READINGS IN NORTH QUEENSLAND
MINING HISTORY

VOLUME I

Edited by
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Unlike the mining industry, mining history can hardly be said to be booming in Australia today; nor has it received in the past the attention its importance warrants. Even the gold-rushes of south-eastern Australia in the mid-nineteenth century - the one phase of mining squarely in the main tradition of Australian history writing - are given prominence less for their intrinsic importance than for the stimulus they gave to the growth of population and perhaps of democratic tendencies in political life. There is no study of the rushes themselves to compare with Geoffrey Serle's superb Golden Age. In spite of Geoffrey Blainey's distinguished contributions, mining is treated in most histories as if it were peripheral economically as it usually was remote geographically.

It is true that no one living in North Queensland could easily overlook the importance of mining: it has been, with beef and sugar, one of the economy's three major supports too long for that. (However, people in North Queensland might be forgiven for thinking at times that life in North Queensland was no part of Australian history). The theme of this volume may surprise some North Queenslanders, and will certainly strike few as being hackneyed: that for nearly all the first half of the period between the first European settlement in North Queensland and the present day, mining was the dominant influence in shaping not merely the inland, with its many mining fields, but also coastal areas scores of miles distant from the nearest mullock heap or slag tip. It used to be said that Australia rode on the merino sheep's back; with at least as much truth, it could be said that from 1870 to 1920 North Queensland travelled in the miner's ore cart.

Apart from Blainey's history of Mount Isa and the characteristically shrewd insights in Bolton's general history, the mining history of North Queensland has been in the main the preserve of local historians. This it shares with the rest of Australia. At its best, local history as usually written in this country displays an energy and enthusiasm that almost make up for lack of formal training: at its frequent worst, it is anecdotal, sensational and credulous. This volume, together with its planned successor, is intended to stake out a claim to mining history as a rewarding field for the trained historian, by presenting a progress report on work recently completed or still in train.

The Editor, Dr. K. Kennedy, came to write mining history by a roundabout route, which nevertheless illustrates the intricate way in which the subject connects with all aspects of life in the region. As a doctoral student he began research into political history, intending to study the impact upon Queensland of the Great Depression of the 1930s. Before long he concluded that it was first necessary to understand fully the political history of the 1920s. This in turn led him to focus upon a neglected political leader of those years: his thesis thus became "The Public Career of William McCormack, 1907-1932". McCormack, like his close friend and political ally, E.G. Theodore, first entered the labour movement as a union organiser in the mining areas inland from Cairns: the political careers of both men ended in the miasmas of the Mungana affair, the most celebrated scandal in Australian Politics, one which arose directly out of the

Queensland Government's involvement in mining. From Mungana, Dr. Kennedy worked his way back into study of the crisis-ridden Chillagoe Company whose assets were bought by a Queensland Labor Government in order to prop up mining in areas from which it drew much of its political support, on terms which led on to the Mungana scandal a decade later. And from Chillagoe he has moved in to the broad field of mining history with this volume as one of the first fruits.

While the appearance of the present volume marks the beginning of a new emphasis upon mining history within this Department, some earlier research on mining is represented in our previous publications: L.J. Colwell on the North Queensland goldfields; R.B. Brown on the desertion of Gilberton; K.H. Kennedy on the Cloncurry copper field; Noreen Kirkman on the Palmer; and D.C. Roderick on Ravenswood. Bell's fine study of the Mt. Mulligan Disaster has been published as a departmental monograph. Aspects of mining are included in other papers in previous publications: Dr. D.W. Hunt's essay on the early years of unionism in mining camps, Dr. N.A. Loos' study on the impact of mining on aboriginal life; and M.J. Richards' picture of Cloncurry in the 1930s.

Writers from within the Department who have contributed to the present volume are all engaged upon, or have recently completed, research of which these are partial results.

Peter Bell is writing a Ph.D. thesis on North Queensland domestic architecture; Noreen Kirkman has work in progress on the Palmer and the Hodgkinson fields; Janice Wegner has completed centennial history of Etheridge Shire.

The range of work represented in this volume is enhanced by the cooperation of several contributors to whom warm and grateful acknowledgement is made: Geoff Bolton who showed the way for all subsequent historians of North Queensland;

John and Ruth Kerr, whose knowledge of mining throughout North Queensland is equalled only by their dedication to research and their generosity towards fellow-workers in the field;

K.R. Levingston, long Government Geologist in Charters Towers, who has drawn upon a lifetime's technical knowledge and experience for the first article in this volume; and

Don Roderick who has fossicked for knowledge of Charters Towers and Ravenswood as industriously, and rejoiced in his finds as enthusiastically, as any digger.

B.J. Dalton,
Professor of History.

3. For the only reliable account, see K.H. Kennedy, *The Mungana Affair*, Brisbane 1978.
White settlement in North Queensland began in 1861 with the first wave of pastoralists taking up runs in the Kennedy District. A census that year estimated the northern population at eighty-six. Sixty years later, there were nearly 130,000 people in the North about half of whom were living in inland Australia. Population growth was a direct result of the northern mineral discoveries. In fact, between the discovery of gold at Ravenswood in 1868 and the end of the Great War, gold and the base metals were the mainstays of the region's economy. The principal northern gold fields yielded no less than ten million fine ounces, two-thirds of which came from Charters Towers. The Walsh and Tinaroo, Chillagoe and Cloncurry mineral fields complemented this output with millions of pounds worth of tin, copper and silver-lead.

For more than a generation, mining influenced the economic and social character of the North. Apart from rescuing the ailing pastoral industry, it promoted new towns with basic community institutions, new ports and railways, private and public investment and a local manufacturing and commercial sector. It inflamed race relations especially on the remote Etheridge and Palmer River fields where economic competition between Europeans, Aborigines and Chinese was intense; and it even impinged upon Queensland politics and the emerging trade unions by engendering support for the nascent Labour party.

The decline of mining in North Queensland was gradual: gold output, which peaked at 389,000 fine ounces in 1899, was still over 100,000 ounces in 1913; the base metals which commanded the attention of overseas capital in the first decade of the twentieth century were boosted by the output from Cloncurry between 1910 and 1920 and the short-lived prosperity of the Great War. By the 1920s however, mining was depressed, reflecting not only the depletion of the northern gold mines but also low world prices for base metals which closed many ventures throughout Australia. While the state government offered subsidies to many gougers during that decade to halt the exodus of miners from the waning fields, it was clear by 1920 that what Blainey calls the "era of red shirt capitalism" was at an end.

The dislocation occasioned by the demise of northern mining resulted in the government belatedly establishing a royal commission into the industry. Its recommendations, handed down in 1930, marked the beginning of a new era, one characterised by large-scale operations, massive capital investment and new technologies. Ironically, the commission's findings were pre-empted by the rise of Mount Isa, now one of the world's great base metal ventures. In recent years, the value of copper, lead, zinc, tin, bauxite, uranium and cobalt produced in North Queensland has re-asserted mining as the region's leading industry, once the preserve of gold.

North Queensland mining history merits more attention than it has yet received. In addition to the men whose names are still remembered and who deserve biographical treatment - J.V. Mulligan,
John Moffat, A.L. Wilson, E.H.T. Plant, Richard Craven and William Corbould, to list but a few - there are a host of nameless people who collectively made a substantial contribution to the region's history and whose roles should be studied in greater detail: anonymous prospectors, promoters, British shareholders, engineers, assayers, metallurgists, government administrators, underground miners, smelterers and teamsters. Also neglected are many complex themes such as geological ignorance, financial malpractices, inefficient management, disease, social conflict, industrial disharmony and the miners' environment.

This Reader is the first of two volumes on North Queensland mining history. The contents and organisation have been dictated by completed research projects. Its companion volume is planned to include the findings of research still underway and will embrace aspects of mining investment and its economic impact, government intervention and mining law, three major gold fields - Charters Towers, Croydon and the Hodgkinson, the Chillagoe venture and the rise of Mount Isa. A consolidated index and a full bibliography will be included in the second volume. Together they aim to give as full and balanced an account of the subject as is possible on the basis of current research interests. Further, they aspire to remedy many of the deficiencies of previously published "romantic histories" and to complement findings on other aspects of northern regional history.

K.H. Kennedy,
Editor.

The editor desires to acknowledge the financial support of M.I.M. Holdings which has offset the cost of photographic and cartographic work produced by the James Cook University. The Under Secretary for Mines and Geological Survey of Queensland gave K.R. Levingston approval to participate as well as assistance to other contributors. The Australian Society for the Study of Labour History permitted G.C. Bolton's article, long out of print, to be included. Permissions to reproduce photographs have been identified in the captions. Special mention should be afforded to Helen Stokes for the typescript.

The cover incorporates a photograph of the Mount Garnet mine and smelters from the Queenslander, 1904.
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Chapter 1, "A Survey of the Geology and Mineralisation of North Queensland Mining Fields", uses a scientific style of referencing which contrasts with subsequent chapters. It also expresses measurement in metric in accordance with the Department of Mines conformance with the programme for metric conversion in Australia, whereas other contributions resort to Imperial weights and measures and Sterling currency. Accordingly, the following conversion factors may prove useful:

**Length**
- 1 foot = 0.305 metre
- 1 yard = 0.914 metre
- 1 mile = 1.61 kilometres

**Mass**
- 1 ounce fine = 0.031 kilograms
- 1 pound = 0.453 kilograms
- 1 ton = 1.02 tonnes

**Area**
- 1 square yard = 0.836 square metres
- 1 acre = 0.405 hectare
- 1 square mile = 2.59 square kilometres

**Volume**
- 1 pint = 0.568 litre
- 1 gallon = 4.55 litres

Conversion of £1 to dollars would be misleading as there is little relationship between £1 in 1880 and $2 in 1980 in terms of purchasing power. A yardstick worth noting is that a skilled miner's wage for a 48-hour week varied from £3 to £5 in the period 1884 to 1914.
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Sheetmetal Edging, Kidston
Mining Agent's House, Charters Towers
ABBREVIATIONS

A.R. Annual Report, Department of Mines (Qld)
B.M.R. Bureau of Mineral Resources
C.R. Annual Report, Commissioner for Railways (Qld)
G.S.Q. Geological Survey of Queensland
M.L.A. Member of the Legislative Assembly
N.Q.R. North Queensland Register
Q.G.G. Queensland Government Gazette
Q.G.M.J. Queensland Government Mining Journal
Q.P.D. Queensland Parliamentary Debates
Q.P.P. Queensland Parliamentary Papers
Q.S.A. Queensland State Archives
A SURVEY OF THE GEOLOGY AND MINERALISATION OF NORTH QUEENSLAND MINING FIELDS

K.R. Levingston

[1] General Geological background

The geology of Queensland (described in Hill, 1960) is dominated by three fundamental structural elements - the Precambrian* Shield, the Tasman Geosyncline, and the Great Artesian Basin. All are prominent in North Queensland, but, with one exception, only the first two carry the mineral deposits dealt with in this volume.

The Precambrian Shield is the rigid mass of older rocks forming the nucleus of the continent. In North Queensland these older rocks are exposed in the northwest, in the Georgetown area, and in the eastern Peninsula. These different parts of the shield form a great curve roughly parallel to the present shoreline of the Gulf of Carpentaria, and are believed to be continuous under the cover of Artesian Basin sediments which separates them.

The rocks of the shield are generally more strongly folded and metamorphosed than those of later periods, and are often heavily intruded, usually by granitic rocks. By the end of the Precambrian they had been converted to rigid stable blocks, not to be affected by later mountain-building episodes.

To the east of the shield is the Tasman Geosyncline, a mobile zone marked by episodes of sedimentary deposition from the Cambrian to the Permian. The several features of this zone are shown in Figure 1 and their history in Figure 2. The eastern boundary of the Tasman Geosyncline lies under the Pacific Ocean; the western, where it abuts against the Precambrian Shield, is marked by major faults from the Peninsula to the Lolworth-Ravenswood Block; from that point it is concealed beneath the sediments of the Artesian Basin.

* For explanation of terms applied to divisions of geological time see Figure 2.
The Great Artesian Basin, an enormous depression filled with post-Permian sediments, does not carry any of the mineral deposits described in this volume, with one exception: the Dalrymple Sandstone carries alluvial gold in the Palmer River area. Otherwise the Great Artesian Basin represents a cover under which large areas of potentially mineralised country lie concealed. However, any loss it may have caused is to some extent offset by its importance as a carrier of water to the inland grazing areas.

A few rocks which are of interest as hosts or sources of ore deposits are not specifically related to any of these structural elements. The most important are the Carboniferous and Permian volcanics which cover large areas of the Georgetown Inlier and the Tasman Geosyncline from Mount Mulligan to south of Mackay. The latest volcanics in the area - Tertiary to recent basalts - carry no economic minerals (except for occasional gemstones), but cover large areas of potentially mineralised country.


General geology (Hyatt, Paine, Clarke, Gregory & Harding, 1971; Paine, Harding & Clarke, 1971). The two important gold fields of Charters Towers and Ravenswood, and the smaller Cape River field, lie within the Lolworth-Ravenswood Block, a prominent structural feature practically at right angles to the main trends of the Tasman Geosyncline.

In the Late Cambrian and Early Ordovician the area was part of a shallow sea bounded to the north by the Precambrian Shield, and probably extending considerable distances to the west and south. Sediments were deposited in the north, sediments and volcanics further south. Deposition was brought to an end in the Middle Ordovician by an orogeny in which a major intrusive body, the Ravenswood Granodiorite Complex, was emplaced. The sediments and volcanics were raised, folded, and subjected to varying degrees of metamorphism. At the end of the Silurian a further orogenic episode resulted in the intrusion of the Lolworth Igneous Complex to the west of Charters Towers, and the intrusion of smaller bodies into parts of the Ravenswood Granodiorite
FIG. 1 Geological setting of North Queensland

(Modified from Geological Survey of Queensland 1975 )

Precambrian Shields
Tasman Geosyncline
Great Artesian Basin
Deposition of sediments / volcanics.

Episode of igneous intrusion

Important episode of mineralization

Bowen Basin

Georgetown Inlier

Hodgkinson Basin

Lolworth-Ravenswood Block

MT ISA INLIER

Eastern Fold

Western Fold

Belt

Belt

Leichhardt Block

TASMAN GEOSYNCLINE

GREAT ARTESIAN BASIN

FIG. 2 Sketch showing time relationships of the more important geological events. Greatly simplified from Geological Survey of Queensland 1975.
A SURVEY OF THE GEOLOGY AND MINERALISATION OF NORTH QUEENSLAND

Complex. The end of this episode marked the final stabilisation of the Lolworth-Ravenswood Block.

Of the units in the Block, the Ravenswood Granodiorite Complex crops out over the greatest area - 7 500 km$^2$ (3 000 sq miles). It is essentially a major body of granodiorite with smaller bodies of more acid rocks, usually near the margins. Much of it was intruded in the Middle Ordovician, but there has been identified one unit - the Barrabas Adamellite - which is of similar age to the Lolworth Igneous Complex. In a few other areas rocks of this younger age have been identified but not yet mapped, and two cases are of particular economic importance - granodiorite in Charters Towers and tonalite in the Ravenswood-Sandy Creek area. These are described more fully in the detailed accounts of these areas.

The Lolworth Igneous Complex crops out over some 1 200 km$^2$ (500 sq miles). It consists mainly of adamellite and granodiorite, with substantial areas of pegmatitic granite and adamellite, particularly in the east.

The older sediments and volcanics are now represented by the Charters Towers Metamorphics, near Charters Towers; the Kirk River Beds, north of Ravenswood; and the Cape River Beds, which occupy a discontinuous belt for 280 km (180 miles) along the southern edge of the batholiths.

Charters Towers (Reid, 1917; Levingston, 1972). The Charters Towers Goldfield was dominated by a highly productive area, some 10 km$^2$ (4 sq miles) in extent, mostly within the town itself. Two rock units are represented - the Charters Towers Metamorphics and the Ravenswood Granodiorite Complex. The Charters Towers Metamorphics consist chiefly of schist and quartzite, with some hornfels. Within the productive area these rocks cover only small areas, and are of no great thickness.

The Ravenswood Granodiorite Complex consists mainly of granodiorite, cut by many dykes. The granodiorite is, to all appearances, similar
to that forming the bulk of the Complex, but a sample from within the town area yielded an isotopic age similar to that of the Lolworth Igneous Complex. The extent of this younger body has not been established, but arguments based on the abundance of basic dykes in some areas and their complete absence in others suggest that it is limited to the centre of the productive area. If this is correct, so that granodiorite of both ages is present, the sequence of rocks is as follows:

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<td>Auriferous lodes</td>
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<td>Many dykes and minor intrusives</td>
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<tr>
<td></td>
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<td>Granodiorite (Ravenswood Granodiorite Complex)</td>
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<td>Charters Towers</td>
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<td></td>
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<td>Metamorphics</td>
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The auriferous lodes are thus older than Early Carboniferous. However, the absence of similar mineralisation in Middle Devonian rocks within 25 km to the north suggests an even earlier limit. They are obviously younger than the granodiorite in which they occur, and in the absence of any other known intrusive of suitable age, this granodiorite can be regarded as their source.

The lodes occupy fissures of two groups – one trending east to northeast and dipping north to northwest, the other trending north to northwest and dipping east to northeast. Dips are generally 30° or less. The lodes are simple or multiple quartz-sulphide veins, usually associated with more or less "formation" (altered, crushed granodiorite) between the well-defined walls of the fissure. They are thus roughly tabular in form, but abrupt bulging and pinching are frequent. Recorded widths of ore range from a few centimetres to 12 m (40 ft) but in general a vein less than 0.3 m (1 ft) would be regarded as small and one over 1.5 m (4.5 ft) exceptionally large.
Of the 30 or more lodes in the area, production was dominated by two - the Brilliant and the Day Dawn. The Brilliant is in a wide arcuate zone of irregular tensional fracturing, dipping northwest to north at an average of 30°. Loops and branches are common, several being sufficiently distinct to receive names of their own. Ore width was normally 0.3 to 0.9 m (1-3 ft). The lode was explored over a length of 1 700 m (5 500 ft) and to a maximum depth of 930 m (over 3 000 ft). One major shoot and a number of smaller ones yielded 65 t (2.1 million oz) of gold from 2.3 million tonnes of ore.

The Day Dawn is more regular in trend, although looping and branching are still common. It differs from the other lodes in its steeper dip (45°-65°), and in its following an earlier basic dyke over much of its course. The Day Dawn was explored over a length of 2 400 m (8 000 ft) and to a depth of 820 m (2 700 ft). Ore widths were normally 0.9-1.2 m (3-4 ft). Four main shoots and a number of smaller ones yielded 43.5 t (1.4 million oz) of gold.

The predominance of these two lodes is shown by the fact that between them they accounted for over half of the output of the field. The next two lodes in order of importance each produced between 5 and 6 t (160 000 and 190 000 oz) of gold, and the remainder each less than 3 t (100 000 oz) (mostly much less). Only five of the other lodes have been followed to over 300 m (1 000 ft). They mostly carried only one shoot, beyond the limits of which the fissure died out within a short distance.

The mineralogy of the lodes is simple, suggestive of deposition from moderately hot ascending solutions of uniform composition. Common constituents are quartz, pyrite, galena, and sphalerite. Less common is calcite, and rare are chalcopyrite, gypsum, barytes, arsenopyrite, and native arsenic. An unidentified gold telluride was found as occasional specimens in two mines only. Galena was usually regarded as the most reliable indicator of gold values.
Many causes have been suggested for localisation of the main ore shoots - faults, changes in country rock, dyke intersections, and intersections with barren quartz veins - but none stands up to critical examination. The principal control is probably structural - the form of the fissures themselves - but no analysis has ever been made.

Ravenswood (Clarke, 1971; Levingston, 1972). As in the case of Charters Towers, the output from the Ravenswood gold field was dominated by that of the town area. The rock within this area and extending to the adjoining settlement of Sandy Creek is a tonalite which has yielded an isotopic age similar to that of the Lolworth Igneous Complex. The surrounding area is occupied by granodiorite of the Ravenswood Granodiorite Complex, but the boundary between the two has not been mapped. No younger intrusives have been found in the immediate vicinity, and for the present the deposits are regarded as being related to the tonalite, and therefore comparable in age with those of Charters Towers.

Unfortunately, recorded information on the Ravenswood deposits is lacking in many details. Although 70 or more lodes are known within an area of 3 km$^2$ (1 sq mile), what geological knowledge we have is largely based on a few of the more important producers. The lodes resemble those of Charters Towers on a smaller scale: they occupy two sets of roughly perpendicular fissures, looping and branching are common, and a small number of lodes dominated the output. The primary mineralisation - quartz, pyrite, chalcopyrite, galena, arsenopyrite, and stibnite - suggests similar conditions of temperature.

The largest producer was the Sunset lode, at least 7 t (225,000 oz) of gold, which was explored over a length of 880 m (2,900 ft) and to a depth of 260 m (850 ft). A shoot was found on each of two distinct branches. The ore averaged 0.6–0.8 m (2–2.5 ft) in the upper levels, decreasing to less than 0.3 m (1 ft) in the lower. In the lowest workings a fissure characterised by extensive looping carried only erratic bunches of ore. None of the other lodes has been worked to more than 150 m in depth, and although returns are hopelessly incomplete, none seems to have been comparable in output with the Sunset.
A conspicuous structural feature of the area is the Buck Reef, a mineralised shear, older than the lodes, which runs for over 1.5 km (1 mile) through the main mining area. It consists of crushed country more or less altered and impregnated with pyrite and quartz. Several of the other lodes cut it, and are enriched near the contact. The Buck Reef itself carries a little gold over much of its length, but prospecting has been mainly confined to the eastern end, where a 200 m (700 ft) length has been explored to a depth of 40 m (130 ft).

**Cape River** (Paine et al., 1971). In the Cape River area metamorphic rocks of the Cape River Beds are intruded by the Lolworth Igneous Complex. Overlying both are the Campaspe Beds, consisting of clayey sandstone and siltstone, usually less than 15 m (50 ft) thick. These sediments were formed in Tertiary times by the erosion of material from the granitic rocks of the Lolworth Range and its deposition on the lower country to the south.

Some gold was won from veins, but the most important occurrence was the Cape River Deep Lead. This is an auriferous conglomerate, 0.3-0.5 m (1-1.5 ft) thick, lying at the base of the Campaspe Beds. Where discovered, near Capeville, it was narrow, rich, and shallow. To the south it became progressively wider, poorer, and covered by greater thicknesses of virtually barren sediments. About 4 km (2.5 miles) south of Capeville a dyke formed a high bedrock bar. South of this only small disconnected areas were rich enough to be mined, and the cost of sinking 30 m (100 ft) to bedrock brought work to a halt. Production is not completely recorded - it was at least 1 t (30 000 oz) of gold, but probably much more.

**Other centres** (Clarke, 1971; Levingston, 1972). There were quite a number of smaller mining centres in the Charters Towers-Ravenswood area, the most important being Black Jack, Broughton, Donnybrook, Dreghorn, Kirk, Rishton, and Sandy Creek. In most of these centres the deposits were fissure-filling quartz-sulphide veins, similar to those in Charters Towers and Ravenswood. The most interesting exception is Mount Leyshon, where gold accompanies pyritic
impregnation of a volcanic neck. About 200 000 t of ore from three open cuts yielded a little over 1 t (30 000 oz) of gold.

[III] The Peninsula region

General geology (Blake, 1972; de Keyser & Lucas, 1968; de Keyser & Wolff, 1964; Willmott, Whitaker, Palfreyman & Trail, 1973). The Precambrian basement rocks of the Peninsula are exposed in three separate areas. The southern is the northern part of the Georgetown Inlier, more fully described on p. 19. Further north are the Yambo Inlier near the extremity of the Hodgkinson Basin, and the Coen Inlier extending as far north as Temple Bay. Originally these were a probably continuous sequence of mudstone and sandstone, with some greywacke, basic lava, and limestone, deposited in a marine basin. They were folded and metamorphosed late in the Precambrian, and subsequently intruded by Middle Palaeozoic granitic rocks.

