver Hills Motel, Queenstown
9.30-9.40 am	President's Welcome, Dr. Peter Bell (Chairperson for Keynote address)
9.40-10.30 am	Keynote Speaker – Prof. Geoffrey Blainey, *Researching Mt. Lyell*
10.30-11.00 am	Morning tea
11.00-12.30 pm	*Session **1**–Transport* - Chairperson, Mel Davies Peter Brown**:** *Routes to the West Coast* Dr. Ruth Kerr**:** *Recap Mines and Tramway on the Chillagoe Field - it's connection to southern Australia and Queensland politicians 1890 to 1920s* Tony Weston: *Mining Lower Grade Ore Through Changes in Mining Technology at The Mount Lyell Mining and Railway Company, Queenstown, Tasmania from 1931 to 1938*
12.30-1.30 pm	Lunch
1.30-3.00 pm	*Session 2 - Geology/Environment* – Chairperson Dr. Ken McQueen Keith Corbett: *From Blow to go - a geological take on the early days of Mt Lyell* Leonie Knapman**:** *Weather versus Glen Davis* Dr. Barry McGowan: *Booms, busts and the environment: the life and times of the base metal mining community of Captains Flat*
3.00-3.30 pm	Afternoon tea
3.30-5.15 pm	Visit Lake Margaret Power Station
7.00-10.00 pm	AMHA Conference Dinner, Silver Hills Motel

Monday 6 October

8.30-1.30 am	Visit Iron Blow
10.30-11.00am	Morning tea
11.00-12.30 pm	*Session 3 - Labour/Gender* - Chairperson Anne Both Wendy Fowler: *Convicts and Salt Water River Coalmine Research Project* Prof. Pam Sharp: *Millie's Story: Women, Domesticity and Commerce in Gwalia and Leonora* Dr. Roger Kellaway: *New Zealanders and the Zeehan Silverfield 1891-1895*

12.30-1.30 pm	Lunch
1.30-3.00 pm	*Session 4 - Mining personalities* – Chairperson Sandra Kippen Richard Allsop: *Was Mt Lyell a better teacher than Oxford?* Dr. Philip Hart: *'A carter, a businessman, and a prospector with several things in common'* Dr. Nic Haygarth**:** *Chasing a shadow? T.B. Moore, Robert Sticht and the Balfour copper boom*
3.00-3.30 pm	Afternoon tea
3.30-6.00 pm	Mt. Lyell Mine Tours
7.00-8.00 pm	Visit to Spion Kop Lookout

Tuesday 7 October

8.30-10.30 am	*Session 5 - Health & Safety* – Chairperson Peta Chappell. Anne Both**:** *From a tent to a modern hospital: the role of mine and community in Queenstown health care* Marita Bardenhagen: *Invisible women - Bush Nurses at Adamsfield* Dr. Adrian Hutton: *Bulli and Appin Mine Disasters – Who Was To Blame?* Peter Schulze: *Tragedy at the Mt Lyell Mine, 1912*
10.30-11.00 am	Morning tea
11.00-12.30 pm	*Session 6 - Materials* – Chairperson Nick Haygarth Prof. David Branagan: *The Oldest Marble Quarry in Australia* Greg Drew: *Pugholes and Brickworks of Adelaide's Western Suburbs* Dr. Ken McQueen: *Quidong Mineral Field, NSW: An intriguing discovery of W.B. Clarke*
12.30-1.30 pm	Lunch
1.30-3.00 pm	*Session 7 - Heritage* - Chairperson Peter Claughton Prof. Ross A. Both: *Gilles v. the Glen Osmond Union Mining Company* Geoff Cordery**:** *The Mt Lyell Mine - Challenges of operating a large mine in a heritage environment* Jo Field: *Getting lost in the Myths: Blue Tier mining history at risk*
3.00-3.20 pm	Afternoon tea
3.30 pm	Mt Lyell Disaster Ceremony, South Queenstown
4.15-6.00 pm	**AMHA ANNUAL GENERAL MEETING (members only) -** or Cemetery visit South Queenstown for non-members
6.30-9.30 pm	Rotary Dinner and Band Recital at RSL Club, Queenstown

Wednesday 8 October

8.30-10.30 am	*Session 8 - Technology* – Chairperson Prof. David Branagan. Jim Enever: *'Not for Want of trying': The history of the Coopers Creek Copper Mine, Victoria* Dr. Peter Claughton: *Mining on the frontier: some comparisons in the working of precious metals at the extremities of English/British rule* Dr. Richard G. Hartley: *Sons of Gwalia gold mine: reasons for operational longevity* Nicola Williams: *FINE or FORGED: Precious Metal Assay Through the Ages*
10.30-11.00 am	Morning tea
11.00-12.30 pm	*Session 9 - Tasmanian Exploration & History*- Chairperson Dr. Ruth Kerr.

	Donald J. Perkin: *History of the Discovery of Gold and Iron Ore and the Development of the Magnetite deposits at Savage River, NW Tasmania, from 1877 through to the 21st Century* Dr. Tim Jetson: *"That some rich lode amongst these hills is waiting for us yet"* Greg Dickens**:** *Mining in Western Tasmania - A Brief History of Exploration and Development*
12.30-1.15 pm	Travel to Strahan
1.15-1.45 pm	Lunch at Strahan
1.45-3.00 pm	Tour Strahan and Regatta Point
3.00-7.00 pm	Regatta Point to Queenstown via Abt Railway

Thursday 9 October

8.30-10.00 am	Travel to Zeehan & Zeehan Smelter
10.00-10.30 am	Morning tea at Central Hotel, Zeehan
10.30-12.00 pm	West Coast Pioneers Museum
12.00-1.00 pm	Barbeque lunch at Central Hotel, Zeehan
1.00-2.00 pm	Visit Spray Tunnel area
2.00-3.30 pm	Visit Renison Bell
3.30-4.15 pm	Return to Queenstown
4.15-5.45 pm	Queenstown Walk, including Galley Museum & 'Penghana'
7.00-9.00 pm	'Sunset Tour' (Mt Jukes Road)

Friday 10th October

8.00-9.00 am	Queenstown to Tullah
9.00-11.00 am	To Sheffield via Cradle Mountain Link Road
11.00-11.30 am	Morning tea
11.30-1.00pm	Bus travels to Launceston Airport
1.00-1.30pm	Bus travels to Launceston City Centre

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ABSTRACTS

Richard Allsop,
Was Mt Lyell a better teacher than Oxford?
My PhD on 'The Works of Geoffrey Blainey' is attempting to meet a challenge posed by Graeme Davison in the *Oxford Companion to Australian History*. Davison lamented that existing studies of Blainey's work were 'mostly polemical in approach'. He believed there needed to be 'a more mature assessment' of Blainey's work that would 'illuminate more clearly the personal and ideological dimensions of his maverick career, as well as acknowledging the sustained creativity, intellectual range, pervasive influence, and literary distinction of his writing'.

The view of the academy that Blainey was something of a 'maverick' can be traced all the way back to 1951. That was the year when, if Blainey had followed the conventional approach of first class honours graduates from the History Department of Melbourne University, he would have headed off for further study at Oxford. Instead, Blainey came to Mt Lyell and wrote about a very different topic, and in a very different way, to that which his contemporaries were doing at Oxford.

Blainey's time here, and his subsequent ten years as a freelance historian, largely earning an income from writing commissioned histories, certainly gave him a different perspective on history to other historians of his generation. Crucially, this enabled him to write a different version of Australian history, one that takes account of a range of important factors that other historians have tended to neglect.

Marita Bardenhagen – Research Officer, Heritage Tasmania
Invisible women - Bush Nurses at Adamsfield
Adamsfield is an example of a particular type of experience in mining history. It was an osmiridium mining town, one of the most isolated communities in south-west Tasmania. Memories of the place allow us to reflect on health professional interactions and the role of women as pioneers and health care providers during the first half of the twentieth century. But this history is not available in the voluminous mining reports. Archaeological investigations may be able to locate the remnants of the town now camouflaged by the bush, but oral histories provide the 'flesh on the bones'. By examining the lives of Bush Nurses that were sent to serve in this community we can also catch glimpses of another group that is absent from the records—women that shared the digs with their men. We have no artefacts that tell us of the makeshift tents in the mud and snow. There are no extant buildings that show us the living conditions for families. The Bush has wrapped all evidence into its dense growth. Unlike urban history where artefacts and records still exist, rural and bush environments disappear from the landscape more rapidly. Evanescent mining towns are even more susceptible to losing their sense of place. Some photographs exist but even these can deceive and can contribute to false impressions. The voices of Bush Nurses have been captured in letters held in the DPH and more importantly in oral histories that have recently captured what life was like for women in a harsh male dominated town. The conflict and contradictions between the public record and the recorded voices of Bush Nurses offer another dimension to the history of Adamsfield. How does the historian diffuse and interpret these opposing views? Perhaps these dilemmas in themselves offer another layer of understanding of Adamsfield - a ghost town.

Geoffrey Blainey, AC.
Keynote Paper - Researching Mt. Lyell

Anne Both
From a tent to a modern hospital: the role of mine and community in Queenstown health care
The present day West Coast Health Centre, now funded by both the Tasmanian and Commonwealth Governments, had its genesis in 1895 under the joint auspices of the Mt Lyell Co and the mining community. The Mt Lyell Co and the growing population of the district perceived the need for "the formation of a fund or society of some kind for the immediate assistance, surgically etc. of the many residents of the district ...". The District Accident Society was formed, and the resident engineer of the Mt Lyell Co was asked to deduct subscriptions from mine employees' pay. As the town and workforce grew so did the Society (later the Queenstown Medical Union). The community began to raise funds and the Tasmanian Government was

petitioned for assistance to build a hospital to serve the district needs. With the continued growth of Queenstown, and the decline of the townships of Zeehan and Strahan, the hospital became the chief medical facility for the west coast. Although the nature of the modern Health Centre differs somewhat from that of the original hospital, it continues to serve Queenstown, Zeehan, Strahan and district. The paper explores the genesis of the hospital, the changing roles of the Mt Lyell Co and the community in its first fifty years.