To the cast of the Precambrian inliers and separated from them by a fundamental structural feature - the Palmerville Fault - is the Hodgkinson Basin. This basin developed by subsidence in the Late Silurian or Early Devonian. Shallow-water deposits in the Chillagoe and Mount Garnet areas were succeeded by thousands of metres of siltstone and greywacke (Hodgkinson Formation), laid down in a rapidly subsiding trough. The basin was destroyed and its contents strongly folded and faulted by a major orogeny in the Early Carboniferous. In the Late Carboniferous and Permian several major granitic bodies were intruded.

Overlying parts of the edge of the Hodgkinson Basin, and separating the Precambrian exposures, are the oldest sediments of the Great Artesian Basin.

Palmer Goldfield (de Keyser & Lucas, 1968). More than 90 per cent of the gold won on the Palmer field was from alluvial deposits along the river and its tributaries. Although over 160 km (100 miles) of the river’s length was worked, as far as 80 km (50 miles) west of Palmerville, most of the gold was obtained in the stretch between
10 km (6 miles) and 70 km (45 miles) east of Palmerville. The recorded production was about 42 t (1.3 million oz) of gold, but Chinese miners are reputed to have disposed of substantial amounts through unofficial channels.

The ultimate source of the gold in the richest area was the many veins, some of which were later worked. Further east, however, the source has not been identified. In Mesozoic times the drainage of the area appears to have been to the north, and alluvial gold was deposited with gravel in stream channels. These beds of gravel, usually 1-1.5 m (3-5 ft) thick, were later consolidated to become the conglomerate at the base of the Mesozoic Dalrymple Sandstone. Later earth movements produced the present drainage pattern to the west, and movement on the Palmerville Fault raised the country east of Palmerville by a substantial amount. This resulted in a renewal of the power of erosion in the eastern block, so that the Dalrymple Sandstone was removed from that area and any gold that it contained was redistributed. In the underlying Hodgkinson Formation, the lodes also yielded gold to the watercourses. The rugged topography produced by the increased erosion provided the necessary "traps" in which gold could accumulate. Below Palmerville the topography remained old and flat, and there was little accumulation of gold.

Lode mining was far less important, yielding only some 4.25 t (137 000 oz) of battery bullion. The lodes occupy fissures in sediments of the Hodgkinson Formation, and are composed of quartz with some pyrite and arsenopyrite, and in some cases stibnite. Generally, they average 0.3 m or less in thickness. The most important was the Anglo-Saxon in the Limestone area, 40 km (25 miles) south of Maytown, which produced 960 kg (30 000 oz) of bullion. It was noted for the richness of its surface ore, some of which yielded over 2 kg (60 oz) of bullion per tonne.

Attempts were made from time to time to work the conglomerate at the base of the Dalrymple Sandstone, but values were too low.
Hodgkinson Goldfield (de Keyser & Lucas, 1968). The lodes occupy fissures in rocks of the Hodgkinson Formation, and consist of quartz veins with or without interleaved country, from a few centimetres to a metre or more wide. The quartz carries stibnite, pyrite, arsenopyrite, chalcopyrite, sphalerite, and galena. Other minerals that have been recorded are scheelite (Southern Cross and Tyrconnel), molybdenite and tourmaline (Southern Cross) and barytes (Minnie Moxham).

The ore-shoots were generally greater in vertical extent than horizontal. Controls of ore localisation were recognised in only two cases - the Tyrconnel, where the shoot is located in a strong bend in the lode, and the Flying Pig, where the shoot pitches parallel to the intersection of the lode with certain kaolinised or carbonaceous slates. In general the best gold values were in white platy quartz with dark slaty seams: massive quartz was relatively poor.

The Hodgkinson field was also an important producer of tungsten, molybdenite, and bismuth from deposits at Wolfram (Connah, 1965). A body of granitic intrudes the Hodgkinson Formation and late Palaeozoic volcanics. The contact dips north at 50° or more, and the granite is altered to greisen in a zone 3 km (2 miles) long and up to 800 m (2 600 ft) from the contact. Within the greisen are the orebodies, mainly quartz pipes 0.3 m (1 ft) to over 10 m (30 ft) in diameter. These pipes are roughly circular or elliptical in cross section and are irregular, tortuous and branching. The ore-shoots are irregularly spaced and commonly yield from 50 kg (1 cwt) to several tonnes of 1-50% ore. Wolfram, molybdenite, and native bismuth are the predominant minerals, and a large number of minor, non-valuable, minerals have been recorded. Over 250 pipes have been identified, but many have been worked to only shallow depths.

Chillagoe area (de Keyser & Wolff, 1964). Within a small radius of Chillagoe are a number of areas where copper and silver-lead occur separately and together, in a wide variety of deposits. Some of these are summarised in Table 1 - namely Chillagoe, Redcap, Zillmanton, Calcifer, Muldiva, Cardross, Dargalong, Ruddygore. The overall
pattern of mineralisation is marked by three features: the probable
association of all the deposits with Permian granitic intrusives; the
high temperature conditions that appear to have prevailed during
deposition; and the association of most of the important deposits with
the limestones of the Chillagoe Formation. The influence of the
limestone on deposition lessens progressively from the unusual pipes
at Mungana, through the irregular and unpredictable contact deposits,
to the regularity disposed fissure lodes. Superimposed is a tendency
(and no more) for copper to predominate near granite contacts and
purer silver-lead ores to be furthest from them.

The output of the area was dominated by the Mungana mines,
particulatly the Girofla and Lady Jane. At the Girofla two vertical
pipe-like bodies 6-9 m (30-60 ft) in diameter at the surface broadened
at depth and joined at about 45 m (150 ft). The composite pipe had a
maximum diameter of 75 m (250 ft) at the 125 m (410 ft) level, but
narrowed to about 18 m (60 ft) further down. A third pipe, discovered
at the 30 m (100 ft) level, was worked to 125 m (410 ft). The pipes
were filled with chert breccia in a clayey matrix, silicified at the
surface. From the surface flux ore was worked; between 90 m and 125 m
(300 and 410 ft) secondarily enriched ore, and below 155 m (510 ft)
lead ore was worked to the lowest level, 247 m (810 ft). The primary
ore contains abundant pyrite, pyrrhotite and marcasite, lesser galena,
sphalerite, chalcopyrite, jamesonite and tetrahedrite, and sparse
arsenopyrite and stannite, in a sideritic gangue. In the zone of
secondary enrichment covellite and chalcocite replaced pyrite.

The Lady Jane is also a pipe-like deposit, probably with similar
primary mineralogy, but the distribution of values is different:
0-45 m (150 ft) high grade copper ore; 45-98 m (150-320 ft) high grade
copper and lead ores, in some places separate, in others mixed;
98-128 m (320-420 ft) (the lowest workings) high grade, secondarily
enriched, copper ore.
The breccia pipes that carry these deposits have been interpreted as cave fillings, volcanic vents, and the intersection of fissures with joints. It is more likely that they are crush breccias associated with a wide zone of fracturing.

Some 64 km (40 miles) north-northwest from Chillagoe was an isolated group of copper deposits worked in the O.K., North O.K., and South O.K. mines. The O.K. (at one time the largest single copper producer in the Chillagoe area) worked a number of pipe-like orebodies in a belt of low-grade kaolinic material transecting sediments and volcanics of the Mount Garnet Formation. Near the surface the grade ranged from 8 to 18 per cent, from 14 to 35 m (45-115 ft) was the zone of secondary enrichment, and at greater depths the grade decreased with increasing pyrite content (de Keyser & Lucas, 1968).

The Chillagoe area has been Queensland's largest producer of fluorspar. The lodes are genetically related to the Permo-Carboniferous Elizabeth Creek Granite, and occur either in the granite or the Dargalong Metamorphics (part of the Georgetown Inlier). They are fissure lodes, usually vertical or nearly so, up to a maximum of 2-2.5 m (6-8 ft) in width, carrying lenses and sporadic patches of fluorspar in otherwise barren quartz and brecciated country. They tend to occur in groups, the most important being west of Mungana; near Dargalong; and in the Almaden area.

Herberton-Mount Garnet area (Blake, 1972). The rocks of the Georgetown Inlier lie to the west of Mount Garnet and thence to Herberton and beyond are those of the Hodgkinson Basin – the Mount Garnet and Hodgkinson Formations. Following the mid-Carboniferous orogeny in the Hodgkinson Basin there was an episode of volcanic and intrusive activity that continued into the Permian. Though there are quite a number of volcanic and intrusive formations, there are only four rock units in the area that are important from the point of view of mineralisation: the Mount Garnet Formation, the Hodgkinson Formation, the Featherbed Volcanics (Carboniferous) and the Elizabeth Creek Granite (Permo-Carboniferous). All are extensively mineralised and the
### TABLE 1. Copper and Silver-Lead Deposits, Chillagoe Area

<table>
<thead>
<tr>
<th>Type of Deposit</th>
<th>Metal</th>
<th>Locality</th>
<th>Principal Deposits</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vertical pipes</td>
<td>Copper, silver-lead</td>
<td>Mungana</td>
<td>Girofla, Lady Jane, Griffith</td>
<td>See description in text</td>
</tr>
<tr>
<td>in limestone</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lodes in</td>
<td>Silver-lead</td>
<td>Chillagoe</td>
<td>Chillagoe Consols</td>
<td>Below 20m (60 ft) sphalerite increasingly abundant. No ore below 36m (120 ft)</td>
</tr>
<tr>
<td>fissures in</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chillagoe</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Formation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lodes in</td>
<td>Copper, silver-lead</td>
<td>Redcap</td>
<td>Redcap-Morrison</td>
<td>More or less follows Redcap fault. Redcap oxidised lead ore, Morrison secondary copper ore</td>
</tr>
<tr>
<td>fissures</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>bounding</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chilagoe</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Formation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lodes in</td>
<td>Copper</td>
<td>Zillmanton</td>
<td>Zillmanton-Shannon</td>
<td>Brecciated siliceous garnet-hematite</td>
</tr>
<tr>
<td>fissures</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>bounding</td>
<td></td>
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</tr>
<tr>
<td>Chilagoe</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Formation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contact</td>
<td>Copper</td>
<td>Chilagoe</td>
<td>Ti-tree</td>
<td>Jasperite hematite-magnetite-garnet rock</td>
</tr>
<tr>
<td>metasomatic</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>deposits</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Copper, silver-lead</td>
<td></td>
<td>Chilagoe</td>
<td>Christmas Gift, Lyonite Hills</td>
<td>Sinuous iron-garnet lode</td>
</tr>
<tr>
<td>Silver-lead</td>
<td></td>
<td>Muldiva</td>
<td>Eclipse, Paisley</td>
<td>Garnet, calc-silicates common. Zinc increases with depth</td>
</tr>
<tr>
<td>Lodes in</td>
<td>Copper</td>
<td>Cardross</td>
<td>Chieftan, Clansman, Spaniard</td>
<td>Bunches of ore at intervals in a mesh of fissures</td>
</tr>
<tr>
<td>irregular</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>fissures in</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dargalong</td>
<td>Silver-lead</td>
<td>Dargalong</td>
<td>Jubilee</td>
<td>Short shoots following stratification at an angle from main shear</td>
</tr>
<tr>
<td>Metamorphics</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Porphyry copper</td>
<td>Copper</td>
<td>Ruddygore</td>
<td>Ruddygore</td>
<td>Anastomasing quartz veinlets in metasomatized granodiorite. Payable values terminated above 38m (125 ft) level</td>
</tr>
<tr>
<td>Pipe-like orebodies in Mount Garnet Formation</td>
<td>Copper</td>
<td>OK</td>
<td>OK</td>
<td>See description in text</td>
</tr>
</tbody>
</table>
Table 2: Examples of Tin Deposits, Herberton-Mount Garnet Area.

<table>
<thead>
<tr>
<th>Type of Deposit</th>
<th>Locality</th>
<th>Principal Mines</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disseminated deposits in granite</td>
<td>Bakerville, Emuford</td>
<td>Ruby Anne, Sugar Bag</td>
<td>Rare workable deposits associated with quartz-cassiterite veins</td>
</tr>
<tr>
<td>Disseminated greisen deposits</td>
<td>Gurrumba</td>
<td>Boulder West</td>
<td>Small quantities of sulphides occasionally present</td>
</tr>
<tr>
<td>Greisen lodes</td>
<td>Mowbray Creek, Glenlinedale</td>
<td>Croesus, Black Prince</td>
<td>Fluorite common associate. Lodes small, only rich shoots worked</td>
</tr>
<tr>
<td>Biotite lodes</td>
<td>Nymbool</td>
<td>Smiths Creek</td>
<td>Biotite, chlorite, quartz and sulphides. Country is Elizabeth Creek Granite</td>
</tr>
<tr>
<td>Chlorite-quartz lodes in granite</td>
<td>Herberton, Watsonville</td>
<td>Great Northern</td>
<td></td>
</tr>
<tr>
<td>Chlorite-topaz lodes</td>
<td>Watsonville</td>
<td>Sullivan</td>
<td>Only known occurrence. Chlorite, topaz sericite, fluorspar and sulphides</td>
</tr>
<tr>
<td>Chlorite-quartz lodes in sedimentary rocks</td>
<td>Vulcan (see text)</td>
<td></td>
<td>Account for more than half lode tin produced in area</td>
</tr>
<tr>
<td>Chlorite-garnet lodes</td>
<td>Bakerville, Watsonville</td>
<td>Vesuvius, Irish Girl</td>
<td>Reddish-brown garnet up to 5 mm (0.2 in) diameter</td>
</tr>
<tr>
<td>Quartz lodes</td>
<td>Bakerville, Dry River</td>
<td>Peacemaker, Captain</td>
<td>Mostly only small producers</td>
</tr>
<tr>
<td>Quartz-tourmaline lodes</td>
<td>Irvinebank</td>
<td>Wyatts</td>
<td>Common in Herberton-Irvinebank districts, confined to sedimentary rocks</td>
</tr>
<tr>
<td>Complex sulphide lodes</td>
<td>Watsonville, Emuford, Silver Valley</td>
<td>Northern Australian, Brass Bottle, Lancelot</td>
<td>Cassiterite, stannite, chalcopyrite and other sulphides. Quartz main gangue</td>
</tr>
<tr>
<td>Calc-silicate lodes</td>
<td>Silver Valley</td>
<td>Magnum Bonum</td>
<td>Magnetite, hematite, calcite, epidote, fluorite</td>
</tr>
</tbody>
</table>
Elizabeth Creek Granite is regarded as the source of the mineralising solutions.

Mineralisation falls broadly into four zones, related to the configuration of the Elizabeth Creek Granite and the zone of metamorphism beyond its contacts. These are, in order of increasing distance from the main bodies of granite, the zones of tungsten, tin, copper, and lead. The tin deposits have been the most important economically, with a small contribution from those of copper: the other two metals are unimportant.

The tin deposits fall into a number of types reflecting differences in levels within the zone of deposition, in composition of solutions, and in host rocks (see Table 2). However, one type is predominant: chlorite-quartz lodes. These occur both in sedimentary rocks and granite, and are usually associated with steeply-dipping shear zones. The shoots are in the form of steep or vertical pipes, and are often rich, erratic, and discontinuous.

The most famous single deposit was the Vulcan, near Irvinebank (Mason, 1953). The orebodies, which developed along shears and other lines of weakness in the enclosing greywackes, took the form of a series of branching pipes. With the exception of two breaks, ore was followed continuously from the surface to a depth of 372 m (1 220 ft) — the limit of payability. A further tin-bearing body found at 427 m (1 400 ft) was too low grade to be worked. Available dimensions of cross-sections of the pipes show that the length was often at least twice the width, and a maximum of 465 m² (5 000 sq ft) is given for the area. The ore tonnage produced suggests an average cross section of about 170 m² (1 800 sq ft). The ore was mainly chlorite, quartz, cassiterite, and magnetite, with minor sulphides. A total of 183 000 t of ore yielded an average of 7.5 per cent cassiterite concentrate.

Examples of other types of lode are the Great Northern, Herberton (quartz-chlorite pipes in granite — 5 000 t of cassiterite concentrate); the Smith's Creek, Nymbool (biotite lode in granite —
1 500 t of concentrate), and the Lancelot, Silver Valley (complex sulphide ore - approximately 1 200 t of concentrate).

The area has been less important as a copper producer. The main single producer was the Mount Garnet mine, which produced some 96 000 t of 4.8 per cent copper ore from lenticular pipe-like orebodies in a vertical fault zone in hornfels. Collectively, the group north of Herberton known as the Copper Firing Line were probably the greatest producers. The lodes occupy fissures in sediments, roughly parallel with the granite contact, and carry copper and other base metal sulphides in a gangue of quartz and chlorite.

Mareeba area (de Keyser & Lucas, 1968; Connah, 1965). The only noteworthy producers were the Mount Molloy copper mine and the Mount Carbine tungsten deposits, both in sediments of the Hodgkinson Formation.

The Mount Molloy deposit occupies a shear zone with well defined walls dipping westerly at 50°-70°. It was as wide as 6 m (20 ft) in places, but averaged 2-2.5 m (6-8 ft). In the oxidised zone, above 27 m (90 ft), the ore consisted of secondary copper minerals in a gossanous siliceous or kaolinitic gangue: it averaged 10 per cent copper. The primary ore, below 43 m (140 ft), consists of pyrite, chalcopyrite, and some sphalerite in sheared siltstone and greywacke, and averages probably less than 3 per cent copper. The deposit was worked over a length of about 250 m (800 ft) for a recorded (incomplete) output of some 44 000 t of ore, yielding 3 900 t of copper.

At Mount Carbine, tungsten occurs in a large number of vertical, sub-parallel, anastomosing quartz-feldspar veins in a zone 2.5 km x 0.5 km (8 000 ft x 1 600 ft). The veins are commonly less than 0.6 m (2 ft) in width, with local swells up to 1.8 m (6 ft). The veins consist mainly of milky quartz with varying amounts of feldspar. Tourmaline is distributed throughout as fine needles, and muscovite occurs as a selvage in a few veins. The ore minerals are wolfram and, near the surface, scheelite. The tungsten-bearing veins are confined to sediments: quartz veins in the nearby granite are barren.
Eastern Gulf region

General geology (White, 1965). The area is basically that of the Georgetown Inlier - a resistant block of mainly Precambrian rocks forming the western margin of the Tasman Geosyncline. These rocks are exposed over an area roughly 250 km (150 miles) square, and are concealed to the west, north, and south beneath the sediments of the Great Artesian Basin.

The earliest known rocks were highly metamorphosed early in the Precambrian to schist, granulite, amphibolite, migmatite, and so on. The most important units are the Einasleigh Metamorphics and the Dargalong Metamorphics, which occupy a discontinuous belt up to 140 km wide along the north-south diagonal of the inlier.

In the Early Proterozoic the inlier was warped to form a central ridge, flanked on either side by a sedimentary basin. On the eastern side 4 500 km (15 000 ft) of sediments were deposited. The western side was even more strongly downwarped to form a geosyncline in which 9 000 m (30 000 ft) of sediments were deposited, the most important being the Etheridge Formation. At some time during the same period the Croydon Volcanics were erupted on the far western side of the inlier.

Before the end of the Precambrian the rocks of the Georgetown Inlier were again folded and fractured. The core of the central ridge was intruded by granite, and its eastern edge by ultra-basic rocks. Further deformation occurred late in the Palaeozoic: the inlier was warped into an arch, producing extensive fracturing in the central and northeastern portions. Igneous activity produced granitic intrusions and extensive subsidence areas occupied by volcanic rocks.

Mineralisation is associated with several periods of igneous activity, but that of the Precambrian is by far the most important.
plagued miners for the ensuing decades. A succession of processes to treat the "mundic" ore were tried throughout the 1880s and 1890s: an "electric-dynamo" machine, Cassell's chlorination process, the "Newbury-Vautin" process; Barton's refined chlorination process, and cyanide ponds - all of which failed to unlock Ravenswood gold. Finally, a successful treatment method was devised. Crushed ores were passed directly on to Wilfley concentrating tables which yielded three products - free gold and galena, both of which were amalgamated with mercury in Berdan pans, and sulphurets which were bagged and despatched to the Aldershot smelters at Maryborough.

During the late 1880s, the township was sustained by the silver output of Totley and the advent of the railway which provided cheaper transport for the export of mundic ores. After Totley closed in 1891, outside shows, such as the John Bull at Evlinton under A.L. Wilson's management, and an injection of British capital into the Ravenswood mines succoured the community through the depression of the 1890s. Despite the uncertainties and frustrations experienced by the miners, Ravenswood had evolved as a very stable community. A School of Arts and reading room was established in 1876; a Post Office and residence and a hospital were erected; new churches and a convent were completed; and

7. The warden commented as early as 1877 on the mundic problem: an exodus now took place, and Ravenswood decreased, while the newer goldfield, Charters Towers, went ahead with great rapidity. The year 1872 was one of memorable depression, yet one of the chief incidents in connection with it was the erection of machinery for the treatment of tailings; many and various were the experiments tried without success; the general body of the miners became disheartened, and with the exception of a new claim, the field became deserted almost, but not quite: some of the old identities stuck to the old place.

8. For details on treatment, see W.E. Cameron, Recent Mining Developments on the Ravenswood Gold Field, G.S.Q. publication 183, p.4.

9. Ravenswood was serviced by three churches. The Catholic Church was built in 1871 and a rear portion was added in 1905. The Sisters of Mercy established a school and convent in 1885 beside the church. The Anglican church was erected in Elphinstone Street in 1879. Little is known of the date of establishment of the Methodist Church and Manse, sited opposite the London North Mine.

44
RAVENSWOOD: SURVEYING THE PHYSICAL EVIDENCE

Pugh's Almanac records a township with a population of two thousand residents serviced by butcher shops, bakers, blacksmiths, bootmakers, tinsmiths, plumbers, chemists, drapers, tailors, dressmakers, grocers, hairdressers, tobacconists, cabinet makers, undertakers, livery stables, saddlers, sawmills, photographers, solicitors, assayers and brokers, although it was not uncommon for ownership to change hands frequently. Of the seven hotels, however, none remain today. 10

1898 was the turning point after years of agonising over mundane ore and the need for new techniques and substantial capital investment. Three factors were responsible for the new flush of optimism: the work of the New Ravenswood company, the Donnybrook yields, and improved returns from cyanide treatment. The formation of the New Ravenswood Limited was chiefly the work of A.L. Wilson, who secured a commitment from an English syndicate to discharge the Queensland National Bank's lien over the General Grant, Sunset, Black Jack, Shelmalier and Mellaneur mines, together with the Mabel Mill. A company was registered in London on 23 March 1899 with an authorised capital of £50,000 in shares of four shillings. Wilson was appointed general manager, and as the directorate was absentee, the company's future lay almost exclusively in his hands. The mines, tramway and mill were re-equipped at considerable cost and crushing recommenced in January 1900. Fifty percent dividends in 1901 and 1902 vindicated the investors' faith and Wilson's reorganisation. In fact over the subsequent decade to June 1912, the company won just over £750,000 worth of gold and declared aggregate dividends of nearly 300 percent. 11 At Donnybrook rich veins yielded considerable profits and attracted new miners to the field, while cyanide treatment of slimes and sands boosted gold output at the

10. See Pugh's Almanac, 1887. The hotels were: Commercial, Criterion, Exchange, Miners Arms, Ravenswood, Royal, Railway (a wooden structure on the site of the present Railway Hotel).