Ross A. Both, Adelaide University

Gilles v. the Glen Osmond Union Mining Company

The Glen Osmond Mine was one of a group of silver-lead mines that commenced operations in the early 1840s in the foothills of the Mount Lofty Ranges near Adelaide. These were Australia's first metalliferous mines and represented the start of South Australia's first mining boom. The Glen Osmond Mine was located on property belonging to Osmond Gilles, the first Colonial Treasurer of South Australia. Osmond Gilles' brother Lewis came from Tasmania to direct operations. Lewis subsequently purchased the lease of the mine from Osmond and went to London to form the Glen Osmond Union Mining Company. He was appointed General Superintendent of the mine and, following his return to Adelaide, the company commenced its operations in December 1846. Work was suspended in January 1849 when a writ was issued by the Supreme Court of South Australia on behalf of Osmond Gilles, seeking to have the company ejected from the lease on the ground of non-payment of royalties. Osmond Gilles was unsuccessful and operations were recommenced and continued until closure of the mine in 1851. This paper will review the reasons behind, and the outcome of, the court case and the role of the personalities involved in the dispute, particularly the Gilles brothers.

David Branagan, School of Geosciences, University of Sydney

The Oldest Marble Quarry in Australia

In the second volume of Thomas Mitchell's *Three Expedition into the interior of Australia* … (1838) he devoted a sentence or two to a visit he made to an interesting **site**, not far from his Great Southern Road:

> Near the Wollondilly, and a few miles from Towrang, a quarry of crystalline variegated marble has been recently wrought to a considerable extent, and marble chimney-pieces, tables etc. now ornament most good houses in Sydney. This marble occurs in blocks over greenstones and has hitherto been found only on that spot.

The marble was apparently first located by an early settler, Peter Stuckey, who established the property, *Longreach*, on the bank of the Wollondilly River in the 1820s, near where the quarry occurs. Stuckey made the original development, but apparently found the operation too difficult, and passed it on to the government.

The site was visited in the 1840s by the geologist, the Rev. W.B. Clarke who saw that the altered limestone was fossiliferous, despite previous comments that it did not contain fossils. Several specimens of the 'prepared' marble were taken to England by a Captain Baker and presented to the Rotunda Museum, Scarborough.

The quarrying for marble only lasted a few years and was replaced by an operation using the material for lime. This activity also faded out when larger sources were located. However the site is still accessible and some evidence of the site's two lives as a mining centre can still be studied.

Peter Brown

Routes to the West Coast

The end of the 19th century saw a strong interest in linking the rising fortunes of the new mines of Western Tasmania with the commercial centres of Launceston and Hobart. The tumult of the various railway routes has been well documented as the 'Railway Wars' but the poor cousin of these grand schemes was the overland tracks.

Rough pioneering tracks had been cut into this country from the 1850s, which led to the spate of mineral discoveries at Zeehan, Rosebery, Queenstown and other smaller fields. In the time of the Railway Wars, a series of substantial tracks were proposed between Central and Western Tasmania. Possibly as part of the overall hysteria of the Railway Wars, the public interest in these tracks was intense, but of all the proposals only a few of these routes were cut by the Public Works Department. These were the Linda Track from Marlborough, near Lake St Clair, to Linda, near Queenstown; the Mole Creek Track from Liena near Mole Creek to Rosebery and; the South Gordon Track from Tyenna to the Gordon River. The stories of these tracks have been obscured by the more sensational railway proposals and the work of the track cutters has been almost entirely forgotten.

The main aim of this talk is to examine the success, or otherwise, of these tracks, the art of their construction and the life of track cutters, using the Mole Creek Track as the main example.

Geoff Cordery, Environmental Manager, Copper Mines of Tasmania
The Mt Lyell mine - Challenges of operating a large mine in a heritage environment.
Mt Lyell has a rich mining and cultural heritage and has been the stage for many "firsts" in the mining and metallurgical fields. This has created a diverse and abundant catalogue of heritage features and stories that now provides challenges to the historian, conservator, mine operator, environmentalist and legislator. Along with the rich mining and industrial heritage, there is a wealth of European cultural, Aboriginal, geo and natural heritage. Copper Mines of Tasmania is working to achieve a realistic and sustainable environment where heritage can be conserved and balanced with the needs of production, community growth, environmental protection and public safety, though this has its challenges.

Heritage features and historic documents are plentiful, relatively well preserved, maintained and documented. The mid 1990's saw a detailed heritage inventory compiled that was the basis for a heritage management plan for the site. Heritage on site is protected by legislation and specific conditions on land use. Our most significant challenge is the scale of the site which is still operational. Should the mine cease production the formal closure plan allows for the conservation of heritage together with potential future mineral, tourism and other land uses.

Awareness and competing perceptions are challenges and effort has to be made to protect documents, retain the integrity of the cultural landscape, but also ensure that a balance exists between conservation and problems associated with health and safety issues. One recent problem has been associated with storage of information, with some digital records from the 1970's to 1990's no longer useable due to changes in computer technology. With a commitment to responsible conservation, Copper Mines of Tasmania has a heritage management plan in preparation to ensure a sustainable environment where heritage can be conserved and balanced with the needs of production, community growth, environmental protection and public safety.

Peter Claughton, Exeter University, UK.
Mining on the frontier: some comparisons in the working of precious metals at the extremities of English / British rule.
Carlisle in the 12th century or Ophir in the 19th; there were certain similarities in the way that the working of precious metals, silver or gold, was regulated. Significant differences are also apparent, particularly in the way the English Crown chose to react to the discovery of rich metal deposits which could be worked by the small operator. Well-established English practice was apparently ignored in Australia although it had given good service in a similar situation, albeit seven centuries earlier, and continued to be used in modified form up to the present day.

Keith Corbett, Consultant Geologist, Hobart
From Blow to go - a geological take on the early days of Mt Lyell
The early development at Mt Lyell in the 1880's and early 1890's centred around a large outcrop of gossan-like hematite ironstone known as the Iron Blow. Sluicing of nearby creeks produced fine gold which appeared to come from the Blow, but the costly attempts to crush the hard, heavy barite-laced hematite and extract payable gold were a failure, and forced the sale of the works to a Melbourne group, from which followed its development as a highly successful copper mine. Geological studies indicate that the Iron Blow was actually a fossil gossan formed about 500 million years ago, when the original sulfide body was exposed and oxidised at surface, but not completely eroded away. This happened when the mass of softened clay-rich rock, or schist, surrounding the orebodies, collapsed off the scarp of the great fault which cuts the field, and rolled out onto the younger conglomerates accumulating on the downthrown side. The huge slug of schist at North Lyell, surrounded by conglomerate and containing the rich bornite orebodies from the top of the system – the basis for the rival North Lyell Company's short-lived wealth - was also formed at this time.

A younger 'normal' gossan which had formed on the eroded upturned end of the sulfide body now lying beside the Iron Blow – but originally underneath it – also yielded good gold for a short period. The 250m-deep sulfide body, consisting of massive pyrite and chalcopyrite, became the mainstay of the new Mt Lyell Mining and Railway Company, but it was the discovery of an amazing bonanza of silver-rich ore just beneath the Iron Blow hematite which got the company to its feet in the first critical years. This bonanza probably resulted from weathering and supergene enrichment processes acting on the upper part of the original sulfide body, which might well have been mostly lead-zinc sulfide, during this early interval of surface exposure and oxidation of the orebody.

Greg Dickens, Mineral Resources Tasmania
Mining in Western Tasmania - A Brief History of Exploration and Development"
Exploration to this mineral-rich region of Tasmania began in 1856, with the discovery of a quartz vein near Mount Arrowsmith, by government surveyor James Calder. 150 years later, mineral discoveries are still being made, leading to the establishment of new mines such as the Avebury Nickel Mine near Zeehan.

Exploration carried out over the past 50 years has not only supported existing mining operations but has contributed to the successful reopening of some abandoned mines. The continued development of Western Tasmania's mining fields presently generates around 80 per cent of the state's mineral wealth.

This paper, not only briefly traces the history of the major mining fields and its supporting communities, but provides a background story for the Conference.

Greg Drew, PIRSA

Pugholes and Brickworks of Adelaide's Western Suburbs

Due to the absence of timber suitable for building purposes, brick making commenced in SA soon after the establishment of the colony in 1836. Hand-moulded primitive bricks were first made using red alluvial clay from the banks of the River Torrens through the parklands. After the banning of this activity in 1840, brickmaking moved to the low-lying area west of Adelaide including Brompton, Torrensville and Beverley, which became the major brickmaking region of South Australia. For more than 100 years the history of the Brompton, Torrensville and Beverley areas was the story of pugholes – digging them out and filling them in.

This area is underlain by red alluvial clay which is up to 100 metres thick and ideal for brickmaking. The clay was worked by hand from pits or pugholes to natural water level that averaged about eight metres in depth. Clay was shovelled into trucks and hauled up incline railways to the adjacent brickmaking plants. Brickmaking in the area began as a backyard industry and it was not until the early 1900s that the larger clay workings were developed. The industry was at its peak in the 1920s when about 30 individual brickworks contained four large Hoffmann kilns and up to 100 smaller kilns, and employed 100s of workers.