11. For details, see R.L. Nash, Australasian Joint Stock Companies' Yearbook, 1913-14 (Melbourne 1914), pp.457-8; Cameron, Recent Developments on the Ravenswood Gold Field, p.3; A.R. 1898-1913 passim.
D.C. RODERICK

turn of the century in the same way that Charters Towers output was greatly increased by recycling tailings. 12

The success of Wilson's venture encouraged new capital investment and vigorous mining over the Ravenswood leases. The Grant and Sunset Extended, Grand Junction, London P.C. and London North were hives of activity. Probably the most ambitious project was the 'Deep Mines'. In late 1901, a lease was issued ahead of the Sunset and General Grant workings. The Ravenswood Deep Mines Limited planned to intersect the Sunset reef at 1,200 feet and tap no fewer than six anticipated reefs on its course. The shaft was commenced during the worst drought experienced which saved pumping costs and provided stone for the dams of the Mabel and Brothers mills. It eventually reached 1,536 feet but after extensive crosscutting and driving only a few hundred ounces of gold were recovered. 13

The townscape of Ravenswood changed considerably after the turn of the century. New residences were constructed; new hotels (in particular Delaney's Imperial and Moran's Railway, both of which were financed from profits on mining investments), new commercial premises and public utilities appeared, reflecting the opulence of Ravenswood at its peak. The population reached 4,707 in 1903, but its decline soon after mirrored the fortunes of the field. Many mines were returning lower yields to the ton; some were forced to close to avert financial losses. By 1911, Ravenswood's future was bleak: the population had decreased to 3,300; ore treatment was still high at 36,000 tons, but the yield was the lowest since 1897; and the New Ravenswood Limited recorded its smallest returns and dividend (6½ percent) since its inception. 14

By 1912, Wilson found himself struggling against overwhelming odds. As the local mining warden recorded, the financial position of New

P5: General Grant Mine [A.R. 1901]
Ravenswood Limited was attributable to a 12½ percent reduction in costs over three years, a considerable achievement as miners were working at greater depth and the seams were "narrow and erratic". A strike at the Sunset mine in late December 1912 mushroomed, bitterly dividing the community. For their part, the mining workforce saw the current 18¾ percent dividend, the increased value of the yield, and nearly £35,000 in general reserves as strong grounds for wage claims; for his part, Wilson declared: "I made this town and I'll bugger it before I'll give in to the strikers". The episode was Ravenswood's "last hurrah". Reefs were pinched out at greater depth and costs had rendered mining uneconomic. The death knell was sounded by the liquidation of the company in 1917. Intermittent activity was recorded at some smaller mines over the following twenty-five years, but the returns were negligible. Like so many northern goldfields, Ravenswood was finished by the end of the Great War.

Most of Ravenswood's mining and treatment plants and buildings were removed after the collapse of the field; only brick constructions which defied relocation and the corporate property of the dwindling community remained. However a collection of ruins and buildings representative of the period are still extant: derelict head frames, explosive magazines, stamps, stacks, dams and mullock heaps surround the church, hall, library, school, two hotels and a few houses and shops which comprise Ravenswood today.

Close by the gravel road from Mingela to Ravenswood are numerous stands of the narrow-leaved "Ironbark", native to the area; but within four miles of the township, the eucalypts disappear completely to be

replaced by an exotic species common to most northern mining fields - the "China apple". Originating from Madagascar, and widespread throughout Africa, India and Asia, the China apple was prized for its fruit which, when dried and treated, was known as "chinese dates". This stunted tree dominates the broken Ravenswood landscape and, coupled with the aggressive rubber vines which thrive at every disturbed site, denotes the perimeters of settlement. Native trees in close proximity to Ravenswood are rare indeed; a few black beans, tamarinds, date palms, fig trees and other introduced species provide relief from the monotony of the China apple and rubber vine.

The devastation of native vegetation on the northern mining fields, and replacement by exotic varieties, can be attributed to a number of factors, especially the miners' disregard for the environment, the presence of Asiatics in the early days, and the introduction of the goat. Eucalypts were ravaged by the miners for timbering shafts, for hoisting gear, for domestic firewood, and to fuel the voracious Cornish boilers. The Miners' Right also allowed miners to fell trees or to strip them of bark for roofing on dwellings. Photographic evidence of Ravenswood in the early years highlights the rape of the landscape. However, replacement by imported trees and the introduction of the rubber vine illustrates the pragmatic notions of miners towards their surroundings. Imported trees invariably had a propensity to give a dense shade canopy against the harsh North Australian climate. Similarly, the noxious rubber vine seems to have been introduced for use as decorative hedges, the green foliage and large pale blue flowers contrasting with the barren desecrated surroundings. Tamarinds and especially mangoes were cultivated for their fruit, the latter having a resilience to the sulphur fumes of the chlorination process. Furthermore, though the goat provided a handy source of meat and milk, they foraged on the regrowth of eucalypts and intensified the environmental havoc. 17 Short term utility invariably

17. A parallel can be drawn with Charters Towers where Bishop Gilbert White, writing in 1885, complained: "Every tree has been cut down and the ground is without vegetation of any kind. Mine shafts, chimneys and hoisting gear appear in every direction". Warden Sellheim complained of the goats as early as 1880: "At a modest computation at least ten thousand goats are allowed to devastate the landscape of this town".
dictated the type of imported flora and fauna, and their numbers often reflected the size of the mining field.

Approaching Ravenswood over One Mile Creek, the first signs of its mining past are noticeable as boiler stacks and mullock heaps rise in the distance. Entering the township, the ruins of the Mabel Mill, adjacent to the Railway Hotel, reinforce a notion of former grandeur. Little remains of the mill except two brick stacks, which serviced the boiler and the assay house, engine foundations, raffwheel foundations, tunnels and ten head of stamp. But the site houses an abundance of physical evidence from which the mill's origin can be traced. The surviving machinery frame of the thirty-head stamper is Oregon pine, imported from North America. Roman numerals chiselled at each junction of the structure indicate that the frame was pre-cut and pre-fitted prior to its erection at Ravenswood. Further, a small metal tag advises that it was inspected in 1905 by a government officer and was found to comply with the Mines Regulations Act. The stampers' brand name reveals its manufacture by a Townsville foundry, Brand and Drybrough. Similarly, the engine was cast with the importing agency's brand name - "Smellie and Company - Machinery Importers", one of the colony's most reputable firms, but there is no indication of its origin or manufacturer. The boiler stacks and tunnels betray not only the influence of the steam raising technology of the Cornish tin miners, but also the reliance of the northern mines and mills on the Scottish brick industry, as many of the scattered and broken bricks bear the names "Cartcraig", "Glochairn", "Glenboic" and at least seven others. Presumably these were shipped to North Queensland as ballast, fulfilling a demand for bricks which local manufacturers could not supply either in quality or quantity. In contrast to the ruins of the Mabel Mill, nothing remains of its competitor, Barton's 'Brothers Mill' which was situated upstream on Elphinstone Creek, other than the minimal evidence of some tailings.

18. The Mabel Mill and other remains and structures in Ravenswood have been detailed in a study for the National Trust of Queensland, undertaken by D.C. Roderick in 1974. See Ravenswood (Ian Black and Co., Townsville).
There are nineteen mine sites within Ravenswood itself. [See Mine Sites Map]. Inspection of the sites reveals that only ten possess substantial remains beyond collapsed shafts and mullock heaps. Probably the Sunset [Site 18], the field's most productive mine yielding more than 175,000 ounces of fine gold over a forty year period, warrants the most detailed comments. Although the mine has collapsed and is in a very advanced state of decay, it still represents the best surviving example of an "underlie brace" in the district. This method of mining was used extensively throughout the Ravenswood-Charters Towers area, as most of the reefs were inclined at an angle from the surface outcrop, where the machinery was located. The system of transportation of men and ore along the reef can be reconstructed from the surface remains, comprising engine house foundations, a brace and pulley, a carriage way, rails, an ore cart and an inevitably large mullock heap. 'Checking' of timber in the surviving main supports of the tramway enables the location of the rails and their centres to be deduced. An ore cart adjacent the mine illustrates the modifications effected to allow for its inclined path of travel, and the pulley wheels show the way that the winding engine was employed to transmit its winching power into the path. The other mine sites with surface remains, corresponding to site numbers are:

4. **New England**: The only evidence of the enterprise which boasted stampers and a treatment plant is minimal mill foundations.

7. **London North**: Poppet legs, part of the winding gear and some timbering still remain. The poppet legs are Maryborough hardwood, while the mullock heap is blocked by a pig-sty retaining wall of timber with rubble fill.

10. **Grand Junction**: Concrete foundations to the machinery area remain, along with a boiler stack and ore carts.

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19. Others, Shelmalier (Site 1), Overlander (2), Mellaneur (3), Black Jack (5), New Irish Girl (6), London (8), Little Grand Junction (9), Mount Pleasant (13), Eastern (15), are located from early surveys.

P9: Cottage adjacent the mullock heap and poppet legs of the London North Mine

[P. Bell]
PI0: Remains of the Sunset Brace
[D. Roderick]

PI1: Remains of the Mabel Mill
[D. Roderick]
11. **Deep Mine**: Significant portions of the battery and treatment area remain, including brick foundations, sluice-gates and tailings. A Cornish boiler stack, a magazine with an ornamental brick barrel arch design and extensive brick work and paving are also prominent. The soft porous paving bricks, branded Townsville Brick and Tile Co., are indicative of their low cost, and inferior quality.

14. **Duke of Edinburgh**: Part of an underlie brace, and machinery foundations are the only remains of the surface plant.

16. **General Grant**: Boiler stacks, a magazine, a head frame, a collapsed boiler stack, and substantial machinery foundations indicate the scale of operations at this major mine site. (The Grant power house probably fed direct current to both the Grant and the Sunset).

17. **Grant and Sunset Extended**: Poppet legs and a boiler stack still stand.

19. **Eureka**: Only collapsed poppet legs remain on the surface.

There are two other general features of these mine sites warranting comment: brick scatters and unprotected timber work. Most mine sites are surrounded by "brick scatters", with few full bricks evident, as these would have been collected for re-use at other locations. In the nineteenth century, cannibalism of building materials was prevalent. Relative costs of materials and labour made it worthwhile to demolish structures, to clean the materials and to re-use them at another site. On the other hand, unprotected timber work is a common feature, timber being relatively accessible and cheap. But this also reflects the pragmatism of the miners who erected timber superstructure sufficient to have a service life only for the life of the mine.

21. This gives a further possible insight into the assessment of mining ruins. On the one hand, it suggests that structures built with a homogeneity of materials reflected an urgency to complete the surface plant or a shortage of recoverable materials, while on the other hand, it also suggests some structures were built in periods of prosperity and that there was a sense of pride in the end product which precluded use of cannibalised materials.
The townscape of Ravenswood, despite the removal of many buildings after the decline of the field, survives as a statement of the absence of any degree or form of urban planning. The juxtaposition of cottages, shops, hotels, churches, mills, mines and mullock heaps illustrates not only the discomfort which must have been experienced by the town's residents, but also the impediment which commercial and residential structures would have posed to the development of the mines. The Mabel Mill with its stampers and chlorination works was located beside the Railway Hotel; the London North, a busy mine with two working shifts and one baling shift each day, was situated amid a group of cottages; while the Imperial Hotel was sited directly over a drive of the Eureka mine. In this case, a side elevation reveals a brick relieving arch incorporated into the hotel wall, suggesting that its designer was well aware of precautions required when siting a structure over mine workings. Even then, large portions of the town were relocated to make way for the mining of reefs that were more promising at depth than the surface blow indicated.

Early photographs of Ravenswood show areas formerly occupied by buildings that are now an extensive collection of mullock heaps. Yet in neighbouring Charters Towers the physical evidence discloses a completely different urban structure. Whereas Ravenswood's commercial and residential structures mushroomed within the reefing area, the business sector of Charters Towers is a considerable distance from the cairn commemorating the first gold find and from the early workings. Here, a town plan existed, defining the commercial and residential zones in the grid-iron pattern of contemporary municipalities. Irregular mining sub-divisions with street patterns superimposed over mining operations are to be found only on the outskirts of the town. Clearly, something occurred between the discovery of Ravenswood (1868) and of Charters Towers (1872) to account for the contrast in the townscape.

22. For example, the imposing New Ravenswood Hotel was shifted to Winton to become Scott's Hotel; the Masonic Hall was removed to Giru; and several houses were relocated in Townsville.

23. Early plans of Ravenswood and Charters Towers are in the possession of the author.
RAVENSWOOD TOWNSCAPE

EXISTING BUILDINGS
1 RAILWAY HOTEL
2 POST OFFICE & RESIDENCE
3 AMBULANCE
4 THORP'S BUILDING
5 IMPERIAL HOTEL
6 SCHOOL OF ARTS
7 ROMAN CATHOLIC CHURCH
8 SCHOOL & RESIDENCE

SIGNIFICANT SITES
9 RAILWAY STATION
10 COURT HOUSE
11 A L WILSON RESIDENCE
12 BROWNES HOTEL
13 BROWNES BUILDINGS
14 MASONIC LODGE
15 OLYMPIA THEATRE
16 CONVENT SCHOOL
17 METHODIST CHURCH
18 HOSPITAL
19 NEW RAVENSWOOD LIMITED OFFICE
20 NEW RAVENSWOOD HOTEL
21 THORP'S MINING EXCHANGE
22 N N BANK
P13: Macrossan Street from the London Mine with Wilson's 'New Ravenswood Hotel' and the Railway Hotel on the right [A.R. 1905]
In 1866, the Queensland government framed regulations pursuant to the act governing gold mining, inherited from New South Wales on the attainment of self government. It is these regulations which provide an interpretation of Ravenswood's town planning form, especially clause 21: viz,

No miner shall dig upon or undermine any land enclosed by any authorised occupant, or which is occupied by any building, or with machinery in connection with mining operations, or used as a garden, or as a government camp, police station, or for any public purpose, unless such miner first deposits with the Commissioner such an amount of money as the Commissioner and assessors...may deem sufficient to compensate for such removal or any loss occasioned thereby.

With a great deal of the land occupied in the initial rush before buildings were erected, Ravenswood thus developed with little sense of order. The Charters Towers townscape, though conceived before the 1874 legislation providing for reserved, surveyed town areas, does indicate the first warden's foresight and determination to avoid a development similar to Ravenswood. Unfortunately, the main reefs of Charters Towers dipped at an angle under his townsite, and, as the years passed, the largest mines were to be located within the town area where straight deep shafts were sunk to intersect the inclined reefs. The mullock heaps remain as testimony to a town planning exercise which went astray.

Several significant structures, representative of the townscape in its heyday, are still standing in Ravenswood. [See Townscape Map]. Moreover, as only a few buildings have been erected since 1908, the townscape is not complicated by contemporary additions. The buildings, corresponding to their site numbers, are:

1. Railway Hotel: Built in 1902 by Jim Moran, the hotel comprises two stories, and characteristics of a utilitarian design with a concern for costs. Locally made bricks were used for the external walls, partitions and piers. The floors are timber, and the ceilings are pressed galvanised iron. The upper story has simple timber balustrade and restrained verandah sweeps; the lower story has arch forms in metal and timber to the verandahs. The basement areas obviously provided cheap accommodation for single miners.
2. **Post Office and Residence**: An early building dating back to 1886, it is constructed entirely of timber, and is architecturally interesting because of its timber framed portico and adjacent verandah.

3. **Ambulance**: Built in 1904 to provide a community service in the "boom" period, the building has brick external walls, single lined tongue and groove timber framed partitions, concrete and timber floor and piers, a corrugated galvanised iron roof and flat galvanised iron ceilings.

4. **Thorpe's Building**: A two storied building erected in 1905 by S.H. Thorpe as a store with professional offices above, it is architecturally restrained in expression, with cast iron balustrade to the upper floor verandah and with cast iron sweeps as the only relief. The external walls are brick, as are the partitions on the ground floor. The upper floor partitions are brick and timber, while the roof is made of corrugated galvanised iron.

5. **Imperial Hotel**: This is the third building on the site. Tom Lee's store was demolished in 1900 to make way for a timber hotel which was destroyed by fire and subsequently replaced by Jim Delaney's hotel in 1902. Probably the best known of Ravenswood's buildings, it is a two storied structure with brick external walls, timber floor, tongue and groove timber ceilings and corrugated galvanised iron roof. The partitions are brick to the ground floor and timber framed single lined on the first floor. An excellent example of "Gold Fields Brash", it has cast iron balustrades to the facade, highly decorated timber arch forms to the verandah framing, and applied plastered ornament - Blood and Bandage style - to the front facade.

6. **School of Arts**: (a) **Hall** - a simple architectural style constructed from corrugated galvanised iron and timber, it reflects the early recognition of cultural and social activities as an important aspect of community life on an established goldfield; (b) **Library** - built in the 1870's of corrugated galvanised iron and timber, it contained two reading rooms and a meeting room. Its porch is one of the town's better architectural features.

7. **Roman Catholic Church**: The front portion of the church was built
PL4: Railway Hotel (1979) - little changed in 75 years  [P. Bell]
P18: Roman Catholic Church, Convent and School  [D. Roderick]
PI9: State School and Residence - one of Ravenswood's earliest structures [D. Roderick]
RAVENSWOOD: SURVEYING THE PHYSICAL EVIDENCE

in the early 1870's, and the rear section was added in 1906 to cater for the expanded population of the boom period. It is constructed of timber and corrugated galvanised iron on concrete stumps, and has been recently restored after cyclone damage nearly ten years ago.

8. State School and Residence: Built in the mid-1870's with weatherboard and corrugated galvanised iron, the structure has provided facilities for children for over a century.

There are a number of sites with existing remains in evidence. The physical remnants, together with contemporary photographs, help piece together the Ravenswood of the golden years.

9. Railway Station: The Railway opened in 1884 and closed in 1930. Only the remains of bitumen paving to the platform and some posts indicate its location.

10. Court House: The only remains of this structure are the brick retaining wall and steps.

11. A.L. Wilson's Residence: An imposing house, it was removed about 1945. Only paths, steps, a section of paving and a fireplace can still be identified.

12. Browne's Hotel: The only first class hotel in the town, with fifty bedrooms, billiard rooms and other facilities, its location is marked by trees and "the steps on the corner".

13. Browne's Building: One portion survives adjacent the Imperial Hotel. Constructed of brick, timber and corrugated galvanised iron with an ornate facade, it made up part of the commercial heart of Macrossan Street. The brick piers and some structure indicate the scale of the complex.

14. Masonic Lodge: Only the stumps remain after its removal to Gira.

15. Olympia Theatre: The concrete paving marks its location.

16. Convent School: Stumps and some foundations of the bath rooms are all that remain. It was shifted to Gira in 1948. The garden areas between the Convent and the School, like the tennis court foundation, can be easily traced on site.

17. Methodist Church: Stumps and stairs to the church still stand.
18. **Hospital**: This was the town's second hospital, and closed in 1908. Only a brick structure, reputedly the operating theatre, remains on site. Isolation wards were built as separate units at the rear of the hospital.

Finally, there is no physical evidence of buildings such as the New Ravenswood Limited Offices [Site 19], New Ravenswood Hotel [20], Thorp's Mining Exchange [21] and the Queensland National Bank [22]. Only rare photographs record their design.

The remains of kerbing and channeling, defining populated areas, can be found in many areas of the town. Construction varies from stone foundations to poor quality rubble concrete. Some fencing exists, often obscured by rubber vines. It is generally of paling and laced wire design. On the southern outskirt of the town is the overgrown cemetery with its share of tilted headstones, the earliest dating back to 1872. Inscriptions on the graves hint at the country of origin of some miners, at the type of accidents responsible for their deaths, and of the high infant mortality rate in the township. The weathered wrought iron gate at the entrance, with its ingenious self-closing device, is ornate: medallions at the intersection of the bracing rods proclaim their origin. The factory of Francis Morton of Liverpool mass produced railway gates; identical gates can be found in Charters Towers at the Park Hotel and at Thornburgh College. Together with the regular finds of tins stamped Bell Bros. of London "Boomerang" wax-matches, or Van Houtens of Holland cocoa, the Francis Morton gates provoke reassessment of the notion of "ballast cargoes", which is often the rationale for the presence of foreign manufactured items on the northern mining fields.

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24. For example, the Celtic cross of Kelly Cusack's grave (Mining Warden from 1890 to 1912) denotes his Irish origin; the Wriggles family lost two infant sons Ronald aged four months (22 January 1899) and Edwin aged two and a half (6 February 1899), presumably from the same epidemic.

25. Along the railway from Mingella steel telegraph poles bearing the brand of their London manufacturer, Siemen Bros., still support the telegraphic communication lines of Ravenswood. There are numerous other examples throughout the district.
P20: Thorp's Building (1979). The steps are the remains of Browne's Hotel
[P. Bell]
Ravenswood's Ambulance Centre has hardly altered in seventy years

[D. Roderick]
P22: Browne's Hotel at the turn of the century was described as the "Pride of the North"
[Cummins and Campbell Monthly]
RAVENSWOOD: SURVEYING THE PHYSICAL EVIDENCE

Probably the fire bricks found on northern mining fields and the iron used in Australian foundries are the only categories which can be classified for certain as "ballast cargoes". There was a steady demand for high quality fire bricks which local brickmakers were unable to supply; and there was a heavy reliance on pig iron and iron and steel goods which the infant Australian manufacturing industry could not produce. As Helen Hughes notes, the colonies brought nearly £5 million worth of iron and iron products by the mid 1880's, but there was no "adequate market for a single multi-purpose ironworks" in Australia: "Freights between colonies remained higher than freights from England, especially pig iron which continued to come out as ballast."26

Indeed there has been a tendency to attribute as ballast, goods and cargoes shipped at ballast rates. Any cargo which would enable ships to arrive in Australia with the minimum delay to secure export cargoes for England was preferable to the African trade and sailing the remainder of the journey in ballast. If it could be coupled with immigrants, then all the better. Often these cargoes were acquired by British exporters, or Australian importers, or ship owners/captains on speculation for sale in the colonial ports. However, there are many other explanations for the preponderance of British and European goods on the northern mining fields. Agencies had an important role: not only had several importers secured sole distributing rights for overseas manufacturers, but they also established strong local agencies in towns such as Townsville and Charters Towers.27 Some British firms, such as Francis Morton, had their own agencies on the mining fields, which would in turn secure orders on catalogues or remainder stock for improvised use. (This is one possible


27. For example: E.S.C.A. were sole agents for "Babcock and Wilcox" water-tube steam boilers; Gutheridge Ltd. distributed "Sperry" sliming and vanning buddles; McLennan and Co. were Queensland agents for "Worthington Pumps"; Brabant and Co. were agents for "Nobels" Glasgow Explosives Co. Ltd; and Adams and Co. were Queensland agents for C.T. Parsons (Newcastle-on-Tyne), Miller and Co (Edinburgh) and John Stephens and Sons (Falmouth).
explanation of the origin of the Francis Morton railway gates being adopted for other uses in the North). There is also the possibility that several types of machines and manufactures were shipped to North Queensland by the London based directors of British companies with mining interests in the north, the orders having been placed directly with the British manufacturer; or that Australian companies placed specific orders with British manufacturers because of a belief that the product would be better quality than the local product. The attitude of "British is Best" was strongly held by one of Charters Towers wealthiest magnates, Thomas Mills, who scorned the substitution on 1913 Australian stamps of an effigy of a kangaroo for Edward VII by thundering to a journalist from the Northern Miner: "How can any decent Englishman be expected to lick the back of a kangaroo; an animal with a small brain."

It was not as though there was an absence of iron works in Queensland and southern colonies. In Queensland alone there were several foundries turning out products for the mining industry from pig iron and steel imported from overseas. Walkers of Maryborough was established as early as 1868: it was a major supplier of ore carts, kettles and baling buckets, skips, safety cages, steel poppet-head frames, stampers, winding gear and engines. Brand and Drybrough, located at Townsville in the 1880's, supplied mining machinery including stampers, berdan pans, shoes, dies and cams to many northern centres. Other Queensland foundries included the Bundaberg foundry, the Vulcan foundry at Cairns, Burns and Twigg at Rockhampton, and Sargeant's "Britannia Ironworks" in Brisbane. Most of their products, however, would not have required the same degree of technical expertise and investment in plant as the imported mining and treatment equipment, and it is likely that the differential in British technological efficiency and labour costs, the advantages of ballast rates and the uncertainty of demand factors for other than basic mining and treatment equipment made it impossible for local industry to compete in most manufactured lines. The hypothesis requires further analysis through customs records and many other diverse sources. Even so, brand names, ruins, extant buildings, railway formations and machinery offer sufficient physical evidence for the industrial archaeologist to provide a better understanding of the past.
P24: Railway Station. Note its proximity to the Railway Hotel and London Mine  [D. Roderick]
GOLD MINING ON THE ETHERIDGE

Janice Wegner

The Etheridge gold and mineral field extended over an area of 13,000 square miles on the watersheds of the Gilbert and Einasleigh Rivers, and included the smaller Green Hills, Gilbert and Oaks goldfields. Gold was dispersed throughout the field, but the major reefing mines were grouped in the vicinity of Georgetown, the administrative centre, and Charleston (Forsayth), terminus of the railway connecting with the port of Cairns. Its remoteness, dry monsoonal climate, inadequate transport facilities, narrow fissure deposits and complex ore bodies impeded its development. The Etheridge's potential was extolled by promoters and mining men for more than half a century. In fact, it yielded well over 500,000 ounces of gold before World War I, but still remained a "poor man's field" and as Bolton suggests, "a museum of the various ways in which a London mining company could lose money".1 The Etheridge was the enigma of North Queensland gold mining areas with a chequered history more characteristic of base metal mining and its cyclic patterns.

The discovery of gold on the Etheridge is credited to Richard Daintree who explored the areas to the north and east of the Gilbert River in 1866. Two years later, after his appointment as government geologist, Daintree led a party of miners to the upper reaches of the Gilbert. His subsequent report of payable gold triggered a rush in 1869.2 Despite warnings that the alluvial deposits were patchy and would soon be worked out, there were 3,000 miners on the field when T.R. Hackett, the new gold commissioner, arrived in July the same year. Hackett observed the familiar conditions of a gold rush in North Queensland, to be repeated in the following decade. In the bustling shanty town of Gilberton, there was a shortage of food, an abundance of liquor, and little water, which not only hindered mining but also caused serious outbreaks of fever. The early exodus of impatient and disillusioned

2. R. Daintree to Secretary for Public Lands, 20 April 1869, 69/4292 WOR/A17 Q.S.A.; see also Bolton, A Thousand Miles Away p.47. The important rushes proceeding Gilberton were Cape River and Ravenswood, and to a lesser extent, Cloncurry.
prospectors was reversed by new finds, improved store supplies, and better water. New arrivals flocked to the field from the port of Cardwell.\(^3\) Gold mining methods were necessarily crude: for alluvial, they consisted of pans, cradles and sluice-boxes which allowed for mobility but not for water shortages; for reefing, miners resorted to burning and hand crushing.\(^4\) Soon after, prospectors had fanned out in search of more lucrative deposits.

In May 1870, gold was found at Western Creek; a mining camp was established; and the gold commissioner’s office was removed from Gilberton to the new discovery. Within a few months, the Overland Telegraph reef was located near the Etheridge River. The small township which was established was first known as Etheridge, but before long was renamed Georgetown by the Mines Department, honouring the gold commissioner, Howard St. George. By the end of 1871, over forty-four separate auriferous reefs had been located in the region; in January 1872, the Etheridge was proclaimed a gold field and Georgetown was allotted a Court of Petty Sessions.

The reefs soon attracted crushing machinery. Within the early months of 1872, a machine was at work at Twenty Mile Creek and others were being planned or erected at Mount Hogan, Gilberton, Georgetown and the Percy River. The gold commissioner, however, reported the familiar handicaps of insufficient water, lack of blasting powder, high cartage rates and primitive mining practices.\(^6\) Most of the batteries were placed a short

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4. L. Townley to Secretary for Public Works, 7 April 1870, 70/778 WOR/A28 Q.S.A.

5. L. Townley to Secretary for Public Works, 15 May 1870, 70/996 WOR/A44 Q.S.A.

6. H. St. George to Secretary for Public Works, 1 February 1872, 72/1020 WOR/A48 Q.S.A.
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distance from the mines to overcome heavy cartage costs, but without large and expensive dams to provide water for treatment milling was only intermittent. Paradoxically, works sited near permanent water, such as the Gilbert River Company's plant at Riverston, had to contend with higher overheads for freight on stone. As the development of the Etheridge was characterised by a series of independent prospecting trips, followed by ephemeral rushes, the batteries often had to pursue the mining camps. This involved costly delays removing and re-erecting machinery; owners had little control over the mill sites. In time, some localities proved more reliable than others, and mill proprietors such as Schaffert at Donnybrook, sought to attract miners to their mills by offering modern gold-saving machinery and incentives including advances on ores.

In the early years, few of the reefs were mined with purpose. Most claims were exploited by open trench methods, dug from peg to peg, and from three to eight feet in depth. This caused considerable damage to the claims during the wet season, and many were subsequently abandoned when poor timbering failed to prevent cave-ins. In addition, the restlessness of the miners and the perils of settlement in remote areas affected the field's progress. The nomadic nature of the prospectors and alluvial diggers was reflected in their philosophy: to win a fortune and then depart to new ground. Many miners were lured to Charters Towers, the Palmer and the Hodgkinson during the 1870's. It was during the Palmer rush of 1873 that the few residents of near deserted Gilberton were driven from the town by Aborigines. This incident and subsequent clashes earned the Gilbert and Georgetown districts a reputation as a hostile mining frontier terrorised by ferocious blacks. For a time after the attack on Gilberton, miners tended to prospect in large well-

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7. Their reputation was not without substance. In 1873 a group of Walshtown miners attempted to establish friendship with local Aborigines. The only armed white man lay down his rifle in a conciliatory gesture, but the miners were soon after driven back to the settlement, suffering two fatalities including one of the battery owners. For details, see Inquest Nos. 73/182 and 73/183, JUS/N37 Q.S.A. As late as 1878, a panic gripped Georgetown when several horses were speared following the departure of the police on escort duty. Queenslander, 24 August 1878, p.657.
armed parties, contrary to practice on most northern goldfields.  

This factor combined with isolation, climate and the nature of the ore bodies to deter capital investment in reefing during the 1870's. Few miners or entrepreneurs were willing to outlay substantial sums on timbering or machinery, especially pumping equipment while so many disadvantages existed. Even by the mid-1870's with cartage rates still high, with water for the mills a perennial obstacle, with expensive food and costly labour conditions to be contended with, local miners calculated that the reefs might yet yield profits. What they had not bargained for was the complication of mundic ores at depth.

Although many reefs had to be abandoned after surface blows were pillaged by open trench mining, several deposits showed promise of encouraging returns from the sulphide zones. As workings reached the water table, the easily-milled brownstone gave way to mundic ore which was often richer, but impossible to treat by conventional milling

8. Indiscriminate shooting of Aborigines, kidnapping of women and children and competition for water and game were the main causes of revenge attacks by Aborigines. Thomas Coward, a Native Police Officer, claimed in 1874 that the Etheridge was noted for the lack of harmony and communication between races. For details, see N.A. Loos, Aboriginal-White Relations in North Queensland 1861-1897, Ph.D. thesis, James Cook University of North Queensland 1976.

9. Isolation and climate were factors which impinged on the Etheridge to a greater degree than probably any other northern mining field except Cloncurry. There were no formed roads, and the chief mode of transport was horse drays and bullock wagons, which were subject to delays in the wet season, and tick fever and shortages of fodder in the late spring and summer months. Carriage rates varied from £30 to £60 per ton, and the return journey to the port of Townsville averaged two to three months.

10. Prospecting techniques and geological knowledge were based mainly on experience. This did usually not extend to an awareness of how to manage a mine economically to maximize returns. Often only the rich surface ores were mined, leaving large quantities of low grade ore which, if worked in a more systematic manner, might have been payable. It was not until the early 1890's that mineralogical lecturers and technical officers from Croydon and Charters Towers visited the field.
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Moreover, the admixture of gold with other metals in the mundic ore rendered it less valuable. Just as Ravenswood grappled with treatment problems for thirty years, the Etheridge miners experienced decades of frustration. Gold-saving equipment added to the batteries proved inefficient; later, cyanide plants were little better even though some millers persisted with this process into the twentieth century.  
The cyanide process was thus mainly used for the treatment of tailings. Smelting was a satisfactory solution, but the economics of erecting small smelters at the scattered mines were dubious, and few local men had sufficient capital for such costly plant. Limestone, ironstone and suitable fuels, all necessary for smelting, were scarce on the Etheridge.

Most of the principal reefs on the goldfield were located during the first decade, though no records of production were kept until 1878. With Gilberton and smaller shows at the southern end of the field abandoned to Chinese fossickers, the main workings were confined to the Georgetown and Charleston districts. At Georgetown, the Papa, Overland Telegraph and St. George P.C. attracted attention; to the west, the Durham and Cumberland mines were being vigorously worked; and to the south, the Better Luck, Spero Meliora, City of Glasgow, Lighthouse and Lord Nelson were promising. The Queenslander, Nil Desperandum, Big Reef and Havelock, and the Caledonian at Goldsmith Creek, made up the leading mines of the Charleston district. Yet the dearth of communications, suitable treatment facilities and capital investment obstructed large-scale development. Consequently the Etheridge retained its title of the "poor man's Eldorado".

11. R.L. Jack, "Geological Observations on the North of Queensland, 1886-7", Votes and Proceedings, 1887, II, pp.821-36. Stone taken from the Nil Desperandum at Charleston was said to have stripped the mercury from the amalgamating plates in five minutes, and coated the iron with copper. Jack, ibid, p.826.

One of the first outside companies to invest in the field was the Sydney-based Grand Papa Gold Mining Co., formed in 1881 to work the Papa reef near Georgetown. It acquired a ten-head battery and erected a furnace for smelting, but collapsed in 1883. However, its fortunes in no way deterred southern investors, as, in the following year, there was a rush of company owned machines into the district. The upturn in business activity and the Indian and Colonial Exhibition of 1886 attracted British capital to many Etheridge mines, including the Cumberland and Durham, which were floated on the London market. The Cumberland Gold Company began with a nominal capital of £180,000, only portion of which was working capital. A complete crushing plant was erected and additional surface machinery was acquired at a total cost of £60,000. During its first year, 17,125 ounces of gold were recovered and a 2/6 dividend was declared. This initial prosperity, however, was short-lived. The reef pinched out below 600 feet, and for the next eight years until its closure in 1895, operations at Cumberland were maintained by optimism rather than gold yields. On the underlie, the shaft reached a depth of 1,106 feet, but gold-bearing stone remained elusive. Over-capitalisation of the mine and heavy management expenses eventually exacted its toll. The Durham suffered a similar fate. Sold to an English company in 1886, it yielded high returns for several months at the rate of nearly 400 ounces per week. In 1890, operations were abandoned. As one observer recorded:

...notwithstanding those excellent returns no dividends were paid. It took all the capital obtained from the gold to carry on. It has been

15. See Cairns Morning Post, 5 December 1895.
16. For details on the mine, see W.E. Cameron, The Etheridge and Gilbert Goldfields, G.S.Q. publication 151. Cameron wrote: "It seems incredible that a reef which has given such returns within 600 feet of the surface [£200,000 worth of gold] has suddenly pinched out below that depth. It is difficult at this time of day to find out whether the efforts to find the reef at lower depths were as well directed and persistent as they should have been with such a reef left behind; but in the light of mining experience all over the world, it seems very improbable that the Cumberland Reef has yet given up the large portion of its gold."
P30: Lady Norah Cyanide Plant, Cumberland  [A.R. 1903]
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said that although there was £8 worth of gold in every ton of stone, it took £11 to get it. The palatial residences for managers and officers, costly machinery, and extravagant management generally soon told on the resources of the mine. A shoot of gold that was enabling the company to keep going petered out, and there being no funds to sink farther the company, after failing to effect a reconstruction, collapsed. 17

At a very early stage, the local warden had struck a sour note, warning that company activities would be beneficial "always provided they intend to raise dividends from the mines themselves and not from speculation alone". 18 His caution was vindicated in 1887 when the activities of the Etheridge Goldfield Company were publicly disclosed. This company had floated three subsidiaries, the Canadian, Elektron and Etheridge Reefs; the subscribed capital of the group aggregated £450,000. The parent company sold unimproved gold claims to its subsidiaries for cash, which enabled it to declare a twenty percent dividend before the group collapsed in September 1887. Not a ton of stone had been raised or crushed, and the outcry temporarily damned the Etheridge in the eyes of investors. 19 Even when speculation and fraud were not major considerations, many companies financed by outside capital exhibited poor management, extravagance and mining incompetence. Most were over-capitalised and outlaid large amounts on batteries and machinery to the exclusion of mine development and dams. It was clear from the early 1890s that few companies had any hope of paying dividends proportionate to their capital investment, and the warden even reported rumours that foundry proprietors held large interests in the original flotations and influenced the choice of management and the orders of elaborate machinery. 20 Goldfields of North Queensland Limited took twelve months

17. Koradji, Etheridge Mining Fields and the New Chillogoe Railway and Mines Company Limited, North Queensland (Brisbane 1904), p.16; Cameron, ibid, commented: "Men who have worked in the mine report that good stone was left in all the south-western ground, and the abandonment of the mine is universally put down to extravagant and incompetent management."

to erect a ten-head mill at Georgetown at a cost of nearly £25,000, only to find that no gold-bearing stone was at hand. By 1891, the companies began to collapse. There had been little long term purpose in their operations, and with the capital market now closed, the companies were wound up, their mines were abandoned and machinery was left to rust. In sum, over £1,000,000 was reputed to have been absorbed on the Etheridge with little benefit.

The Etheridge miners were characteristically experienced, energetic, resourceful and, in the main, independent. Only few men disagreed when the Mundic Miner grouped "wages men" with whisky swillers. Their restlessness was satisfied by small rushes, such as those to Woolgar (1880), Lane's Creek (1889), Percy River (1892) and Green Hills (1896). After the collapse of company mining, many miners drifted to Croydon and to Charters Towers where the discovery of the Brilliant lodes had ushered in a new era of prosperity. Others turned to base metals in the Herberton district; while some departed for the West Australian goldfields. Those who remained on the Etheridge acquired properties and machinery at extremely low prices. Mines abandoned by the companies, in many cases, provided rich returns for local miners: Carl Karius

21. Another company had three separate batteries of ten stamps each: one at Goldsmith's Creek which worked for two months and was then "hung up" for want of stone; a second at Lighthouse which did not crush for two years; and a third which arrived from England—was unloaded at Goldsmith Creek, only to be left in pieces, rusting.

22. Symptomatic of company extravagance was the Etheridge Reef Quartz Co. which engaged a legal manager at £800 per annum and at least three mining managers on £600 a year. Bolton, A Thousand Miles Away, p.129. The Cairns Morning Post recounted that the Durham managers on £2,000 a year had great liking for champagne and 4-in-hands. Ibid., 25 July 1895.

23. The nomadic character of the miners was typified by one pair. Leaving the Hodgkinson for the Tate to wash alluvial tin for supplies to sustain them on the Gilbert field, they subsequently worked at Mount Hogan, the Robertson River and then Percyville with indifferent results. The Gilbert they found to be uprooted by a number of Chinese fossickers, so they moved on to Goldsmith Creek and then to the Etheridge River where they finally won modest returns for a short time. See North Queensland Cutting Book No. 1: Cairns Post, 6 February 1941, Oxley Library.

P32: Queenslander Mine at Forsayth [G.S.Q. 219]
purchased the Big Reef and its machinery for £3,000 and was able to recover £3,600 worth of gold from the battery plates. The Canadian and St. George similarly provided their new owners with unexpected profits. In fact it was in the wake of the companies' crash that the Etheridge achieved its highest gold output of 29,185 ounces, half of which came from the Charleston group of mines including the Big Reef, Queenslander and Nil Desperandum. These mines had been held back for want of capital and ore treatment problems, but were subsequently developed by local miners who salvaged abandoned machinery and plant. However, with capital unavailable, the Etheridge production rapidly declined: by 1900, the gold yield was less than 10,000 ounces, drawn principally from the Queenslander and Nil Desperandum at Charleston, the Jubilee Mine at Cumberland, and the International at Rocky, near Georgetown. Parties of gougers contributed the balance, hand-picking ores for smelting at Aldershot or cyaniding tailings. For their part, Mines Department officers despaired that the field had slid into depression. The local warden attributed the downturn to "a desire to live on foreign capital, if at all procurable, or to make a rise at the expense of those likely to secure foreign capital to assist them in the development of their mines." Similarly the Under Secretary for Mines commented in 1899:

The Etheridge has made no real progress in years. Rather it has slowly, but surely, been declining. The lack of interest manifested in the field since the retirement of English capital, and the inability of the residents to initiate or carry to a conclusion any scheme which calls for persistent effort, sufficiently accounts for its present position. Nor is this any disparagement of the miners or business-people of the field. Simply the task of development is past their power, and the disclosures of the riches of the Etheridge will probably be reserved for a new and vigorous generation.

25. Cairns Morning Post, 21 November 1895. The lease alone had originally cost the Big Reef Company £40,000.
26. Details of mining activities between 1886 and 1899 are contained in Cameron, G.S.Q. publication 151.
It was not just for want of capital that the Etheridge remained moribund; the problems were more complex. Distance from centres of population and ports, and the absence of suitable transport swelled overheads. The isolated location of the reefs and their small size discouraged the erection of on-site batteries and, because of high cartage costs on ores to treatment works, rendered many shows uneconomical. In turn it precluded capital investment to fully develop the reefs and to test the permanency of ore at depth: as a result few mines were opened below 250 feet. The refactory nature of the ores below the water table was a constant worry, although geologists were confident that modern metallurgical methods would successfully unlock the gold. Finally, seasonal factors were a consideration. Mining was limited to times of the year neither too wet nor too dry. The ruinous floods of 1895 which washed away dams and valuable tailings and the prolonged drought from 1900 to 1903 exacerbated difficulties. However, the potential of the Etheridge was frequently lauded, despite the depressed reality. When solutions were suggested, the construction of a railway invariably received priority. It was argued that a railway would lessen both mining and living costs, provide access to treatment facilities and indirectly stimulate new capital investment to work the mines on a larger, more economical scale.

The revival of the Etheridge after the turn of the century was occasioned not by a new gold rush, but by the opening up of the Einasleigh copper mine. When base metal prices were high, miners often

29. The problem was not only the cost of bringing up machinery from the coast. The cost of living, and the purchasing power of wages was a constant grievance. English potatoes cost £45 per ton and the humble sweet potato fetched £25 per ton. The Chinese had a virtual monopoly on market gardening, of which Warden Haldane complained in 1889, "...one shilling is charged for 5 or 6 green coarse leaves, known here as cabbage, or eight to ten carrots not the size of an ordinary radish." A.R. 1889, p.289; see also 1893, p.65.

30. For examples see the warden's reports for 1900 and 1901. As Warden Boddington remarked, "Progress is unfortunately still delayed, and enterprise still languishes." Work at Percyville and Mount Hogan was almost at a standstill and in 1901 there was a decrease in production of 1,175 ounces, attributed to the collapse of the Queensland Gold Mining Co. Ltd. The busiest gold town in 1900 was Gilberton, where 'leader-hunting' occupied 30-40 men. A.R. 1900, pp.69-70; 1901, p.57.

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P34: Charleston (later Forsayth) prior to the construction of the Etheridge Railway [G.S.Q. 219]
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turned to copper, silver-lead and tin as useful standbys. Many base
metal deposits were known to exist on the Etheridge: copper was located
at Einasleigh by Richard Daintree; silver-lead was found at Mount Turner
near Durham in 1888, at Percyville in 1891 and at Mosquito Creek near
Charleston in 1898; while additional copper lodes were pegged at Ortona
on the Gilbert in 1900. Although the British financed Einasleigh
Freehold Copper Mines Limited suspended operations in 1902 after a fall
in base metal prices, it aroused the interest of Australian investors in
the Etheridge's mineral deposits and spurred agitation for the
construction of a rail link. The bait was finally seized by the giant
Chillagoe Company.

After outlaying over a million pounds on its railway network, large
central smelters, port facilities and its mines, the Chillagoe Company
was troubled by short supplies of ore. The Etheridge base metal lodes
were seen as the company's salvation. The chairman of directors, J.S.
Reid, brought strong pressure to bear on the government for some form of
financial assistance for a railway to the field. As one historian
recounts:

He warned that in the absence of more capital, which
the company could not raise by its own credit, it
would have to close down the smelters. He claimed
if ore supplies could not be drawn from the Etheridge
field, the 'practical abandonment of Chillagoe' was
almost certain, which 'would be little short of a
national disaster, at once depriving some 3,000 to
4,000 people of a livelihood'.

The proposal brought forth a chorus of resolutions supporting a railway
from public meetings at Cairns, Atherton, Mareeba, Chillagoe and

31. See chapter 7.

32. The company was desperate for more ores: early in the year it had
defaulted on debenture payments, even though its railway was running
at a profit. The Chillagoe company's proposal was not the first
scheme for a railway to the Etheridge. In 1902, the Einasleigh
company unsuccessfully proposed a railway to Almaden, conditional
on government financial support. The British firm Berwick, Moreing
and Co. put a proposal to the government for a tramway, but later

With individual politicians sympathetic towards the company, it was no surprise when a definite agreement was concluded and then ratified by the Etheridge Railway Act of 1906 which provided for a line from Almaden to a point "at or near Georgetown". Work commenced in 1907 and the line was completed in January 1910, not to Georgetown but to Charleston, via the Einasleigh mine, in the south-eastern portion of the field. Georgetown and the other gold mining areas to the north-west and south-west were thus denied the benefits of cheaper transport and access to smelting facilities. To obviate uneconomical practices, the company planned to take up groups of mines and equip each group with a concentrating plant to treat ores before raling them to Chillagoe. However, this policy was never realized: the base metal prospects of Macmillan Creek, Stockman Creek and Ortona were tested, but in 1911, the company temporarily settled its ore supply dilemma by purchasing the Einasleigh mine. Ironically, the group on which expensive treatment facilities was conferred was the Charleston gold mines in which the company became interested in 1910. It also worked the Hawkins Creek and Union gold mines, neither of which had appreciable base metal contents.

The Charleston group comprised the Queenslander, Havelock, Big Reef and Nil Desperandum: it was floated into a subsidiary company, Etheridge Gold Mines Limited, with a nominal capital of £60,000. These mines were chosen because they were proven producers, having yielded £224,000 worth of gold; they were close to the railway and to permanent water; and they contained some quantities of base metals as well. Over £30,000 was spent on the group in the first twelve months, which included the cost of a large mill at the Havelock mine, but here also the company experienced

34. For details see Q.P.P. 1904, I, pp.1335-50. See Chapter 10 for the agreement.

35. The company principals claimed that the route was designed to tap the reserves of copper and silver-lead; the northerly route to Georgetown would have travelled through gold-bearing country, which was not of primary interest to the company. Though he publicly stated that the railway would be built where it would most benefit the district, Reid subsequently informed the State railway authorities that they were not building the line for sentiment or philanthropy. In fact, of all the company's major mines on the Etheridge, only one - the Einasleigh - was not a gold mine.

J.S. Reid to Commissioner Thallon, 14 August 1907, RLY A/9218 Q.S.A.

Charleston was renamed Forsayth in honour of the Railway Commissioner, J. Forsayth Thallon.

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shortfalls in ore supplies. In desperation, it secured options over a number of other mines, but after heavy expenditure admitted defeat. The Havelock was closed down in 1913 and the Queenslander soon after. Even the government which had catered to the Chillagoe management over the years refused to be drawn into a scheme to extend the railway from Charleston to the Gilbert region.