By the 1960s, the traditional clay sources in the western suburbs were nearing exhaustion. This combined with the pressure from urban development and the preference for lighter coloured bricks, forced producers to develop new plants on clay deposits at Golden Grove. The last pughole closed in the late 1970s and most were subsequently filled with building and industrial waste and used for sporting activities or light industy. More recently, urban renewal projects have seen some contaminated sites excavated and refilled for housing. All that remains of a once significant brick manufacturing industry is the Hoffmann kiln in the Brickworks complex and four small kilns at Beverly. It is hoped that these kilns can be used to tell the story of the district's first manufacturing industry.

Jim Enever

'Not for Want of trying': The history of the Coopers Creek Copper Mine, Victoria

The first significant discovery of copper ore in Victoria was made during 1864 at the junction of Coopers Creek with the Thomson River near Walhalla in North Central Gippsland. During the years from 1866 to 1880, two main companies and a number of tributers attempted to make a go of what turned out to be a small but rich copper deposit located in rugged terrain on the southern flank of the Australian Alps. The driving force was provided by a number of local mining promoters, versed in the art of quartz mining for gold, but not base metal mining and smelting, for which there was no real precedent in Victoria at that time.

A feature of these years was the stream of imported managers engaged to provide the technical know how needed. Many of these came with a background honed by their involvement with copper mining in South Australia. Their attempts to translate experiences gained in more established mining centers to the isolated and testing environment of Coopers Creek generally proved disappointing.

The story of Coopers Creek in the 1860s and 1870s is dominated by the struggle to introduce smelting based on the use of local timber as fuel, timber that was invariably wet, and the high cost of transport for materials coming in and product going out. Although modest operating profits were made over limited periods, none of the operators was able to claim a viable enterprise when repayment of capital was taken into account.

Jo Field, Tasmanian Department of Environment

Getting lost in the Myths: Blue Tier mining history at risk

The significance of the Blue Tier in Tasmania's northeast is its rich tin mining history, dating from 1873. By 1878 the township of Blue Tier junction had three hotels, shops, stores and a small cluster of cottages. While the main period of tin production in the Blue Tier was between 1875 and 1913 prospecting has continued until recently. The Blue Tier is littered with the physical remains of the mining era, from large open cut faces to mining machinery, and even remains of prospectors' picks. Although mining and prospecting has had a very large effect on the landscape of the Blue Tier plateau, certain mining exploration marks have become the centre of a controversy.

Over the last 90 years reported observations of surface markings on tin granite boulders, at numerous locations on the plateau, have raised speculation to their origin. Some researchers have attributed the markings to Tasmanian Aborigines. An early investigation to determine these markings' identity by a multidisciplinary team in 1957 concluded they were a combination of natural weathering processes and mining exploration sampling. Another investigation in 2007 claimed the markings were examples of Tasmanian Aboriginal rock art,

dating back 1,000 years. We have re-examined the evidence from earlier investigations and undertaken additional research in order to clarify the origin of these intriguing markings and to clarify for what purpose (if any) they were made. The results of these investigations are presented. The resolution of this issue is of great relevance to the correct historical interpretation of this iconic area.

Wendy Fowler
Convicts and Salt Water River Coalmine Research Project
Initially the Coal Mines Research Project began with the hypothesis that there must have been a high level of skills amongst the original convicts and their military supervision at the Salt Water River site, Tasmania. A careful examination of convict records and technical reports indicated that this was not the case. Further it is clear that the decision makers within the colonial government had several agendas. The author's research compares the skill level of the convict miner workers with the general convict population and explores dependence upon a small number of key operatives in Tasmania's first mining operation. The research focuses on the period 1833 to 1847, at which time the mine was leased to a private operator. In particular focus will be on the men who worked the coal seam rather than the technical details of the mine engineering.

Philip Hart, University of Waikato
'A carter, a businessman, and a prospector with several things in common'
In the 1880s, Alexander Jackson was a carter and William La Grenade Mitchell was a businessman with a variety of ways of making money. In the twentieth century, Edward Ralph Martin was a 'professor' of music and an enthusiastic prospector for gold and oil in several areas of New Zealand. All three men had a slight involvement in gold mining in the Te Aroha district, but as well had three other, surprising, features in common, as this paper will explain.

Richard G. Hartley
Sons of Gwalia gold mine: reasons for operational longevity
The Sons of Gwalia gold mine near Leonora was the biggest gold producer in the state outside Kalgoorlie and was also the longest operational mine (1898-1963). It was British owned and managed but its management by Bewick Moreing, a company which in the early 1900s was one of the most powerful organisations on the Western Australian goldfields in its later years was somewhat of an anachronism. The paper argues that the mine's long term operation from as early as 1912 was largely dependant on local innovations and Government assistance rather than British capital and international technology. The company at the peak of its influence in 1904 managed nearly twenty mines. This was in contrast to the majority of British companies in the state, which were almost all single mine companies, a factor which adversely affected management mobility. Bewick Moreing's three main northern mines – the Sons of Gwalia, Great Fingall Consolidated and Yuanmi GM - had a common scarcity of fresh water and fuel, which encouraged the search for alternative power sources. Shortages of processing chemicals during the First World War also stimulated innovations in gold precipitation techniques. Consequently these isolated mines became world leaders in producer gas power generation and gold processing and during the downturn in mining during the 1920s as the industry steadily shrank the Sons of Gwalia, the last of the three mines was able to attract government finance for much needed development work.

Nic Haygarth
Chasing a shadow? T.B. Moore, Robert Sticht and the Balfour copper boom
T.B. Moore, the prospector who claimed to have discovered—but not pegged—the Mount Lyell Iron Blow, wins the prize for Tasmanian mining lore's greatest 'one-that-got-away'. He gained nothing from Australia's last colonial mining bonanza, the Mount Lyell copper boom. Moore's post-Iron Blow career was not spent in the boardroom or the boudoir, but 'on the wallaby' in bush camps. For the last 15 years of his life he was a waged prospector charged with reviving the fortunes of the Mount Lyell Mining and Railway Company, whose birthright apparently once lay at his feet. The focus of this work from 1907 to 1911 was the 1,000 square kilometres of coastal plains and ranges that came to be known as the Mount Balfour mining field. The interest of Mount Lyell general manager Robert Sticht and a Melbourne land grab sparked a Balfour copper speculation boom of more than 300 mining leases, most of them still virginal today. Sticht's fortunes were perhaps just as ironic as Moore's. One of the architects of Tasmania's greatest mining boom also directed its greatest fizzer, squandering much of his own wealth in the process.

Adrian Hutton
Bulli and Appin Mine Disasters – Who Was To Blame?
The Bulli seam was one of the first seams mined in New South Wales and continues to be mined today. The seam has a long history of gas outbursts and explosions with two notable accidents being on 25 March 1887 in Bulli mine when 85 men were killed by an explosion and the other, a massive fire 31 July 1902 which killed 96

miners, some of them boys, in the Mt Kembla mine, only 20 kilometres south of the Bulli mine fire. Although less catastrophic with respect to fatalities, two other significant mine accidents occurred at Bulli Colliery in 1965 and Appin Colliery in 1979. Both these so-called accidents were followed by judicial inquiries.
The fire at Bulli Colliery on 9 November 1965 resulted in the death of four of the 11-man crew near where the fire occurred. Two subsequent inquiries disagreed as to the cause of the accidents. On 24 July 1979 fourteen men were killed when a large explosion hit the underground workings in the Appin Colliery. The inquiry following the disaster was critical of Appin mine operations, the performance of some mine employers and officers of the Department of Mines at the inquiry
This paper will look at the published information following the Bulli and Appin accidents, especially the causes and the consequences that followed.

Tim Jetson, Education Faculty University of Tasmania, Hobart
"That some rich lode amongst these hills is waiting for us yet"
This paper outlines the development of mining at the Barn Bluff and Pelion mining fields, located in what is now the Cradle Mt-Lake St Clair National Park. Phases of mining, from the early 1890s until the end of World War II, are delineated and analysed. Reasons for the demise of the fields, including the area becoming a Scenic Reserve, are suggested. Key figures, such as prospectors, mine managers, speculators and politicians, associated with the mines are identified and details of mining operations are provided. Finally tentative conclusions are drawn about mining's environmental impact and its significance in the history of the National Park.

Roger Kellaway, School of Geography and Environment. Studies, Univ. of Tas, Hobart.
New Zealanders and the Zeehan Silverfield 1891-1895
In 1891, 1,222 persons arrived in Tasmania direct from New Zealand. This was more than three times the annual average of the preceding decade. In 1892, departures to New Zealand were equally abnormal. The most obvious explanation for this unusual pattern involved the activities of T.A. Reynolds and Company. Loosely associated with the Union Steam Ship Company, Reynolds and Co. had the contact to build the Strahan to Zeehan Railway. Unable to secure sufficient workers locally, they recruited large numbers of labourers in Dunedin. The completion of the railway, the difficult natural environment and the temporary collapse of the silver boom following the failure of the Bank of Van Diemen's Land saw many of the navvies return to New Zealand on the expiry of their contract.

The railway project by itself cannot explain the large number of New Zealanders coming to Tasmania in the early 1890s. The Zeehan silverfield offered other attractions, especially for residents of declining mining regions in New Zealand. Miners, mine managers, share brokers, storekeepers and others left stagnant townships throughout Central Otago and the Thames to seek their fortune on Tasmania's West Coast. This study examines the importance of Zeehan as a magnet for New Zealanders by measuring its impact on the scale of inter-colonial migration. The paper also considers the information flows in the New Zealand press that provided the stimulus for emigration despite the majority of reports being negative. Some attention will be placed on the wider significance of the influx of a skilled mining population into a largely non-mining colony.