The immediate effects of the Etheridge railway on the mining industry were disappointing. The warden noted that production fell as miners were content to stack ore or to seek exemptions until construction was completed. Southern speculators demonstrated a new interest; several properties were taken up on behalf of Tolhurst, Keats and Cumming, Melbourne brokers, and other Melbourne syndicates investigated the International mine. But other strong developments were independent of the Chillagoe company's activities. By 1911, Croydon interests had successfully gambled on the Durham and International mines: the Durham Consols Goldmining Company discovered gold at the 750 ft. level in the Durham mine, the deepest that gold had been discovered on the Etheridge; and the Mount Jackson Company won substantial amounts of gold from the International at Rocky. However, the greatest boost to the field was the Oaks rush of 1908.


37. Aside from the Charleston group, the company held the Caledonia at Goldsmith Creek; the Boomerang, Perseverance, Black Eagle, Union, Percy Queen, Mountain Maid and Homeward Bound in the Percyville district; and the Cobar and Cobar West at Mount Turner near Georgetown. In 1911, it also took over Hawkin's Hill, near Cumberland. Many more were taken up under option and tested.

38. See Minute on letter, A.J. Thynne to D. Denham, 1 August 1913, Q.P.D. CXXV, p.2415: "The company was very confident of the Etheridge country and represented that a railway to Charleston meant life to the Chillagoe Company, but we all know what a 'frost' this has been. I decline to be drawn at present into even considering a railway to Gilberton...."


In September 1907, Charles Mack and William Barry located gold on the Copperfield River, thirty miles south-east of Einasleigh. A rush followed the disclosure of the find, and by June 1908, there were nearly 1,700 on the field. This was to prove one of the last of the big alluvial rushes; it attracted men from all over Queensland, including John Campbell Miles, later discoverer of Mount Isa, who rode a bicycle 1,500 miles on punctured tyres stuffed with grass and with his swag strapped to the frame. Diggers converged on the field from all points, despite the warnings about the doubtful permanency and worth of the field. Most came by the new railway reaching out from Almaden; others from Cardwell on the east coast, and from Croydon to the west. Some townships on the Etheridge were temporarily deserted. It seemed that the field's proximity to established towns and a railway would have prevented shortages and high prices, but the residents of the new town of Kidston still complained of expensive goods, and carriers found a ready market for supplies. Opinions of the field varied. William Maxwell, MLA for Burke, suggested that it would last for two years; the warden believed that it might become an important leader centre; while the Government Geologist E.O. Marks predicted an even longer life, as he noticed an immense width of rock containing low values, which if crushed with the small rich leaders and veins, could be made payable. To an

41. The prospectors reported their find to Constable Donelly. It seems that Mack inadvertently disclosed the location while drunk at the nearby mining camp of Lucky Creek. Such secretiveness caused the Mines Department a great deal of annoyance. See P.M. Hishon to Under Secretary for Mines, 14 November 1908, MMO 14B/68 Q.S.A.

42. Ibid. The auriferous area of one and a half square miles was concentrated around three small hills, known as the Knobs.


44. P.M. Hishon to Editor, *Q.G.M.J.* 16 March 1908 MMO 14B/7 Q.S.A.; Cairns Post, 26 March 1908.

45. Construction of the Etheridge railway was briefly halted when navvies deserted to the rush.

P36: Chillagoe Company’s Havelock Mine at Forsayth [A.R. 1911]
extent, they were all correct as the Oaks followed three overlapping stages of development. The alluvial yield began to decline in late 1908 coinciding with reefers commencing work on the small rich quartz veins. On appeal, the warden upheld objections by alluvial miners over the area of claims pegged by reefers. With the arrival of a battery, erected with government assistance, and Suhle and Archbold's Enterprise mill, the area became an important leader centre employing 300 reefers and 100 alluvial miners. In 1911, the amalgamation of leases was permitted to facilitate mining on a larger scale; Kidston subsequently enjoyed several years of prosperity based on economical open-cut mining and bulk crushings. In 1916, the state constructed a dam in an attempt to overcome the seasonal water shortage, and in 1920 a state battery was commissioned. Besides boosting the gold output of the Etheridge for many years, the Oaks sparked a series of small alluvial rushes between 1908 and 1912 to Halker's Creek, Mount Adler, Mount Joyce and Percyville, where only the original prospectors' claims proved payable.

The Oaks output, however, disguised a general decline in goldmining on the Etheridge in the immediate pre-war years. Reduced activities at Durham, increasing unprofitability of many smaller enterprises and the drift of prospecting parties from the field were evident. The fatal blow came in early 1914 when the Chillagoe Company closed down its mines and smelters: it was in financial straits again as the Etheridge had not come up to expectation. Mostly, it was the fault of company management.

47. In May 1908, Warden Hishon reported a dispute between reefers and alluvial miners over a reefing claim 50 feet by 400 feet. The alluvial miners wanted the entitlement reduced to 50 feet by 100 feet. At a public hearing, they claimed that there was nothing to stop thereefer working the claim for alluvial gold; the reefers countered by threatening to take the matter to the Mines Minister. See P.M. Hishon to Under Secretary for Mines, 23 May 1908, MWO 14B/7 Q.S.A. The size of the lease was confined to six acres in 1910 to overcome sub-letting. In fact, an application by the Chillagoe Company for a 12 acre lease was later refused. Ibid., 6 December 1910, MWO 14B/9 Q.S.A.


Only the Einasleigh copper deposits were worked vigorously, and with little foresight to future ore supplies, to keep the smelters at Chillagoe operational. The Charleston mines were never worked in unison, and little capital was provided for mine development to augment high outlays on surface plant. The company's failure depreciated the value of locally owned mines; it also had many mines locked up under option and exemption, which caused intense local resentment. Funds were diverted to the Mount Mulligan coal deposits to provide cheaper fuel, even though the metallurgical problems with refractory ores had not been fully solved. As a result of a series of mishaps, including disasters at two of its major mines at Chillagoe and a fire at the smelters, and the heavy interest burden on its railways and surface plant, the company called a halt and opened negotiations for the sale of its assets to the state. It was nearly five years before smelting was resumed at Chillagoe under state management.

The failure of the Chillagoe Company and the long interval until the state takeover dislocated mining in far North Queensland. Many miners left the region, as ores now had to be shipped to southern smelters at high cost. Most mines closed permanently. Loans from the Mines Department and various state assistance grants kept some small shows producing; but despite the facility of the state smelters which operated from 1919 to 1927 and from 1929 to 1943, there was to be no third boom. The Einasleigh closed in 1922 and the Kidston state battery did not operate continuously after 1925 for want of stone. It was abandoned in 1949. Towns such as Cumberland, Durham, Percyville and Mount Hogan disappeared, while Georgetown and Forsayth turned to supplying the pastoral industry.

51. The Chillagoe Company had outlaid not less than £5,800,000 since 1897 on its operations. For further comment on the company's failure, see Further Report of the Select Committee on the Chillagoe and Etheridge Railways Purchase Bill, Q.P.P. 1918, III, pp.1548-9 (evidence of C.I. Hewitt) and 1379 (evidence of F.G. Hughes.)
GOLD MINING ON THE ETHERIDGE

During the depression of the 1930's, interest was aroused in abandoned mines due to the exchange rate on gold and the federal government's gold bounty, but the expense of reopening old mines, and equipping them with modern machinery, and the erratic and low ore values defeated the few investors who showed some interest in the field. Regional factors, not least being the Chillagoe closure, combined with the interruptions occasioned by the outbreak of war to effect an irreversible decline in mining on the Etheridge, and on other northern fields such as the Hodgkinson, Walsh and Tinaroo and Chillagoe districts.
THE PALMER RIVER GOLDFIELD

Noreen Kirkman

Gold on the Palmer River was discovered by James Venture Mulligan's 1873 expedition. The rush which followed, and which was sustained for several years by further alluvial finds, was different in several significant ways from gold rushes elsewhere in Australia. Many of the elements which stamped the uniqueness of the Palmer were characteristic of other alluvial rushes, but never had they occurred in combination.

It was an extremely rich field yielding over a million ounces of alluvial gold. Most was produced during the short boom of 1873-76; and a substantial unrecorded quantity was exported by Chinese and European miners. Moreover, the early reports from the Palmer sparked off a tremendous population movement - twenty to thirty thousand people made their way to the field or to Cooktown in the early years. Whereas far greater numbers had flocked to the New South Wales and Victorian diggings in the early 1850's, the Palmer, unlike most alluvial finds, was situated beyond the frontier of pastoral occupation and far from the seat of government. Thus the European penetration of Cape York peninsula had important implications not only for the northern mining industry but for communications, settlement and race relations.


3. See Blainey's comments on the economic inter-relationship of the mineral and pastoral industry in The Tyranny of Distance (Melbourne 1966), pp.144-5.
were eventually to dominate the European population. Although European-Chinese economic conflict was an established pattern in Australian goldmining, never had European miners faced competition with Chinese at a time when clashes with Aborigines were still frequent. 4

News of Mulligan's discovery of payable gold on the Palmer first reached Georgetown early in September 1873. 5 Within seven days at least 200 men set out over 250 miles of unsurveyed terrain to peg the alluvial deposits. 6 Excitement heightened in the other northern gold towns of Gilberton, Ravenswood and Charters Towers; and crushing machinery, especially on the Etheridge, fell silent as miners and carriers were attracted to the new rush. The opportunists and entrepreneurs of Georgetown swiftly decamped in the wake of the goldseekers as one newspaper correspondent recorded:

Drays conveying swags, provisions, cradles and sundry other essentials for a new rush are leaving every day, charging 6d. per lb. freight; storekeepers are rushing post haste to meet teams originally destined for this place, to turn them Palmer-ward from the turn off near Carpentaria Downs station, about 90 miles away; publicans are joining the universal skedaddle; sawyers and other tradesmen are packing up the implements of their respective callings; and local stocks of 'Port Mackay' and other stimulants are largely drawn upon, and waggoned off, to meet the anticipated heavy requirements for goods of this description at the new rush. 7

However within a month unfavourable news filtered back with the return of unsuccessful diggers driven away by the lack of rations and general distress on the remote Palmer field. 8

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4. It could be argued that the Gilbert and Etheridge fields were exceptions in North Queensland.
5. Telegrams dated 5 September 1873 reproduced in Queenslander, 13 September 1873. Mulligan's party returned to Georgetown on 3 September 1873 after an absence of three months.
6. Ibid., 20 September 1873.
7. Etheridge correspondent for the Cleveland Bay Express writing from Georgetown, 15 September 1873, quoted in Brisbane Courier, 18 October 1873.
8. Ibid., 6,7 October, 1 November 1873; Queenslander, 29 November 1873.
**THE PALMER RIVER GOLDFIELD**

The isolation of the Palmer River district and its climatic reputation influenced the government to adopt immediate measures to overcome the absence of access roads and of official administration on the goldfield before the onset of the wet season which would halt all communications. The Secretary for Public Works, J.M. Thompson, successfully urged Cabinet to authorize special arrangements for a government expedition with administrative staff, road party, and Native Mounted Police "to guard against the hardships which must be endured by the diggers" to the new rush. 9 S.S. *Leichhardt* was promptly despatched from Brisbane on 15 October 1873, partly because supplies on the Palmer were exhausted. 10

The expedition, which also included eighty-six diggers, was led by the Gold Commissioner, Howard St. George, an experienced administrator and "a man of known integrity and ability", 11 and was accompanied by A.C. Macmillan, the long serving Engineer for Public Roads for the Northern Division. Both men soon experienced problems arising from the non-existence of previous European settlement. The port of Cooktown had to be established by the expedition with limited labour, equipment and supplies, factors which inhibited road-making from the outset. As few horses were transported on the *Leichhardt*, the accompanying diggers were obliged to walk to the new field in the hottest and driest month of the year. The urgency with which the road was cut through unexplored country reflected the inadequate survey and resulted in a dray track of 140 miles to be used throughout the Palmer's most productive years. In

9. Secretary for Public Works to Cabinet, 14 October 1873, 73/4887 WOR/A75 Q.S.A.
10. See report by A.C. Macmillan, government surveyor, in *Queenslander*, 29 November 1873.
11. *Cooktown Courier*, 25 July 1875. Born in Ireland, St. George lived in Queensland for thirty-five years until his death in 1897. Appointed to the Queensland public service in 1868, he served as a gold commissioner at Western Creek, Gilberlon, the Etheridge and Charters Towers before his appointment to the Palmer.
addition, the expedition suffered several attacks by Aborigines. The subsequent reprisals were to lead to a government enquiry soon after. Thus, despite the government's readiness to assist the development of the Palmer, it was clear that local officers faced a formidable task.

Writing from Palmerston (later Palmerville) four days after his arrival, St. George issued a glowing appraisal of the field. Miners were making £1 per day and above; one man had discovered fifty ounces worth nearly £200 in three days. He acknowledged the "excellent quality" of the gold, and believed that it was "the richest and most attractive Goldfield yet discovered". The diffusion of high quality alluvial gold was due to the Palmer's geological history, deriving from reefs and dispersed by faulting of the Maytown block and consequent erosion by the Palmer and its tributaries. Ninety percent of the gold is estimated to have come from the river and tributaries between Fish Creek and Byerstown, an area of nearly 2,000 square miles. Described by W.O. Hodgkinson, a subsequent mining warden, as a "great auriferous basin", the Palmer yielded nearly £5 million worth of alluvial gold in its first decade, with the peak output of 260,000 ounces in 1875. As

12. H. St. George to Secretary for Public Works, 16 November 1873, 74/158 WOR/A77 Q.S.A. The Aborigines were described as "very numerous and hostile".
13. Inquiry into Accusations re: Killing of Blacks by Government Expedition, 74/701 COL/A194 Q.S.A.
14. H. St. George to Secretary for Public Works, 16 November 1873, 74/158 WOR/A77 Q.S.A. In fact the gold yield averaged £4 per ton compared to Charters Towers returns of £3/8/8 per ton for the period 1874-84.
15. See Chapter 1 for geology of the field, and for references to geological survey literature.
16. W.O. Hodgkinson to Under Secretary for Mines, 2 June 1881, 81/648 MWO 13B/22 Q.S.A. In the 1881 Mines Department report, Hodgkinson stated that the uniform value of the gold was unparalleled in mining history, a sweeping claim but indicative of official praise. A.R. 1881, p.14.
late as 1901, official sources acclaimed the Palmer as having "transcended anything previously or since discovered in Queensland". 17

In its alluvial phase, the Palmer was an ideal "small man's field". Miners without capital and experience had the opportunity to get rich quickly, as the only equipment required was a dish, pick or shovel and a bag, over and above rations. 18 Two years after the initial rush, the field, according to the Queenslander, "was still attractive to "fossickers":

the Palmer happens to be the only gold-field in the colonies where the fossicker can eke out a livelihood with the tin-dish when things are at the worst. He can, therefore, 'hold his own' without diminishing his capital; and is on the ground ready to start at a moment's notice in the event of anything new breaking out. 19

Climatic influences assisted the "fossicker" in at least one way. Turbulent floods acting as vast sluices uncovered new alluvial deposits, even if temporarily mining was dislocated in the wet season. 20

In general terms, the alluvial miner on the Palmer encapsulated the digger image of earlier decades. 21 The austere, primitive lifestyle,


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<th>Year</th>
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<tr>
<td>1873</td>
<td>58,829</td>
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<tr>
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<tr>
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(Source: A.R. 1876-83 passim; yield in ounces, price per ounce).

18. See Cooktown Courier, 20 June 1874; Cooktown Herald, 8 July 1874.

19. Queenslander, 17 July 1875.


the isolation, and the need to travel long distances in search of new finds was characteristic of the Palmer digger. Periods of profitable gold extraction were interspersed with extended periods of prospecting, travelling to drier areas to accumulate washdirt for the wet season, and bouts of hectic revelry in the numerous shanty pubs which proliferated in the raw settlements. Furthermore, the Palmer digger tended to be more transitory than his southern counterpart and less inclined to invest in or develop his claim, enhancing the traditional view of the alluvial miner.

Regular, small rushes became an established pattern in the early years of the Palmer River goldfield. By May 1874, only six months after the initial influx of diggers, depression and destitution was widespread. It was eased by the rush to Sandy Creek the following month which entrenched diggers at Oaky, Stony, Fine Gold and Sandy Creek. The original township of Palmerville was abandoned, and Edwardstown (later Maytown) became the new centre of population. Again, frustration and disillusionment re-emerged, but was offset by another rush at the end of August 1875, to the Kennedy Fall of the Conglomerate Range. The alluvial miner, yearning for easy gold, readily abandoned his ground to follow new rushes, a characteristic which warranted comment by the mining warden, P.F. Sellheim:

If the Northern miner has one besetting sin, and, if such a thing is possible, even in a larger degree than his Southern brother - and it certainly proves the existence of, at any rate, a remnant of energy that even the severity of a Northern climate has not been able to deprive him of - it is his readiness at a moment's notice to sacrifice his all, if required, to enable him to hurry off to the scene of some new discovery - good or bad, authenticated or not. 25

22. H. St. George to Secretary for Public Works, 6 July 1874, 74/3703 WOR/A88 Q.S.A.; Cooktown Couriier, 22 May 1875.
23. Cooktown Herald, 26 September 1875.
24. Ibid., 22 September, 9 October 1875; Queenslander, 9 October 1875.
The rush to the Hodgkinson River in 1876 took most of the European population from the Palmer, and delivered many of the claims on the alluvial field to the Chinese.

The alluvial mining communities tended to concentrate in ephemeral canvas camps. The three most substantial townships were Palmerville, Maytown and Byerstown. Their establishment reflected an eastward movement of the mining population along the river. In May 1875, Maytown became the administrative and business centre of the field. The air of impermanence of the galvanised iron and canvas townships contrasted with the diversity and success of the businesses which lined the cobble-edged streets and which impressed one visitor in 1878:

Maytown is not the most imposing-looking place in the world. There are the usual concomitants of a bush township - bark, galvanized iron, and policemen; a Warden to settle gold-fields' disputes and tell men not to make "swine of themselves" when he is fining them for imbibing too much of the rosy, a butcher's shop, several stores, twice as many pubs, a quack doctor or two, a blacksmith's shop, Hospital, one billiard saloon and a variety of banks and their aristocratic-looking clerks in snowy moleskins and paper collars. But Maytown is the best place that I have yet seen in the North - for the main thing: money. Everybody complains of the dull times here, but I have seen more money change hands, and more spent over the bars, at a bob a nobbler, than I have seen in any other towns in the North - and I have visited them all - Island Point and the famous Hodgkinson included. 26

The sheer size of the population, estimated in May 1877 at 19,500 for the field, kept money circulating among commercial houses for essentials and luxury goods, but at the same time, there was little financial investment in the permanent manifestations of settlement.

Few social institutions were opened during the first decade, and for Warden Sellheim, an educated family man, residing on the Palmer was "the most monotonous life on the globe." 27 Even so, it was Sellheim who

27. A.R. 1878, p.22.
NOREEN KIRKHAN

initiated the establishment of a hospital, school and Miners' Institute Library, although they did not eventuate until after the majority of Maytown's population had departed. Religious life was almost totally neglected. No Christian church was established on the field, although there was a Joss House for Chinese.

Government officials found their administrative tasks very demanding. Until the passage of The Gold Fields Act of 1874, gold mining in Queensland was administered under legislation inherited from New South Wales, which in many respects was inadequate for developments in Queensland. Acclaimed as the "first really comprehensive piece of mining legislation undertaken since Separation", the 1874 Act, coinciding with Sellheim's arrival on the Palmer, however did not lessen the difficulties of administering so vast and isolated a goldfield. The undulating terrain and the scattered and transient population of the Palmer hindered the issue of miners' rights, the collection of revenue and the collation of statistics. In its heyday from 1875 to 1877, there were insufficient officers, horses and time to fulfil assigned duties. For his part, according to the Cooktown Courier, the warden's responsibilities singled him out as "probably one of the hardest worked men in Government service". Hampered by distance from Brisbane and physical isolation in the wet season, the warden was also required to preside over the Warden's Court, conciliating disputes over claims and arranging gold escorts; to act as police magistrate; to regulate law and order; to

28. A school was set up in 1877, but closed after five months. Reopened in October 1882, its sole teacher was Edith Hodgkinson. Charles Kimble to Secretary for Education, 10 March 1882, 82/388 EDU/Z1729, Q.S.A. A temporary hospital operated in the late 1870's, but in 1882 plans for a permanent building were considered unnecessary "for half a patient a week". W. Hodgkinson to Secretary, Maytown Hospital Committee, 1 March 1882, 82/907 MWO 13/B92, Q.S.A.


30. C.A. Bernays, Queensland Politics During Sixty Years (Brisbane 1919), p.359.

P37: "A variety of banks and their aristocratic-looking clerks..." Maytown c.1877 [N.O.R. July 1921]
P38: Laura Railway Station about the turn of the century  [Col Bar]
J.V. Mulligan published simultaneously news of his discovery of payable gold and the outcome of mild Aboriginal resistance encountered by his party. On his arrival, St. George wrote that the Aborigines of the Endeavour River held "intense hostility...towards the location of a settlement" and that retaliation was likely. Nevertheless very little was done by Europeans to avoid conflict or to promote harmonious relations. The inclusion of a contingent of Native Mounted Police in the first expedition to Cooktown reflected official recognition of the concern for the safety of miners on the new frontier. Even so, the Native Mounted Police could offer only limited protection. Between 1873 and 1884, there were at least twenty confirmed deaths attributable to Aborigines; another thirty-one probable; and certainly many more unrecorded among the Chinese. Unlike the squatter, the miner was transient and more reckless, often "gully-raking" in scattered and vulnerable groups. In addition, miners often tended to keep "a close secret of the direction they intended taking." Admitting that Palmer miners were exposed to attack while police numbers were small, the Police Commissioner, D.T. Seymour, explained that the "broken nature of the country and almost total absence of grass" were also factors. Considerable effort was expended by Aborigines in attacks on property - cattle, horses and telegraph lines - thus exploiting the miner's chief enemy, isolation. To overcome the hindrance, "well armed and equipped parties" increased in number. Aboriginal deaths are incalculable but the impact of the European miners is portrayed in the rock art of the Laura Gorge, highlighting the symbols of invasion: the gun, the horse

36. Article by Mulligan dated 10 September in *Queenslander*, 11 October 1873.
37. H. St. George to Secretary for Public Works, 30 October 1873, 73/4597 WOR/A74 Q.S.A.
38. Deaths have been compiled from Inquests, Register of Deaths for the Palmer River District, and newspapers. See also N.A. Loos, Aboriginal-European Relations in North Queensland, 1861-1897, Ph.D. thesis, James Cook University 1976, p.234.
40. *ibid.*, 26 November 1875, 75/2973 COL/A214 Q.S.A.
41. *Queenslander*, 1 May 1881.
THE PALMER RIVER GOLDFIELD

supervise all registrations and censuses, and to provide for the poor and the sick.

The experience and background of the government officials differed considerably. Some were particularly unsuited to the office; others rose to eminence in the mining industry. The long serving Philip Sellheim overcame early criticism to establish a reputation as one of the colony's most able administrators and served eventually as Under Secretary for Mines. The assistant wardens, Hill and Coward, found it difficult to detach their roles from that of officers of the Native Mounted Police and were severe on revenue defaulters. Hodgkinson, warden from early 1881 to April 1884, was a celebrated explorer, journalist and mining administrator. He subsequently entered parliament and served as Secretary for Mines from 1887-1888 and 1890-1893. The experienced and pragmatic St. George, who was appointed warden for the first year of the Palmer rush, succeeded Hodgkinson and served another seven years from December 1885, when the field was in a "very languid state". The warden who witnessed the early rush ironically presided during its demise. In 1893, the Mines Department abandoned the post of warden.

32. For details of Sellheim's career see Australian Dictionary of Biography, VI (Melbourne 1976), pp.101-2.
33. W.R.O. Hill joined the Native Mounted Police in 1863, served in the Rockhampton area for a year, when he was retrenched by the Government. He rejoined in 1866 serving at Charleville and Paroo River. He resigned in 1868. (Statistics of Queensland 1868, p.43; W.R.O. Hill, Forty-five Years Experience in North Queensland, 1861-1905 (Brisbane 1907), pp.24-5, 36 and 39). Thomas Coward was first appointed to the N.M.P. in 1864, serving in northern and north-western frontiers until 1874 (Statistics of Queensland 1867, p.34; Blue Book of Queensland 1874, p.18).

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and the Native Police. Disdaining conciliation, preferring retaliatory actions, the first wave of alluvial miners created a legacy of mutual hatred which was at the root of clashes throughout the late 1870's, the 1880's and even into the 1890's.

Another racial group, the Chinese, also had a profound effect on mining on the Palmer. The tendency of European miners to follow new rushes worked to the advantage of the Chinese. They steadily occupied the major alluvial areas until finally, in 1876, with the rush to the Hodgkinson, the whole Palmer goldfield was virtually left to them; only 200 European sluicers now worked the former centres of alluvial operations, and the overall numbers of Europeans declined to 1,500. The years 1876 and 1877 saw the Chinese population at its highest. In February 1876, they numbered nearly 7,000, while fifteen months later, there were an estimated 18,000 Chinese on the field. Sellheim attributed the decline of the European population to "the superior advantages held out by the Hodgkinson...in the form of cheaper living in consequence of its closer proximity to its ports". His remarks suggest that a movement away from the isolated Palmer field by Europeans was inevitable, despite increased Chinese immigration. Certainly there was no evidence of Cronin's claim of instinctive "violence and undisciplined rioting" by the remaining European alluvial miners.

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42. See P.J. Trezise, Rock Art of South-East Cape York (Canberra 1971), pp.18, 22, 33, 56, 67.
43. P. Sellheim to Under Secretary for Mines, 10 February 1877, 77/37 MWO 13B/G1 Q.S.A.
44. For details, see Report of the Registrar-General Votes and Proceedings 1877, II, p.327. Sellheim noted a population of 11,000 at the beginning of 1877 (Sellheim to Under Secretary for Mines, ibid.) and by mid-year he claimed that there could not have been "less than 18,000 Asiatics". (A.R. 1877, p.9). Soon after, he gave a figure of 17,000 (Cooktown Courier, 27 June 1877) which contrasted with the Premier's estimate of 15,000 at the end of May 1877. (Q.P.D. XXIII, pp.135-46).
45. A.R. 1877, p.4.
probably because, as Sellheim observed in early 1877, the Palmer had "ceased to be remunerative as an alluvial field, as far as the European population is concerned." 47

The existence of such an overwhelming concentration of Chinese immigrants, bound together by strong social organisation and benefitting from ground abandoned by Europeans, was historically unprecedented. The goldfield suited their objectives of gaining wealth quickly, remaining temporarily and still fulfilling social obligations. Their methods of acquiring gold, described as "the safest and surest", 48 involved co-operation, thoroughness and mobility. It featured co-operative cradling: two digging, two carrying washdirt, two at the cradle and the remainder of the group bagging gold. Blowing and weighing usually concluded the daily routine. 49 The whole area of a claim was scoured and invariably reworked three or four times. They only developed an interest in sluicing after the Hodgkinson rush, purchasing claims formerly worked by Europeans and extending co-operative practices to the newly acquired areas. Through the endeavour of the Chinese alluvial miners, the Palmer retained the highest yield in the colony from 1877 to 1879. 50

Such a large population strained the inadequately staffed goldfield administration. Sellheim restricted Chinese to ordinary claims at the close of 1876, even though they qualified for extended claims previously worked and abandoned by Europeans. Reefing by Chinese parties was strongly discouraged because of the possible resentment of the remaining Europeans. 51 Further, the collection of revenue was time consuming for

47. P. Sellheim to Under Secretary for Mines, 10 February 1877, MWO 13B/G1 O.S.A.
48. Queensland, 29 March 1879.
49. Ibid.
51. For details, see P. Sellheim to Under Secretary for Mines, 4 September 1876, MWO 13B/G1; Ibid., 6 April 1879, 79/66 MWO 13B/G1 O.S.A. Sellheim admitted that although Chinese had a right to a reeving claim, there were "probable consequences that might arise".
Sellheim's staff, even though he admitted that "they don't differ vastly from the Europeans". While the Under Secretary for Mines maintained that revenue should be collected from Chinese "without due violence", he conceded that there were no regulations inhibiting the discretion of goldfield officers. Paradoxically, he did not condemn the assistant warden, W.R.O. Hill, of Byerstown, for "rounding up" or "running down" Chinese with Native trackers, but strongly disapproved of assistant warden Thomas Coward's similar tactics being used against Europeans. That there was considerable provocation of the Chinese by these officers cannot be disputed, but Hill's claim that the Chinese often drew knives in retaliation was exaggerated. In fact, in the wake of the European exodus, the Chinese community came to be relied upon more and more by Europeans on the Palmer and in Cooktown as "the producing element of the field". This economic relationship caused increasing tensions between Europeans and Chinese.

Most miners and small businessmen, particularly packers, found Chinese competition detrimental to their livelihood. An anti-Chinese group was soon formed, ostensibly to campaign for the rights of miners, but which in reality had little miner participation. The group relied on sympathetic spokesmen such as J.V. Mulligan for leadership. Not only did Mulligan retain considerable influence within the European mining community, but he possessed advantageous contacts in Brisbane with Gresley Lukin of the Queenslander and Brisbane Courier, which proved a valuable asset for the group. Initial anti-Chinese criticisms were based prima facie on the stereotypes of the Victorian goldfields. It was claimed that Chinese miners did not prospect, but merely anticipated the absence of Europeans from their diggings; and that their impermanency,

52. A.R. 1879, p.17.
54. W. Hill to Under Secretary for Mines, 1 June 1877, 77/85 MWO 13A/G1 Q.S.A.; Cooktown Courier, 23 May 1877.
stolid self-sufficiency and secretive export of gold were prejudicial to the field's future. Chinese were vilified as criminal, violent, debased, diseased and heathen. This pressure group was formally organised in October 1877 as the Anti-Chinese League.

However, there were other businessmen who welcomed a stable laissez faire relationship with the Chinese: they dreamt of Cooktown as an entre pôt for Chinese and Indian trade. Drawing their members from the Chamber of Commerce, the group's most outspoken member was the editor of the Cooktown Herald, W.H.L. Bailey. Their campaign was motivated by economic considerations also, viewing the Chinese as an asset to business, shipping, agriculture and trade. They recognised the value of a voluntary Chinese labour force, believing them to be more climatically suited to North Queensland. It was stated that the Palmer could only be developed by Chinese, as "whitemen cannot make it pay". Such a criticism of the European miner was predictably resented by the anti-Chinese group. While the debate was fundamentally an economic one, the undercurrents of racism were strong. The pro-Chinese group defended the charges that Chinese were undesirable immigrants, but they did not oppose measures to restrict Chinese from new goldfields. Yet when other measures aimed at the Chinese threatened commercial interests by causing poverty among Chinese consumers, they were swiftly denounced.

56. Queenslander, 30 January, 13 February, 3 April, 1 May 1875.
57. Cooktown Herald, 21 April 1875; Cooktown Courier, 27 September 1876.
58. Some members of the League rose to prominence as Cooktown Municipal Councillors, viz., S. Samper and J. Josephson. Other members included Adolphus Norrie, pharmacist and first chairman of the Anti Chinese League; Benjamin Palmer, ex-miner and unsuccessful candidate at the 1876 elections; C.A. Feilburg, one time editor of the Cooktown Courier and author of Anti-Chinese propaganda; F.W. Eicke, Donald Lang, J. Nolan and C.W. Crowley. See also anti-Chinese petition to the Governor from merchants, storekeepers, miners, teamsters and other residents of Cooktown and the Palmer District, dated 15 November 1877, 77/5756 COL/A249 Q.S.A.
59. Cooktown Herald, 19 May 1875; Cooktown Courier, 28 July 1875.
60. Other prominent members were F.J.W. Beardmore, W.J. Hartley, J.C. Baird, J. Walsh and E. Henriques.
61. Cooktown Herald, 3 April 1875.
The Chinese presence on the Palmer, and the agitations of competing European interests, made a political issue out of the development of the Palmer River goldfield. In 1884, J.M. Macrossan, late Secretary for Public Works and Mines, admitted that there "would never have been a Chinese question in Queensland had it not been for the discovery of the Palmer River Gold Field." His comment referred particularly to the amendments to *The Gold Fields Act of 1874* passed in 1877 and 1878. The 1877 amendment, enacted on the pretext of increasing public revenue, provided that Asiatic and African aliens be charged £3 not ten shillings for Miners' Rights. Revenue collection became far more difficult due to the inability of many Chinese to pay. Finding that he had collected less rather than more revenue from miners after its implementation, Sellheim bluntly asserted that the issue of Miners' Rights is a "perfect dead letter". Other wardens experienced similar difficulties, eventually allowing non-payment of licences because of the starvation and suffering which would result. Another Act *The Chinese Immigrants Regulation Act of 1877*, placed a poll tax of £10 per head on Chinese immigrants, although the immediate effects of this Act were not fully apparent. Collectively the legislation of 1877 failed to promote further European settlement on the Palmer, and ignored one of the most important demands of the European mining population and the community as a whole: the exclusion of Chinese from new goldfields for three to five years after discovery. The news that assent had been given to *The Gold Fields Act Amendment Act of 1878*, repealing the previous amendment, was


63. *Queensland Statutes 41* (1877), p.91. The business licence for aliens under this Act was increased to £10 instead of £4 each year. Chinese businessmen appear to have been in a better position to pay this amount. See *A.R. 1878*, p.20.

64. See F. Sellheim to Under Secretary for Mines, 5 February 1878, 78/29 MMO 13B/G1 Q.S.A.


66. *Queensland Statutes 41* (1877), pp.77-8; Very few conclusions can be drawn about the immediate effects of the Act, because the first immigrants to arrive under the Act reached the colony only after assent was given to *The Gold Fields Act Amendment Act* on 2 October 1877.
hailed with much satisfaction by Chinese miners and European businessmen on the field, and Warden Sellheim was besieged immediately by applications from Chinese for Miners' Rights. Under this amendment no Miners' Right would be issued to any Asiatic or African alien on any goldfield for three years from the date of discovery. The 1878 Amendment Act had no effect on Chinese on the Palmer since the field had been discovered five years previously, but may have succeeded in gaining a brief period of monopoly for European miners on the Hodgkinson. For the remaining years of alluvial mining, the Chinese were responsible for the bulk of the Palmer's output.

The Palmer's alluvial phase wound down after 1877. In the following year, a short-lived rush occurred on the Lower Palmer (Lukinville) after Chinese prospectors located "by far the most important discovery of the year". However, few Europeans bothered to join the many Chinese at the new find. Despite discriminatory legislation and a considerable fall in population, the Under Secretary for Mines was hopeful by the end of 1879 that the Palmer could still maintain satisfactory returns:

> Although there has been a considerable decrease in the quantity of alluvial gold produced, it has not been from the individual earnings of the alluvial miner being less than in the previous year, but from the decrease in the number of that class of miners. There has been more gold produced on the Palmer relative to the number of miners working during 1879 than there was during the previous year.

But his comments were misleading, and were probably influenced by the political consideration of maintaining confidence in the region now that

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67. P. Sellheim to Under Secretary for Mines, 5 August 1878, 78/157 MWO 138/G1 Q.S.A.; Miners' Rights issued to Chinese at Cooktown and the Palmer River goldfield during the period January–July 1878 at £3 each numbered only 345, whilst for the period July–December 1878 when Miners' Rights were reduced to ten shillings each, the number issued rose to 5,864. A.R. 1878, p.6.

68. Gold fields acts together with regulations for the management of the gold fields of the colony (Brisbane 1881), pp.68-9.


70. A.R. 1879, p.2.
the government was committed to railway communications with the
goldfield. Certainly other factors belied his case: the population
had decreased considerably; returns had fallen substantially - the 1880
returns were only twenty-five percent of the peak year of 1875; and
reefing had failed to meet expectations. Indeed the aspect of reefing
has been one of the important but neglected themes in the history of the
Palmer field.

Very few of the first diggers had sufficient capital to invest in
more permanent mining ventures on the Palmer. Yet by May 1874 as many
as ten lines of reef were laid off anticipating the advent of machinery
and capital.\textsuperscript{71} Two months later, amid predictions that the Palmer would
develop into a "new Bendigo", a meeting of businessmen was convened to
discuss the urgent need for crushing machinery.\textsuperscript{72} It came to nothing:
local apathy, delays in company formation, reconsidereations by potential
investors and the allure of the alluvial prospects caused all reefing to
by suspended by the end of the year.\textsuperscript{73} Interest in reefing was renewed
in 1875 by visiting capitalists from Victoria and Charters Towers.
However, despite the urgings of the local newspapers, the first machine,
owned by D.M. Jones and J. Edwards and financed by local capital, did
not arrive until July 1875, and then because of the cost of carriage and
the scarcity of teams conveying timber, took the rest of the year to
become fully operational. Even then, the shortage of water and fodder
rendered it impossible for reefers to transport quartz economically to
the machine yards.\textsuperscript{74} Finally in late January 1876, the ten stamper
machine crushed stone from the Alliance Reef. The event was wildly

\textsuperscript{71} \textit{Cooktown Courier}, 18 April, 16 May, 20 June 1874; \textit{Cooktown Herald},
1 July 1874.

\textsuperscript{72} See \textit{Cooktown Herald}, 10 June, 8 July 1874; \textit{Cooktown Courier}, 11
July 1874.

\textsuperscript{73} \textit{Cooktown Courier}, 26 December 1874, 23 January 1875. Among the
investors who promised machinery was H.E. King, Secretary for

\textsuperscript{74} \textit{Cooktown Herald}, 28 July, 9,20 October; 6,10,27 November 1875.
The newspaper commented in its 9 October 1875 issue: "It thus
materially follows that no mill at Edwardstown will not \textit{[sic]} be
able to start work till the grass starts growing."
publicised, but the optimism was soured the following month by the rush to the Hodgkinson.

The Hodgkinson discoveries interrupted the development of reefing at a vital time, squashing plans for the establishment of further machines on the Palmer. Skilled miners moved south; with them went the capital intended for the Palmer as investors and reefers found the new field more attractive because of its proximity to ports and lower cost of carriage. By August 1876 Sellheim described conditions as the "dullest in mining since opening the field", and soon after commented on the "unsettled state of mind" which afflicted the remaining businessmen and European miners.

In 1876, the Palmer's sole operative machine, the "Pioneer", though periodically idle because of mechanical problems, still treated quartz yielding 15,000 ounces. The erection of more machines and the discovery of more reefs made little difference to the annual yield from quartz. By 1877 even the richest lines - Ida, Queen of the North and Louisa - were not considered "sufficiently remunerative", as the presence of heavy water in the principal claims required outside capital to finance powerful pumping and hoisting machinery - capital that was never forthcoming in sufficient quantity. Moreover there were other problems holding back the development of reefing: transport costs, labour difficulties and the absence of sound mining techniques.

The Palmer's isolation and the consequential transport costs was a major obstacle never fully overcome. Carriage from Cooktown over the

75. See Cooktown Courier, 5 February 1876.
76. For details, see P. Sellheim to Under Secretary for Mines, 4 September 1876, 76/173 MWO 13B/G1 Q.S.A.; Ibid., 10 February 1877, 77/37 MWO 13B/G1 Q.S.A.
77. The highest crushing recorded on the Palmer was 4,949 tons in 1877. See Table 3.
78. A.R. 1877, p.10.
track surveyed by Macmillan's party cost £200 per ton in February 1874; through increased competition, rates dropped to £70 per ton in 1875 when mining output was at its peak. 79 The main Palmer road from Cooktown followed a circuitous route north of the Conglomerate Range to Palmerville, but this was reduced in distance over time. Maytown, centre of the reefing, did not have a road directly to it until 1877 when Robinson's Track was built. However, the differential erosion of the main reefing areas made road construction difficult, and the hauling of machinery hazardous and slow. A new arrival aptly described one track as "a series of ladders at an angle as nearly to the perpendicular as is possible."80 By early 1876, Emmanuel Borghero's mail coach provided regular communications to the field, and was extended to Byerstown after the discovery of the Hodgkinson. The journey from the coast usually took thirty hours and was often delayed by seasonal flooding. The contract was assumed by Cobb and Co. in January 1879. Although roads were considered of primary importance, railways became an obsessive preoccupation, especially after the formation of a Railway League. 81 But like so many railways to mining areas constructed by the state, the line was delayed until 1885, and even then only reached Laura. It was too late, as the mining impulse had waned. On the Palmer itself, the numbers of carriers and teamsters had dwindled in number by 1880, making cartage of stone to the machine yards almost impossible, and added to the depression which reigned over the field at the end of its first decade. 82 Transport was a problem which hindered alluvial mining but never to the same extent as reefing:

79. For details, see Queenslander, 28 February 1874 (£200 per ton); Cooktown Courier, 8 August 1874 (£130 per ton); Cooktown Herald, 24 November 1875 (£70 per ton).
80. Cooktown Courier, 17 April 1878.
81. It was S.W. Griffith who first suggested a railway to Byerstown. See S.W. Griffith to Minister for Works, 8 February 1877, 77/927(a), WOR/A130 Q.S.A.; for examples of growing excitement see the following: Cooktown Herald, 29 July 1876; Cooktown Courier, 6 June, 20 June 1877, 27 April, 1 June 1978; debate in ibid., 5,8, 12,15 and 22 June 1878; ibid., 22 March, 19 April, 25 October 1879; Queenslander, 14 October 1882; Brisbane Courier, 25 April 1883.
82. A.R. 1880, pp.16-17.
The principal drawbacks to payable quartz mining hitherto on this gold field have been exorbitant charges, necessitated by an utter absence of grass, for cartage from the mines to the mills, and the high prices for provisions and all other necessaries of life consequent on the high rates of carriage from Cooktown. 83

Skilled labour was always in short supply. The reefers were well paid, generally at a rate of £4 to £5 per week which increased overheads. 84 Moreover, they were in the enviable position to resist any attempts to lower wages. In 1879 there occurred what Bolton has described as one of the "earliest recorded strikes" in North Queensland, arising from wage cuts on the principal claims and employers' threats to import Victorian miners. The strikers resisted, formed a league, and demanded the restoration of a wage of £4 per week. The employers claimed that the cost of carriage and pumping machinery required the lowering of wages. Many of the better miners left the field or took up their own claims, rather than submit to any wage reduction. The strike ended with the remaining miners capitulating to the employers' terms. 85 Sellheim, in a conscious effort to deny any ideological significance in the strike, concluded that "it was not a matter of dispute simply between capital and labour, as nearly all claimholders here are working miners themselves." 86

The techniques of mining were strongly criticised by Sellheim in the late 1870's. He asserted that the shortcomings of the reefer were similar to those of the alluvial miner. Most reefs were operated in a "capricious manner" by reefers who "mullocked up" the ground and destroyed it. Further he decried the absence of intelligence in mining,

83. A.R. 1877, p.10.
84. Ibid. The average miner in the colony received a wage of £2/10/- per week in dry ground, and £3 per week in wet ground.
85. For details see, Bolton, A Thousand Miles Away, p.187; Cooktown Courier, 5,12 November 1879.
86. A.R. 1879, p.18.
even when capital was available. There was no relationship between the
development of a reef, the capacity of the machinery erected and the
projected output of the show. Sellheim believed that the Palmer
reefer belonged to a "floating population, who only work for the
immediate necessity of the hour, who in fact are only the analogue of
the alluvial fossicker." 87 Thus when W.O. Hodgkinson assumed the
wardsanship in April 1881 and studied the field's fortunes, he sought to
arrest its decline. He identified natural problems - water, climate
and the rugged terrain which hindered mining and communications, and
artificial problems - absence of capital, skilled labour and technology.
Hodgkinson attempted to remedy the artificial problems by drawing
attention to one particular mine on the Palmer, but soon found his
career jeopardised.

In 1884, Hodgkinson's administration became the subject of a select
committee of inquiry. A report, ordered by his acting minister, Sir
Thomas McIlwraith, led to a charge of alleged bribery against Hodgkinson
by the Under Secretary for Public Works and Mines who accused him of
intending "to ruin the public". Hodgkinson maintained that he was only
carrying out his duty "to draw attention to opportunities for investing
capital". That McIlwraith's name was linked with Edward Robert Drury's,
registered owner of the Ida P.C. Auriferous Lease No. 61 and manager of the
Queensland National Bank, had all the ingredients of a first rate
scandal to which Hodgkinson was party. In fact the Secretary for Public
Works and Mines, William Miles, labelled his report as "more like a
shareholders' prospectus for the purpose of floating a company to buy a
mine", but fortunately for Hodgkinson's reputation, the Committee found
no evidence that the report was prepared specifically to ruin the
public. 89

87. A.R. 1878, p.22.
89. For details, see Report from the Select Committee on the Report
on the Palmer Gold Field by Warden Hodgkinson, Votes and
The scandal coincided with the demise of the Palmer. The Ida P.C. had closed in 1883; it would re-open, but in the meantime only the Louisa and the Queen of the North remained operational. The proprietors of all mines relied heavily on the financial support of the Queensland National Bank, which Bolton aptly describes:

By 1884 the Queensland National Bank found itself the sole prop of a number of semi-derelict mines, many of which required constant pumping to keep them from becoming water-logged. 90

In that same year, Joseph Shakespeare, Inspector of Mines, did not even bother to go to the Palmer. In so few years, the Palmer had run full cycle from a booming European field, through Chinese occupancy of the alluvial workings, to a declining European reefing field. One "Old Northerner" concluded in 1877 that advocacy of a stabilized European mining population to revive mining was wishful thinking as "the death note of the Palmer had been sounded over and over again...for the European digger, before John came".91 The European miner was defeated not by the Chinese, but by his own capricious character.

A few of the better-run mines, financed by the Queensland National Bank, struggled on for another decade until the financial crisis of the 1890's. Alluvial mining had vanished entirely and the Comet and Queen of the North reefs, worked to nearly 300 feet for an average two ounces to the ton, were eventually forced to close.92 By 1892, Maytown was "in an almost torpid state" and the entire population of the once bustling field now numbered only 1,034.93 Hope rested briefly with the Ida and Caledonia mines, the rich Anglo Saxon, discovered in 1887, and the Recompense, located near Maytown in 1895 and yielding for a short time up to sixteen ounces to the ton. By 1897, all had closed down, effectively terminating the Palmer's gold producing years.

91. Queenslander, 15 September 1877. Chinese were known as "John Chinaman".
P41: Native Police at Laura River Camp
[James Cook Historical Museum]
THE PALMER RIVER GOLDFIELD

Fossickers have worked the area since with modest success, and a few attempts at capital intensive mining have been made. Palmer Gold Mines Limited, formed in 1913, took leases over the Ida and Louisa reefs and worked them from 1915 to 1917. Encouraged by this project, a Cairns syndicate reopened the Comet mine in 1916 and later employed a state diamond drill survey to test its depths. Even the state Labor government was sufficiently enthusiastic to take "the Palmer mines in hand" in 1920, pump out the Louisa mine, test certain areas by means of a diamond drill, only to abandon it within four years. Neither attempt yielded much gold. Finally there were two other schemes in the interwar years. Continuing on from the work of the state government, the Palmer Goldfields Syndicate of Cairns in 1923-4, was engaged in removing boilers and other machinery from the Ida to the Louisa mine. In 1925, the Palmer River Gold Company No Liability engaged in the daunting task of overlanding a former tin dredge from the Annan River to the Palmer. This feat failed to recoup expenses, and the dredge was left derelict in the river in 1936. A more cynical scheme was devised in 1930 when the Palmer Development Company Limited attracted publicity by acquiring leases over the mines at Maytown. No work was done, but the unsuccessful venture was described as "a pleasant gamble", intended for sale on the London market.