Ruth Kerr, OAM. Department of Natural Resources and Water, Queensland
Recap Mines and Tramway on the Chillagoe Field - its connection to southern Australia and Queensland politicians 1890 to 1920s
Redcap mines and tramway are significant for their critical role in the development of the Chillagoe field and as a precursor to the formation of the Chillagoe Company Pty Ltd and construction of the Chillagoe smelters. The mines were opened in 1890 and a battle with influential southern mining directors was fought in the local court over ownership, and the tramway was built in 1901 with steel rails, which were rare in Queensland. The resources and the tramway also figured in the Mungana Scandal in the 1920s and tramway rails were used as uprights in the Palace Hotel in Cairns.

Leonie Knapman
Weather versus Glen Davis
When settlers arrived in Sydney over 200 years ago they did what man had done down through the ages and that was to build along river flats, and so it was when Glen Davis was built along the Capertee River in 1938. *'Floods, what floods '',* was the question as residents arrived to build a new industry and township along the river that had had no water in it for years. Glen Davis had a temperate climate, but the Australian weather can often be unkind but also bounteous. This paper will cover the 14 years of problems that beset Davis from droughts and lack of water to the 29 floods that destroyed homes and damaged the work site many times.

Barry McGowan, ANU

Booms, busts and the environment: the life and times of the base metal mining community of Captains Flat

Captains Flat is located in the southern tablelands NSW about 40 minutes south of Canberra. Its environment and circumstances have many similarities with Queenstown. Gold was found along the Molonglo River and worked for many years on a small scale. In the early 1880s reef gold was found in the hilly country upstream, now the site of Captains Flat. By 1885 the gold bearing ore was found to have a very high silver content. For the next 6 years the Flat was a silver producer, until low silver prices and inappropriate treatment methods led to the closure of the mines, and a focus on copper extraction. Higher copper prices in the mid-1890s encouraged large-scale capital investment based on the pyritic smelting process as at Queenstown. Falling copper prices lead to the closure of the works in the late 1890s.

Captains Flat lay dormant until the mid-1930s, when rising metal prices and the availability of the flotation process encouraged large scale investment. Lead was one of the main products. Throughout the 40s and 50s the town again enjoyed boom conditions, until falling reserves caused the closure of the mines in 1962. Captains Flat survives today as a feeder town for Queanbeyan and Canberra. Locally it is most remembered for its environmental legacy. Defoliation and deforestation in the 1880s and 1890s were bad enough but in the 1940s the slime dams collapsed into the Molonglo River, leading to wholesale destruction of arable farm land. Reclamation and rehabilitation work is ongoing.

Ken McQueen, University of Canberra

Quidong Mineral Field, NSW: An intriguing discovery of W.B. Clarke

In 1851-1852 the Reverend W.B. Clarke, Australia's first geologist, discovered copper at Quidong in the Bombala area of southern New South Wales. Clarke focussed on gold and at panned colours of the metal from detritus trapped in cavities in a limestone outcrop on the edge of the Delegate River at Quidong. Observing nearby veins of copper carbonates he predicted a major mineral field would develop in the vicinity and in 1864 the Quedong Copper Mining Company commenced operations. It produced several hundred tons of copper ore but expended all its capital before a profitable mine could be established. In 1868 the Belmore Freehold Silver and Lead Mining Company took over the Quidong deposits and purchase an additional 100 acres it considered prospective for lead and silver. Crushing equipment and a smelter were erected but there is no record of production and the site was abandoned by the early 1870s.

The area continued to attract interest and in 1955-56 Lake George Mines Pty Ltd. investigated the Quidong Basin for base metal deposits but major problems were encountered in drilling the cavernous and fractured ground. During 1969-1970 Cyprus Mines Corporation in joint venture with Hastings Exploration N.L. and Esso Australia Ltd explored the basin using improved techniques but despite encouraging signs no economic mineralisation was discovered. From 1978 to 1983 Western Mining discovered ore-grade intersections at Clarke's Reef but without sufficient continuity. Further exploration by Plagolmin Pty Ltd and Delta Gold NL from 1987 to 1995 revealed zones of gold mineralisation but with no resulting mine. A new company, Stirling Minerals Ltd, has recently taken over the tenements and completed a detailed airborne magnetic and radiometric survey to identify possible drilling targets. After 156 years the jury is still out on Clarke's prediction.

Donald J. Perkin

History of the Discovery of Gold and Iron Ore and the Development of the Magnetite deposits at Savage River, NW Tasmania, from 1877 through to the 21st Century.

In 1877 Government surveyor and geologist Charles Sprent became the first European to discover the huge magnetite deposits that were cut by the Savage River in this remote part of Western Tasmania. In this expedition Sprent also discovered alluvial and lode gold and other minerals.

In the following 30 years further exploration was undertaken by other hardy government geological surveyors across the highly mineralised area known as the Pieman River Goldfield. This opened up the country for prospectors and developers and led to the publication of the Iron Ore Deposits of Tasmania in 1919.

During the Depression of the 1930s only some desultory gold prospecting was noted in the Pieman River goldfield and Savage River area although a Government report (Finucane, 1933) detailed new insights into the geology of the area. However it also suggested that that most of the alluvial gold at Savage River had already been worked out and that there was little to be gained in enduring the rigours of further prospecting in this remote locality.

In the late 1930s it was estimated that the iron ore resources of the Savage River area totalled over 20 million tonnes of potentially high-grade ore (Rio Tinto), but that this would still be uneconomic because of its remoteness and other reasons.

The post-war period from 1948 to 1960, saw demand and prices for commodities rise strongly in concert with technological advances for discovering and exploiting minerals. Federal and State Government aid including subsidised exploration drilling, and the development of a robust tenure system for mining title propelled the economy into five or six successive economic booms. The Savage River iron ore project is a

reasonably good paradigm, which exemplifies the first of these booms. This development saw a coming-together of Australian entrepreneurs and overseas management, which with government cooperation led to the successful exploitation of low-grade ores.

The above aspects of the burgeoning Savage River Project that was begun in 1964/1965 are just some of the subjects that will be touched upon and illustrated in this paper.

Peter Schulze, J.P., Fellow: Institution of Engineers Australia and of the Institute of Mining and Metallurgy.

Tragedy at the Mt Lyell Mine, 1912

The Mount Lyell Copper Mine at Queenstown in Tasmania has been operating since the 1880's. The most tragic event in its history occurred on Sat 12th Oct 1912. At 8.00am, 170 men went down into the North Lyell Mine. At 11am a fire stared at the 700m pump station. About 78 men were able to get out that day before the smoke intensified. Early Sunday morning 92 men were not accounted for. Attempts were made to rescue them on Sunday, Monday and Tuesday. On the Wednesday, after 109 hours underground, and most of that time without food, 54 were rescued. The total number of lives lost was 42 - more than at Port Arthur in 1996. Twenty widows and 35 orphans were left as a result of the disaster. There are many stories of great sadness, many tales of great courage and many great acts of bravery associated with the tragedy. There were also many lessons learnt about mine safety.

A Royal Commission was established and the Company brought five 'expert witnesses from 'away'. Much of their evidence was faulty, yet given high regard by the Commission. On the other hand, evidence given by experienced Company employees was generally discredited.

My assessment of the Royal Commission transcripts (recently typed up an published) conclude that the Commissions findings were faulty and that the most likely cause of the fire was from an electrical fault.

Pam Sharp, History & Classics, University of Tasmania

Millie's Story: Women, Domesticity and Commerce in Gwalia and Leonora

This paper draws on evidence (mainly oral history) collected for our ARC Linkage Project (Bertola, Fitzgerald, Layman, Sharpe) about the history of the mining communities of Leonora and Gwalia. By focusing on one woman, (Milka Rodonovich born in Dalmatia in 1891), we can take a detailed look at women's employment and social and economic position in a remote mining town in Western Australia. Millie's story includes her emigration; her work running boarding houses and sly grog operations; the laundry trade and provision of food as well as economic aspects of family and household management. We also learn about religion, educational, social life and race relations through the story of this and similar families who lived in these remote communities.

Tony Weston

Mining Lower Grade Ore Through Changes in Mining Technology at The Mount Lyell Mining and Railway Company, Queenstown, Tasmania from 1931 to 1938

The Mount Lyell mining and smelting operation at Queenstown in Tasmania was established in the early twentieth century. It was based on a high grade copper resource, following earlier separate mining developments, and mainly used underground mining. The development of a larger low grade resource in the period 1931 to 1938 was primarily driven by changes to the underground mining technologies employed, followed by large scale open pit mining. The topography at Mount Lyell had allowed the prior development of a 100,000 tons per year low level rail haulage tunnel capable of expansion to much higher capacity. This was at the time when a low-grade pyrite hosted copper resource was being recognised as an alternative ore resource through the application of new, lower cost underground mining technologies. The new underground mining technologies were however unable to produce copper from the low-grade resource at an acceptable cost, and open cut mining was initially developed with a variety of small scale excavation, loading and transport methods. Larger scale drilling and blasting, shovel loading and truck haulage to an ore pass were subsequently used, accompanied by rapidly decreasing mining unit costs. By 1938 Mount Lyell had the highest annual ore production of any mine in Australia, producing more than a million tons of ore each year.

Nicola Williams, Monash University

FINE or FORGED: Precious Metal Assay Through the Ages

The purity, or fineness, of a specimen of precious metal has been important ever since coinage was invented near the end of the seventh century BCE, when forgers saw a golden opportunity for quick profits. Miners, jewellers, mints and banks have been concerned with fineness ever since, and various assay methods have been developed. While some modern spectroscopic techniques are becoming important, the ancient method of fire assay remains the most accurate, and is still the standard for comparison.

This paper describes and compares assay methods, particularly in relation to gold and silver, and the role of accurate weighing in fire assay.