96. Alex Renton was appointed as manager, James Watters advised the government on the areas to be tested, and J. Berry operated the diamond drill plant. The diamond drill ceased operations in 1922. See A.R. 1920, pp.60-61; 1921, p.52; 1922, p.49.
97. Interestingly the Manager of the Palmer Goldfields Syndicate was J. Berry. A.R. 1923, p.55.
Schemes for revival of the Palmer reflected an ingrained faith in the mines of the Maytown region and an ability to disregard climate and terrain which denied the experience of the field's early decades. As late as 1936, the state education department refused an offer for purchase of a building at Maytown abandoned since 1925 when the school closed. The District Inspector of Schools had reported that the "field will come again". The railway department still operated a service from Cooktown to Laura for many years after most of the remaining optimists had been forcibly evacuated during the second world war. In a sense their faith was justified. The quality of Palmer gold was never in doubt, and an unknown quantity remains in the flooded mines, never likely to be exploited. At Maytown, the raised stamps of the Louisa battery, overlooking the silent mine site with its powerful Tangye pump, to this day symbolise the potential and the hope, the hardships and perseverance, and the disillusionment and eventual abandonment of the Palmer. Best remembered as a gloriously rich "poor man's field" in its early alluvial years, the Palmer has been romanticised by writers such as Glenville Pike and Hector Holthouse. But for most of its time, it was a socially debilitating region, and a hellish sink for misdirected and hardwon capital in its reefing phase.

101. Annotation on copy of letter from Mrs. I. Solomon to Public Works Department, 6 January 1936, 36/02094, EDU/ZI729 Q.S.A.

102. H. Holthouse, River of Gold: A Story of the Palmer Gold Rush (Sydney 1967); G. Pike, Queen of the North (Mareeba 1979).

Palmer Goldfield Identities

A.C. Macmillan
[Cummins and Campbell Monthly]

J.V. Mulligan
[Queenslander 1903]

W.O. Hodgkinson
(Oxley Library)

P.F. Sellheim
(Oxley Library)

H. St.George
[N.Q.R. July 1921]
P43: Palmer Goldfield Identities

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### TABLE 3: The Estimated Yield of Gold for the Palmer River Goldfield 1873-1930.

<table>
<thead>
<tr>
<th>Year</th>
<th>Estimated Yield (Ounces)</th>
<th>Year</th>
<th>Estimated Yield (Ounces)</th>
<th>Year</th>
<th>Estimated Yield (Ounces)</th>
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<td>Oct-Nov. 1873</td>
<td>58,829</td>
<td>During 1893</td>
<td>3,280</td>
<td>During 1912</td>
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<td>During 1874</td>
<td>150,200</td>
<td>1894</td>
<td>3,425</td>
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<td>1896</td>
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<td>1915</td>
<td>389</td>
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(Sources: *Annual Report, Department of Mines, 1878, 1884, 1903, 1930*).

### TABLE 4: Administrators of the Palmer River Goldfield 1873-1892.

- 1873-74 Gold Commissioner H. St George
- 1873-74 Assistant Gold Commissioner A. Fyfe
- 1874-80 Gold Commissioner/Warden P.F. Sellheim
- 1874-76 Assistant Warden A. Dorsey
- 1874-77 Assistant Warden T. Coward
- 1876-77 Assistant Warden W.R.O. Hill
- 1877-78 Assistant Warden J. Farrelly
- 1878-81 Assistant Warden L.E.D. Towner
- 1880-81 Warden F. Gill
- 1881-84 Warden W.O. Hodgkinson
- 1884-91 Warden H. St George
- 1892 Warden A.R. MacDonald
LABOUR COMES TO CHARTERS TOWERS*

Professor G.C. Bolton

The experience of Queensland supports, at first sight, the view of the early Labor Party as a movement of the outback. Of sixteen Labor members returned to the Legislative Assembly at the 1893 elections, thirteen came from mining and pastoral constituencies. This was no very surprising record in what Russel Ward has described as "the most 'Australian' and the most nationalistic of all the colonies"¹: what still requires examination is the process by which ideas of radical political organization spread through the Queensland outback so quickly after the 1888 elections, when Thomas Glassey had been Queensland's only working-class politician. Undeniably frontier traditions of egalitarianism and mateship provided fertile ground for labour principles, but it should perhaps be stressed that the techniques of propaganda and organization which made the Labor Party an effective political force were mostly imported from the cities and implemented by a relatively small group of hard-working publicists.

When the Brisbane Worker sought in 1891 to account for the spread of Labor in North Queensland, it looked not to the Shearers' Union or to any of the raw new mining camps such as Croydon or Chillagoe, but to the richest and most established community north of Capricorn. Charters Towers, wrote the Worker, "as the most settled and most concentrated place necessarily gives decided tone to the whole north country... Unionism at Charters Towers, after all has been said that can be said for local jealousies, means really unionism in Northern Queensland."² Barely five years earlier, at the beginning of 1886, trade unionism had been unknown at Charters Towers. At that date the Towers had been in existence fourteen years, and stood second only to Bendigo as a consistent producer of gold: between 1878 and 1883 annual returns never varied by more than ten per cent from an average of 62,500 ounces.

* This paper first appeared in Labour History, 1 (January 1962), pp.25-34. It is reprinted with permission from the author and The Australian Society for the Study of Labour History.
2. Worker, 5 September 1891.
and the opening of several new mines had doubled this output by 1886. Never an alluvial field, Charters Towers won its wealth from a large number of reefing properties owned by local syndicates, usually consisting of such businessmen as storekeepers, publicans and proprietors of crushing mills, but often including working miners. The field was estimated to give employment to 1,750 miners, as well as 550 "carriers, timber-getters and attendants on machines", and 1,600 "merchants and tradesmen" more or less directly dependent on the industry. There were no less than 6,000 women and children, a high proportion for a mining field, indicative of its stability.

Unlike the nomadic prospectors of the early rushes, the miners of Charters Towers were nearly all "wages men", but as their earnings usually ranged from £3.10.0 a week to £4 and never dropped below £3, this gave everyone the possibility of becoming a home-owner, and often a surplus for dabbling in investment. Like the Victorian miners described by Geoffrey Blainey, theirs was a society of "little capitalists". "Some here who were working men a few years ago are now drawing incomes of over £20,000 a year from the gold-mines;" wrote Warden Haldane in 1887, "others are receiving smaller amounts; and a large number have at least made what in the old land would be considered competencies." There was withal a radical tinge to their politics, fed from two sources. The older, and probably less significant, was attributable to the considerable Irish element on the field. Personified in Thady O'Kane, editor of the Northern Miner, the town's leading newspaper, and a ferociously trenchant writer whose style anticipated many of the mannerisms of the labour press of the nineties, this group included many whose dislike of the English ruling class inclined them to republicanism. Equally emotional and more immediately economic in its appeal was the miners' opposition to coloured labour. The anti-Chinese feeling usual on mining fields was reinforced by distrust of the coastal North Queenslanders, whose agitation for

3. In 1886 there were 74 mines in production, and another 89 for one reason or another unworked, but capable of production.
Separation was linked with a desire to continue the import of Pacific Islanders and other alien labour for work in the sugar industry. For this reason Charters Towers at the elections of 1883 and 1888 returned Liberal candidates, supporting Griffith in his campaign to abolish the traffic in Pacific Islanders after the end of 1890.

The economic and social pattern of Charters Towers began to change after 1882, when it was demonstrated that the main lines of reef improved with depth. The old shallow diggings, worked by a few men concentrating on rich patches, were superseded by deep shafts requiring greater outlay of capital and labour. Companies were formed to float Charters Towers properties on the London market, which proved gratifyingly responsive. Capital was freely available for overseas speculation and Queensland was one of the very few areas of the world where mineral production was on the increase. By 1886 Charters Towers was in the throes of a speculative boom, in which the working miners shared to the full. Unable as a rule to buy into the costly established mines along the main lines of reef, they invested extensively in the inadequately tested "outside shows", with their greater element of gamble. Meanwhile, with deep reefing came added problems of safety, ventilation and working conditions. There was less intimacy between the working miners and the new English-owned companies employing from forty to two hundred men, than there had been in the small locally-owned concerns before the share boom. These conditions made for the rise of unionism.

The movement began quietly enough in January 1886, with the formation of a Miners' Accident Association. Six months later, on 29 July, a separate Miners' Union came into existence. Its birth arose from a strike over conditions, eventually settled by a board of arbitration consisting of three mineowners, two miners, and Warden Sellheim. Affiliated with the Victorian Amalgamated Miners' Association, the new union was at first "carried out on...prudent lines of moderation and common sense" which, however, failed to attract many

members; by October only twenty-five had paid their subscriptions. In that month the Charters Towers stock exchange experienced its first slight recession. With the opening of rival attractions in Montana and the Witwatersrand, British speculators were beginning to prove less interested in the over-priced Queensland propositions. As prospects diminished of unloading their properties on the London market, the many small investors holding scrip in "outside shows" could only hope that their properties might, after all, prove gold-bearing. Meanwhile the overseas companies who had bought into Charters Towers at excessive prices were now anxious to cut down costs in every way possible - including outlay on wages and safety precautions. "Any reasonable thinking man must see for himself the benefit accruing from joining the union;" urged one spokesman, "there was foreign capital being introduced here now, and they would no doubt before long work for foreign wages, and they knew what that meant." Some feared it meant the employment of Chinese. By the end of June 1887 branch unions had been formed at Ravenswood and Black Jack, and the Charters Towers body claimed over one thousand members. However, when the Accident Association and the Miners' Union were amalgamated in September, only 336 bothered to vote on the matter.

Early in 1888 the Black Jack reef, six miles from Charters Towers, unexpectedly petered out, and almost every mining company outside the central Charters Towers area went into liquidation. Many working miners and their traditional backers, the small storekeepers, lost heavily in the crash. Even the bigger mines felt the pinch: in 1888 £144,160 was called up by Charters Towers companies and only £76,817 paid out in dividends. The period of greatest depression saw a decline in union activity together with widespread unemployment - something hitherto unknown in the North, where previous hard times had been offset by new discoveries. It was not until depression lifted in 1889

6. Northern Miner, 30 April 1887.
7. The highest estimate was 1,707 members (Northern Miner, 30 July 1887). This may have included miners away at the Croydon rush.
P64: Charters Towers at the turn of the century  [A.R. 1901]
LABOUR COMES TO CHARTERS TOWERS

after the discovery of the Brilliant reef, that the fortunes of the Miners' Association revived. At the Day Dawn mine underground workers struck in protest at the management's insistence on their changing into company clothes while going on and off shift. This strike was unsuccessful, but was followed by a period of active recruiting, not merely in Charters Towers but on the other Queensland goldfields. Ravenswood, previously an apathetic centre of unionism, was stirred in May 1889 by the replacement of white men by underpaid Chinese at one of the crushing mills. A short general strike was followed by the dismissal of the Chinese, and restoration of old wage rates. A meeting of two hundred miners re-formed the union and accident association, with an emphatic provision that Chinese would be excluded totally. At Croydon and Georgetown wage reductions provoked strikes, and unions were formed at both these centres and at Cloncurry. In July 1889 the five North Queensland branches combined with Gympie and Eidsvold to disaffiliate from the Victorian section of the A.M.A. and form a separate Queensland district. The breakaway arose ostensibly from a dispute over the methods of raising funeral levies, but actually marked acceptance of the need for systematic local control. Already the Charters Towers union had taken a leading part in advising and assisting the smaller centres, as at the time of the Ravenswood strike: the Croydon union had been formed by Charters Towers miners rushing to the new find and carrying on as an extra-mural part of the union to which they already belonged.

It is rather difficult to assess the effect of this activity. Union meetings were not always well attended; for instance, the half-yearly meeting of the Charters Towers Miners' Association, at which the breakaway from the Victorian A.M.A. was moved, drew only about three dozen of the one thousand or more members entitled to attend. As late as July 1890, after a period of vigorous radical campaigning, the representatives of the Miners' Association standing for election to the Charters Towers Hospital Board finished at the bottom of a poll of nineteen candidates. But pressures on the labour market were causing trade unionism to spread from the mining centres to the ports. Wharf labourers' organisations were formed between 1887 and 1889 at Townsville,
Cairns, Cooktown and Mackay; in September 1889 these and other unions combined to form the North Queensland Labor Federation. The spate of union-mongering reached its height between April and June 1890, especially on Charters Towers, where bakers, shop assistants, cabmen and even domestic servants formed themselves into unions. Most of these organizations were ephemeral, but their formation suggests a widespread acceptance of union methods. Predictably, employers combined in reaction; although the Charters Towers Employers' Union was not registered until April 1891, there seems to have been a measure of informal co-operation for at least a year previously, and this Union when formed lasted more than fifteen years, outliving a great many employee unions in that time.

Unionism in Charters Towers was meanwhile given a distinctively radical tinge, not through the miners' leaders so much as a group of young men whose background lay only marginally in mining. John Dunsford, who had burnt his fingers speculating in the '86 boom, owned a struggling fancy goods shop and newsagency. Having leisure to read and disseminate the literature of Henry George, Marx, Bellamy and other socialist thinkers, he seems to have become the "ideas man" among Charters Towers radicals. Charles McDonald was a skilful watchmaker, an argumentative bush-lawyer as precise as one of his own timepieces, who cycled hundreds of miles around the Towers to spread his political gospel. Other prominent figures were


Anderson Dawson, William Rawlings, and John "Plumper" Hoolan, the Tom Aikens of his day. Their first interventions had been in local politics. In January 1887 Dunsford and Hoolan were ringleaders of the hecklers who broke up a meeting of the local Separation League so effectively that it faded into insignificance. Two months later they organized a censure motion on the management of the local School of Arts. Later in the same year they were involved in the formation of an ephemeral Land Nationalization League. In July they spread their interests: Dunsford scraped together some capital, and Hoolan was sent off to Croydon to found a newspaper. Finding competition too great, he moved on to Georgetown, where the Mundie Miner won immediate fame as the North's most outspoken periodical since Thady O'Kane's heyday. In 1888 depression quietened the activities of this group somewhat, but served generally to strengthen radical and anti-British feeling on the field. By the beginning of 1890 Charters Towers opinion was inclined to link the advent of hard times and falling wages with the coming of British capitalists. "They have in this locality bought up our best dividend-producing mines," stated John Dunsford, "and now our working classes feel the disadvantageous difference between the dividends being paid in London instead of on Charters Towers." 10 It was now time for Dunsford and his associates to attempt the formation of a Republican Association. Already Queensland disappointment with Britain's vacillation over New Guinea, and Irish partisanship had combined to favour the development of a "go-it-alone" patriotism by no means confined to trade unionists.


10. Northern Miner, 30 April 1890.
The opening meeting of the Republican Association on 3 February 1890 attracted fifty members. Explaining their objects, Dunsford in the chair stated that, although there were already in existence North Queensland branches of the Australian Natives' Association, pledged to the furtherance of a united Australia, that body had compromised itself by failing to condemn the nominee Legislative Council, and was in other respects insufficiently radical. Charters Towers should therefore form a Republican Association, with a more thoroughgoing concept of Australian nationhood. Some controversy resulted after one of the audience suggested, not unreasonably, that since the Australian colonies were too poorly equipped to defend themselves, it might be more reasonable to form a Radical Association and let the republican ideal sleep until a more suitable time. He went unheard. The Republican Association was voted into being, Charles McDonald was appointed to act as secretary, and a platform adopted in which echoes of Henry George and even of the Chartists mingled with local grievances and policies lifted from the Sydney Bulletin:

- Universal suffrage and triennial parliaments.
- Direct tax on land values, irrespective of improvements.
- Simplified procedure of Law Courts.
- Abolition of capital punishment.
- Australia for the white man.
- Complete general, technical and professional education.
- Government issue of all money without intervention of the banks.
- Mining boards and inspectors to be elected by the people.
- No foreign labour at rates under Trade Union.
- Australia to be a democratic commonwealth of free and independent people.

In support of the above we solicit the co-operation of all patriotic citizens who, sick of the degradation of politics, desire by constitutional means to build up the Republic of the South Seas, to establish justice, to preserve liberty, to extend the spirit of Australian nationality, and to elevate humanity. 11

Two afterthoughts were added to this programme. One clause called for the resumption of all freehold land, and the adoption of leasehold as the sole form of alienation. Another asserted that no Australian legislator should accept titles from the British government. Despite

11. *Northern Miner*, 4 February 1890.
Miners in the Brilliant Extended at the 2150 ft. level [A.R. 1904]
P47: Brilliant Extended Underlie at 2300 ft.  [A.R. 1904]
LABOUR COMES TO CHARTERS TOWERS

its republican name, and far-reaching programme, the Association's adherence to "constitutional methods" promised nothing revolutionary, its activities were mainly propagandist and educational, and its sympathisers were not all trade unionists. It was not thought incongruous that the local Anglican rector should address the society on the Christian republic of the future, nor that the Northern Miner, although grown conservative since O'Kane's retirement in 1889, should write in highly favourable terms of the Association's influence on the working men of Charters Towers. Within two months of its formation, the Republican Association boasted 330 members, and could afford to launch its own weekly, The Australian Republican, edited by a fiery young Cornishman, F.B.C. Vosper,12 with a bloodthirsty style that sometimes implied more than he intended.13

Meanwhile the Charters Towers radical leaders were drawn into the task of building up Labor on a Queensland-wide basis. Early in 1890 the North Queensland Labor Federation combined with five other districts to form the Australian Labor Federation, with Charles McDonald as president of the general council. Despite its name the A.L.F. was entirely a Queensland organization, centred on Brisbane, where it began publishing the Worker. By the end of the year the A.L.F. had drawn up a political programme, and a scheme for trade union nomination of parliamentary candidates, which in setting the standard for the whole Queensland labour movement reflected the influence of Lane and other Brisbane men. Theirs was the main role in stiffening outback radicalism with the idea of a planned programme and some form of socialist philosophy. Events during the great strikes of 1890 and 1891 were to prove that local and independent organizations, such as the Charters Towers Republican Association, were too diffuse.


13. Files of the Australian Republican are said to be held by the Victorian Public Library, Melbourne, but could not be found when requested in September 1961. [Ed. Note: See Newspapers in Australian Libraries: A Union List, Part 2 - Australian Newspapers (Canberra 1975), p. QLD 13.]
in their aims and too unsure of their methods to survive. It would be the Brisbane-based A.L.F., with a co-ordinated programme and a colony-wide organ of propaganda in Lane's *Worker* that would generate the progress of the labour movement, through its affiliates, such as (in Charters Towers) the Amalgamated Miners' Association.

The downfall of the Charters Towers Republican Association was fairly rapid after the maritime strike. While many North Queenslanders were prepared to sympathise with the miners in their quarrel with absentee companies, a community so dependent on imported foodstuffs soon found itself inconvenienced by industrial trouble on the waterfront. The *Australian Republican* was uncompromisingly in favour of the strikers, and began to lose favour. In November some hostile critics broke into its office and pied the type of a forthcoming issue. The shearers' strike of February 1891, while it did not involve any pastoralists in the Charters Towers district, was the final effective catalyst. In the *Republican* Vosper penned a challenging, if slightly incoherent editorial entitled "Bread or Blood", in which he asserted that it was "better to see the last squatter and the last member of this hateful Government butchered..." than for the shearers to yield, and "every man, his horse and rifle should fight to the bitter end...".14 Hailed before the circuit court on a charge of seditious libel, Vosper survived one trial when the jury failed to agree, and was acquitted at a second hearing on the grounds that, although the article was a seditious libel, it was not intended as such. Meanwhile the *Republican* had folded up. Completely opposed to Vosper were the clerks, stockbrokers and businessmen who made up the majority of the Charters Towers Volunteer Corps, and who had included at least one or two original members of the Republican Association. They willingly volunteered to preserve order in the strike-affected areas, and were sent off, trimly uniformed and stoutly

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14. *Northern Mining Register*, 28 March 1891. Compare the language used by Ward, district secretary of the A.L.F. at Charters Towers: "...if the Government and squatters fire on us, then I think the result will be a civil war." (*Worker*, 21 March 1891).
armed, to garrison Winton - but saw no action at all. Here as elsewhere in Queensland, political barriers were starting to go up between miners and station hands on one side, and on the other those who felt they had something to lose by a breakdown in existing patterns of law and order.

While the Republican Association declined, the Miners' Union recovered its importance. In March 1891 it had only 543 names on its roll - less than half the number in 1887 - and owed £107 to the A.L.F. for the maritime strike levy. As the shearsers' strike developed into a protracted struggle, interest revived. Enthusiastic open-air meetings expressed sympathy with the strikers, and provided a forum for speakers who stressed the need for concerted and disciplined action by the labour movement. Emphasis was cast on building up the unions as the basis of labour's entry into parliament. Despite the failure of the shearsers' strike, the next two years saw a steady strengthening of the unions, concurrently with growing political success. Although mineowners and employers strongly resisted the entry of the unions into politics, Labor candidates gained experience and prestige in a series of minor local contests, as preparation for the general elections of 1893. Anderson Dawson in 1891 topped the poll in the town ward of the local divisional board; as a result he was dismissed from his job, and could not find alternative employment for nearly two years. Such misfortunes, and alleged victimization of union men, had little effect. Later in the same year Dunsford and Vosper were elected to the Hospital Board. Griffith's volte-face on the coloured labour question in February 1892 brought many recruits to the labour movement, whilst on the more northerly mining fields organizers from Charters Towers, such as William Rawlings at Herberton, were experiencing considerable success in strengthening the unions. The 1893 elections saw Dawson and Dunsford returned for Charters Towers with a record majority; William Rawlings for Woothakata

15. *Queensland Parliamentary Debates*, LXXXIV, p.887. This is Dawson's own account, but it should be noted that in other respects his memory was not always accurate about details.
(the Herberton electorate); George Jackson for Ravenswood; William Browne for Croydon; Charles McDonald for Flinders; and Hoolan, first elected for Burke as an independent in 1890, was now sent in as temporary leader of the Labor party. One or two of these men owed their victory to the absence of preferential voting, but it was an impressive performance nevertheless.

All but one of these members of parliament had been concerned with the growth of radicalism in Charters Towers. Here was a clear indication of the role played by Charters Towers in the political education of North Queensland. It was through such provincial centres that the ideas and organizational techniques developed in the cities were communicated to the outback. Previously the isolated bush unions had suffered their defeats; whilst clubs formed to perpetuate an ideal, such as the Land Nationalization League and the Republican Association had proved unable to translate their principles into political action, partly because of heterogenous membership, partly it would seem through a certain amateurishness in organization. It was through the combination of unionists and political theorists organized on a colony-wide basis by the A.L.F. that labour transformed itself into an effective political force. The experience of Charters Towers suggests that this combination was largely the work of a comparative few, with the patience to learn and the skill to apply the techniques of political organization.

* Ed. Note:
George Jackson [1856-1938] MLA Kennedy 1893-1909 (Labor to 1902, Independent supporting Kidston); Chairman of Committees 1904-09; Secretary for Mines and Public Works 1909.

Tin was first discovered in Queensland at Stanthorpe in 1872. Among those joining the rush was John Moffat, a quiet shrewd Scot, who, despite early financial setbacks, gained sufficient experience in the industry to enable him gradually to build up an extensive tin mining empire in the rich and malleable Cairns hinterland. Between 1880 and the Great War, Moffat emerged as the magnate of the state's largest tinfield. He financed and constructed towns, dams, batteries and smelters, tramways and railways; he diversified into copper, silver, lead and wolfram; and, for a long period, he held considerable sway over the region's economy. The battery and smelters at Irvinebank were the headquarters of his mining empire which stretched over an area of several thousand square miles. A skilled entrepreneur, Moffat's activities were so vital to the development of the Walsh and Tinaroo fields that, after his death in 1918, the state acquired his Irvinebank operations as a state treatment works to sustain tin mining in far North Queensland.

The existence of tin lodes in the Wild River district was recorded by James Venture Mulligan in 1875, but as gold was paramount in the 'seventies, there was little initial interest in such remote areas where rail, road and port facilities were non-existent and where transport charges were prohibitive. With the cost of reefing increasing and with a growing scarcity of alluvial gold deposits, many prospectors turned from gold to tin, silver and copper. John Atherton, a cattleman who had taken up extensive pastoral holdings on the heads of the Wild, Walsh, Herbert and Tate Rivers, sparked an interest in the region's tin deposits when he and his station hands located tin at Tinaroo Creek in 1878, and on the Wild River near one of Mulligan's camps the following year. However, Atherton was more concerned with cattle-raising and was content to pilot a party of prospectors to his Wild River find. Comprising John Brown and Thomas Brandon (both

1. *Queenslander*, 10 February 1883, p.25.
northern prospectors) and William Jack and John Newell (hawkers who had worked for Moffat at Stanthorpe), the party soon abandoned their show, and returned to their twenty acre block at Tinaroo, which, by April 1880, engaged twenty workmen.²

When rumours began about Chinese leaving the Hodgkinson and taking up mining on the Wild River, the four prospectors hurried back to the area in May 1880, only to find the site deserted. Here in a gully they discovered a huge show of tin which could be traced for two miles by outcrops; the lode averaged three feet wide and some two to three hundredweight blocks were found.³ By primitive smelting methods, they confirmed that their discovery was phenomenally rich. Further samples were carefully packed and despatched through Port Douglas to Moffat’s Tenthill smelter near the Queensland-New South Wales border where they assayed at seventy-one percent tin.⁴ Two hundred acres of mineral selections were marked out by the prospectors and were registered at Thornborough.⁵

News of the Great Northern discovery, as their mine was known, attracted a small rush and brought to life the town of Herberton on the banks of the Wild River.⁶ Within a few months, there were seventy men working the tin, and discoveries had spread as far west as the watershed of the Walsh and Wild Rivers where Watson, Hooley and party were working a lode.⁷ As Geoffrey Blainey has remarked: "Herberton was an unusual tinfield, for its lodes were more valuable than the alluvium, and the lodes gave mining a stability that the Border tinfields lacked."⁸ The Great Northern was recognized as the best

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2. Ibid., 17 April 1880, p.499 (quoting Cairns Advertiser).
3. Ibid., 22 May 1880, p.659 (quoting Cairns Advertiser).
4. Ibid., 8 October 1898, p.713.
5. Ibid., 29 May 1880, p.673.
6. The property was christened the Great Northern at a special ceremony on 18 September 1880.
7. Queenslander, 7 August 1880, p.179.
JOHN MOFFAT AND THE NORTH QUEENSLAND TINFIELDS

claim on the field, assaying sixty percent metal content; the miners enthusiastically described its value as incalculable if the lode could be proven at depth. William Joss, manager of Evelyn Station, who had been monitoring developments at the Great Northern since 1879, obtained Brown's one-quarter share for a mere £150, which he no doubt considered a spectacular coup.9

Following an inspection in December 1880, the Hodgkinson mining warden, Towner, assessed the field's prospects. There were twenty-four parties working lodes over a radius of two miles: "Eight or nine are on payable ore i.e. assaying over fifty percent. The remainder are on very good ore, but it will require treatment by machinery before it will pay to remove from the field, it assaying only twenty to forty percent."10 In short, the absence of crushing machinery meant that the best class of tin transported to the coast at the rate of £18 per ton was really worth double the price it fetched. Herberton's need was Moffat's opportunity. Jack and Newell invited him to participate in the Great Northern provided he guaranteed to erect crushing machinery. Although he ordered the battery before leaving Tenthill for Herberton in October 1880, the wet season and local inexperience delayed its erection by some seven months. After a trial in May 1881, Moffat's ten-head battery commenced continuous crushing from Monday, 27 June 1881.11

Moffat's policy of crushing public stone, additional to the output of the Great Northern, ensured a new stability on the tinfield. Rates of thirty shillings per ton for low grade ores, rising according to metal content to £2 per ton, were charged for public consignments. Miners without capital could prospect small, poorer lodes at a profit. By August 1881, there were fifty-four claims being worked, although the deepest shaft was only fifty feet.12 Simultaneously, Moffat diversified into mining, partly as an investment and partly to ensure ore supplies

10. Ibid., 25 December 1880, p.891.
11. Ibid., 7 May 1881, p.594; 9 July 1881, p.45.
12. Ibid., 20 August 1881, p.242 (quoting Hodgkinson Mining News).
for his battery. In 1881, he acquired Joss's mining interests in the region - one quarter share in the Great Northern, half of the Wild Irish Girl claim and one-sixteenth share in the Great Western (six miles west of Herberton) - for £3,000 which local miners considered a "cheap bargain". 13

As the output of Moffat's own mines rapidly increased, the mill's capacity of 150 tons per week was strained and public crushing activities were wound down. Miners thereafter agitated for more machinery on the field and for more ore-buyers to purchase stacks at grass. Two mills did eventuate. The Monarch at Nigger Creek was erected by Daniels and Baker with southern capital, and commenced crushing in September 1882. 14 The Herberton Co-operative Tin Crushing Company's mill was financed by local businessmen; the directors were Dermott Henry and Herman Selig (storekeepers), G.P. Hides, John Collins and Hugh Harrison (hoteliers), F.H. Clarke and Alex Adams (carpenters) and William Jack. The shareholders also were predominantly local men; Moffat was not a shareholder, but his friend, Robert Philp, later Minister for Mines, held 100 shares. 15 Crushing commenced in September 1882. However neither the Monarch nor the Herberton Co-operative mills were successful, owing to poor management, irregular supplies of ore - the 1884 production at Herberton was one-seventh of that in 1881 - and the drift of miners to the new tin discoveries south and west from Herberton. Both closed in 1884 and were bought cheaply by Moffat for use at Irvinebank and Glen Linedale.

In contrast to its short-lived competitors, Moffat's mill, sustained by ores from the Great Northern mine, continued to operate successfully under the Herberton Tin Company - a private concern formed by Jack, Newell, Brandon and Moffat to manage both their mines and the concentrating mill. Moreover, Moffat had initiated the development of

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13. Ibid., 23 April 1881, p.510.
14. For details, see: Ibid., 21 January 1882, p.74; 23 September 1882, p.399 (quoting Herberton Advertiser); 30 September 1882, p.434.
15. For details see: Company File 65 Book 2, Q.S.A.
the Watsonville lodes, obtaining disused machinery from the Hodgkinson goldfield. In mid-1881, he purchased five substantial mines from Robert Watson - the Great Western, O'Lone's, Wild Irish Girl, King of the North and the North Australian.16 His five-head battery commenced crushing at Watsonville in mid-1882, and, after selling a share in the battery at considerable profit to a Melbourne syndicate, Moffat expanded his operations at the Great Western mine by erecting an aerial tramway valued at £5,000 from the mine to the mill on Jamie Creek.17 Further discoveries, rising tin prices and the growing interest of southern capitalists attracted new ventures, in particular the erection of a mill by the Herberton Bischoff Company.

Prospecting was widespread. The ensuing discoveries of alluvial and lode tin, silver and copper heralded rushes to Newellton on the Dry River, Mulligan's Camp on Emu Creek, Mowbray on Thompson's Creek and Coolgarra and Mount Garnet on Return Creek.18 Other finds included California Creek by Halpin; the Tate River by the Palmer mailman, John Hogs fleisch and three other prospectors - John Dow, John Williams and Harry Hammond; and Gibbs' Camp by Gibbs, Thompson and McDonald. Moffat did not invest in any of these new tin discoveries because he was overseas during 1882 and 1883, and his agents, Caird, Patterson & Co., who held mortgages over the Tenthill operations, considered it wiser to consolidate his interests in the Glen Smelting Company at Tenthill, and at Watsonville and Herberton. But other entrepreneurs were interested and gave an impetus to lode prospecting. On 5 September 1882, S.J. Delaney applied for a machine site on Return Creek; he represented a south Queensland syndicate which in turn was registered as the Beaconsfield Tin Mining Company with a capital of £25,000 in mid-April 1882.

16. Early developments at Watsonville are recorded in Queenslander, 18 June 1881, p.787; 13 August 1881, p.207; 3 September 1881, p.302; 15 October 1881, p.494; 26 November 1881, p.679.
17. Ibid., 3 February 1883, p.185.
1883. The company acquired the Beaconsfield, Lothair, Lovely Ethel and Bonnie Dundee, all on Return Creek, but delayed erecting crushing machinery at Coolgarra until 24 March 1884. Known as the Victoria Mill, it worked only spasmodically as transport costs and fluctuating tin prices rendered the venture uneconomical.

The haphazard development at Coolgarra was repeated at Thompson's Creek, Newellton and California Creek. The North Queensland Tin Mining Company erected a crushing and dressing plant at Thompson's Creek to treat ores from the Tasmanian, City of Pompeii, Vesuvius and Chesterfield. Crushing commenced on 6 March 1883 but within six weeks the battery had closed down because of disagreements between the proprietors, poor ores and flood damage to the dam. At Newellton (Silver Valley), the two smelters erected were both failures, and the companies which had been enticed to the area were obliged to seek labour exemptions. The complexity of the ore and the expense and inefficiency of charcoal as a fuel sunk no fewer than four companies. The California Creek lodes at the head of the Tate River were even more remote, and in the absence of crushing machinery, the only work proceeded with was the stacking of washdirt on the main claims. The one promising development on the field was at Gibbs' Creek.

19. Mining Warden (Herberton), Register of Applications for Claims, MWO 12B/29 No. 524. Q.S.A.; Company File 167 Book 2, Q.S.A.
22. The companies concentrated on silver rather than tin. They were the Silver Valley Silver Mining Company, Aurora Galena Smelting Company Limited, Target (Great Extended) Silver Mining Company and North Queensland Company. For details, see: Queensland, 11 November 1882, p.667; 26 May 1883, p.825; 27 October 1883, p.186. A German concern, the Launcelot Tin Mines, later worked the area more successfully, extracting over a thousand tons of tin.
23. The claims included Industry Reward, No. 1 South, Queensland, Transvaal, Californian King, Halpin's, Gregory's and Royal Standard. Queensland, 23 September 1882, p.399; 17 February 1883, p.265; 26 May 1883, p.825.
P48: John Moffat
[Cairns Historical Society]
When Gibbs, Thompson and McDonald discovered several shows in rough country some ten miles west-south-west of Watsonville in July 1882, little did they realize how valuable their finds would prove in the long term. Even the veteran prospector, J.V. Mulligan, was excited by the promise of the deposits, especially the Great Southern, Tyrconnell and Red King. The Great Southern, assaying sixty percent tin, was tested only to twenty feet, but tin persisted on the floors in the shaft; the Tyrconnell and Red King were both chloritic lodes and most suitable for driving tunnels. However there was no machinery on the field, not even a pack track to the nearest battery at Watsonville, so the prospectors had to forgo any hopes of crushing the initial outputs except for dollying. Moffat was still overseas, but one of his partners in the Glen Smelting Company, George Young, was impressed by local miners praise for the prospect, and purchased the seven tin shows at Gibbs' Creek for £6,000. It was a shrewd investment, which not only consolidated Moffat's interests, but also determined his future in North Queensland mining. As Geoffrey Bolton has observed, Gibbs' Creek in 1883 was a well-chosen headquarters in the heart of the mining field, and a legend in the making.

Following Moffat's return, the Glen Smelting Company erected a battery and smelters on an evenly sloping tongue of land between Gibbs' and McDonald's Creeks which were dammed to provide water for the concentrating mill. To prevent competitors restarting crushing operations at Herberton in 1884, Moffat purchased all the machinery, buildings and ore stacked by the Herberton Co-operative Tin Crushing Company for the bargain price of £260. Gibbs' Creek was renamed

25. Ibid., 6 October 1883, p.571. Young's investment coincided with the choice of Cairns as the coastal terminus of the Herberton railway.
26. G. Bolton, A Thousand Miles Away (Canberra 1972), p.120.
27. The five head battery from Thompson's Creek was acquired by Moffat and re-erected in 1884. A.R. 1883, p.49.
28. Queenslander, 28 January 1882, p.109; Moffat to Reid, 16 July 1884, Letterbook 1883-4, p.291; Moffat to Reid, 6 August 1884, ibid., pp.311-2; Moffat to Parents, 14 September 1884, ibid., p.281.
Irvinebank and the mill was known as the Loudon to evoke memories of his birthplace. Ironically, Moffat was not initially impressed with the mines at Irvinebank, believing that on available geological evidence they did not warrant the outlay; but Young reasoned not only that were they significant lode discoveries, but also that the Glen Smelting Company needed to own the mines if it was to maintain its influence over the Herberton tinfields.

The commencement of the Irvinebank battery and smelters in December 1884 guaranteed the permanency of the mining industry in the district and induced miners to work lodes that were previously exempted.\(^{29}\) During the first year of operation, the Loudon mill crushed 3,840 tons of ore, yielding 651 tons of black tin, and returning 438 tons of metallic tin after smelting.\(^{30}\) Moffat instituted a policy of preference for public ore (practised throughout his life) to ensure a continuous supply for the mill. This policy stabilised mining by providing quick returns to individual miners for their ores, and, at the same time, encouraged them to work their claims efficiently.

The mainstay of the Irvinebank group was the Great Southern mine under the management of William Richards, a Hodgkinson miner who again figured prominently on that goldfield in deep-sinking and lode mining in the 1890's. The other mines held by John Moffat and Company (the trading name for the Glen Smelting Company in North Queensland) were the Colombo, Tornado, Red King, Adventure, Comet, Freethinker, Mary

\(^{29}\) According to Moffat the Loudon mill valued at £12,000 was the most complete reducing and tin saving plant for its size in Australia and much more than anything in England. The building contained six terraces on the hillside; a tramway conveyed the stone to a self-adjusting feeder to the five stampers, regulated by steam. Below were the jiggers and separating tables, thirteen feet in diameter and slowly rotating, controlled by a twenty feet diameter water wheel. There were two boilers in the mill, producing steam for the battery and smelter. As well there was a brick kiln for fire and other bricks, a blacksmiths' workshop, and large stables for the company's own teams. For details, see: Moffat to Parents, 12 July 1884, Letterbook 1883-4, p.281; Herberton Advertiser, 9 October 1885.

\(^{30}\) A.R. 1885, p.49.
No. 2, and Tyrconnell. While local mining experts considered these mines very profitable, Moffat was aware that many wereuffered out, and that if his company was to continue as a vibrant developer of Irvinebank tin mines, further prospecting and discovery of new lodes, an increase in the capacity of the Loudon mill, and a reduction in overheads were essential. 31

Moffat's activities were not solely confined to Irvinebank. In 1884, the Glen Smelting Company diversified into silver mines at Montalbion; and in the following year, sensational discoveries of horn silver, assaying 1500 to 2000 ounces per ton, created a wave of excitement among local journalists and in southern investors' circles. Moffat was cautious and refused to be rushed when deciding the type of smelting plant to erect. Finally, the water jacket and cupola type furnace at Montalbion was fired in early September 1886, and smelting commenced in earnest when silver prices began to rise. 33 As Moffat was keen to encourage legitimate British investment in North Queensland, he hoped to use the Montalbion silver deposits to advantage to relieve his company of the responsibility of pioneering and financing further mining developments. Accordingly, with Broken Hill silver commanding international attention, Moffat and Young devised a plan to float or sell the Montalbion deposits and nearby properties. Moffat was adamantly opposed to the extraction of an extortionate price for the mines by Young and Anthony Linedale, even though compared to many companies floated at the time they could have sought a heavy price. 34 The Montalbion mines and smelters were sold to the English company, Mount Albion Silver Mining and Smelting Company, in December 1887 for £200,000. 35

32. A.R. 1885, pp.50-1.
33. Moffat to Reid, 1 October 1886, Letterbook 1885-8, p.117.
34. Moffat to Young, 2 August 1887, ibid., p.293. See also Moffat to William Jack, 15 October 1886, ibid., pp.126-8.
35. A.R. 1887, p.75; Moffat to Young, 26 December 1887, ibid., p.382.
RUTH KERR

Simultaneously, Moffat was involved in the development of Glen Linedale, nine miles south of Irvinebank. One of his prospectors, Edward Giblet, discovered tin in 1886, and two mines in particular, the Gordon and the Oberlin, were remarkably rich on initial testing. But because they were more than ten miles over the Great Dividing Range by track from the Irvinebank battery, it was necessary for Moffat to erect crushing machinery and to construct a dray road if he was to seize this investment opportunity. With an eye to economy, he transferred the recently acquired ten-head Monarch battery from Nigger Creek near Herberton. Doubts about the assays maintaining an average of sixteen percent led to a delay in crushing until July 1888, by which time the property had been sold by Young for £120,000. With tin prices booming at £120 per ton, speculative interest could be expected on the London market, and the Oberlin Tin Company was floated then registered in Queensland with a capital of £200,000 in cash and shares. In fact, the Glen Linedale venture exemplified a trend in northern mining to overcapitalise mines in the absence of testing and development work.

The combined outlays on Irvinebank, Montalbion and Glen Linedale in the three years to 1887 strained the finances of Moffat's company. For a time, he considered disposing of all three ventures, but, for Irvinebank, this was only a passing phase. If he had pursued his policy of realising on all of his mining investments and retiring from the district's mining development, the North Queensland base metal industry almost certainly would have stagnated. Remoteness and uncertain world prices hampered many miners, but Moffat persisted. Large portions of the field, especially to the west, were unexplored.

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36. Herberton Advertiser, 7 May 1886.
37. Ibid., 18 March 1887; Moffat to Parents, 7 January 1886, Letterbook 1885-8, p.50; Moffat to Reid, 1 October 1886, ibid., p.117.
38. A.R. 1888, p.70.
40. Company File 173 Book 5, Q.S.A.
41. Moffat to W.B. McGavin, 4 November 1886, Letterbook 1885-8, p.146; Moffat to Reid, 23 November 1886, ibid., pp.159-60.
With silver prices falling, Moffat encouraged his prospectors — Linedale, Charles Garbutt, John James and Delaney to concentrate on tin and copper. At Chillagoe, sixty miles north-west of Montalbion, they located several promising copper deposits. Initially the plan was to dispose of the copper finds to public companies but it was thwarted by the onset of the depression, and Moffat was forced to maintain the properties at considerable cost during the 'nineties, which, in no small way, impinged upon the finances of the Irvinebank operations. Fortunately, however, there were new developments at Irvinebank.

By 1888 tin mining at Moffat's headquarters was at a low ebb, as the average assay had dropped by half from 17.9 percent in 1886 to 9.1 percent. The most encouraging lode was the Vulcan, owned by Harry Maranta and a party of Italians — Alexandro Leone, Battista Leone and Guiseppe Ampatti. Several crushings of Vulcan ore at the Irvinebank battery in the early months of 1889 assayed twenty percent tin. But promise was not enough. At the beginning of 1889 the men at the Louden mill were paid off, as there was insufficient ore to keep it going: only the Vulcan, Ibis and Thompson's claims were raising ore. It was not until the September quarter of 1890 that the mill reopened to crush public stone from the Vulcan.

The Italians had discovered an indefinite tin deposit seventy feet below the brace of their shaft. In October 1890 a group of miners purchased the Vulcan for £2,100. The Italians reportedly visited their homeland with the profit of their sale; the purchasers formed a company

42. MWO 12B/29 - ML 3003 applied for on 8 September 1888; Mines Department, Register of Mineral Leases MIN/02, p.57 - Lease No. 469 for 5 acres for 21 years from 1 July 1889. Q.S.A.; see also, Register showing return of production, quantities passed through customs, crushing, population, statements, summaries of collections, etc., 1883-1901, MWO 12B/56. Ibid.

43. Herberton Advertiser, 28 February 1890.

44. Ibid., 27 July 1890. It was during the period of the mill's closure that Moffat went to Brisbane to marry Margaret Linedale.
of twenty shares of £100 each. There was a quantity of fifteen percent ore at grass and rumours circulating about the size of the lode. These factors contributed to a rush by miners to participate in a project owned by working miners independent of the mill owner. Accordingly the Vulcan was reformed into a public company, the Vulcan Tin Mining Company, registered on 13 December 1890 with a capital of £4,400 in £1 shares, issued and paid to ten shillings. A dividend of two shillings per share declared by the company in January 1891 was the first such remittance to investors in the district. By August 1891, only nine months after the formation of the company, the Vulcan had paid dividends equal to the called up capital on each share. The company was in a buoyant condition: for a mine valued at £2,000, the market valuation stood at £16,000, and there was additionally some £4,000 in liquid funds.

From the outset the subscribers excluded Hoffat from holding shares in the Vulcan. It was argued that his company was not a public one paying local dividends and the Vulcan was already committed to paying crushing charges to his Irvinebank mill. Most likely it was a stand by miners to assert a degree of independence from Moffat's influence over mining in the district. Nevertheless he infiltrated the company through nominees and by the end of July 1891 controlled more than a third of the Vulcan shares. This coincided with a period when Moffat was manoeuvring to achieve greater independence from his southern financiers. In August 1890 he floated the Irvinebank mill and mines and other northern holdings into a public company, the Irvinebank

45. Ibid., 24 October 1890. Thomas Swan was appointed manager; William White, Henry Bradshaw, James Thompson, Nicholas Hardman and William Moss were the directors; and Herbert Armstrong was secretary.

46. Company File 141 Book 6, Q.S.A.

47. Herberton Advertiser, 16, 23 January 1891.


JOHN MOFFAT AND THE NORTH QUEENSLAND TINFIELDS

Mining Company, with a capital of £60,000 in fully paid £1 shares. 50 Moffat then sought to align the Vulcan company with his interests, to which shareholders of both companies agreed at a meeting on 4 August 1891.51 Accordingly the Vulcan Tin Mining Company No Liability was registered in Herberton on 29 March 1892 and its authorised capital was increased from £4,400 to £44,000 with shares paid up to eleven shillings.52

The reorganisation of the companies at Irvinebank had long term benefits, especially for the Vulcan. Moffat implemented a programme of exploration in the Vulcan tunnels and shafts to consolidate its assets, as quarrelling among shareholders had militated against progress. Working men were suspicious and envious of Swan and Hardman who at first controlled the mine and were its largest shareholders. Personality clashes fuelled arguments about finances, working conditions in tunnels, contracts for deep sinking and strained relations with the Irvinebank company.53 Moffat's intervention not only overcame many of the problems but also established the mine as the staunchest pillar of his empire and the whole Herberton and Walsh River tinfields. Over the subsequent fifteen years, the Vulcan yielded nearly 9,000 tons of black tin valued at £377,362 with dividends totalling £162,030.54

Faced with unexpected management and finance problems in the Montalbion and Glen Linedale ventures, uncertain ore supplies at Irvinebank (excluding the Vulcan) and huge development costs at Chillagoe, Moffat and northern investors welcomed the silver discovery at Muldiva. A smelter was erected in 1891 but closed two years later as falling silver prices, expensive machinery and transport costs, and

50. Register of Companies, 4 January 1889 to 30 April 1896, A/18939 Q.S.A. The crushing capacity of the Irvinebank battery was increased to fifteen head in 1888 to cope with ore from outlying districts. See Herberton Advertiser, 4 January 1889.
51. Ibid., 7 August 1891. The Vulcan company was critically short of liquid funds and impeded by management indecision.
52. Company File 21 Book 7, Q.S.A.
53. Moffat to Charles Arbouin, 1 March 1892 Letterbook 1890-92, p.344.
the collapse of the Queensland National Bank crippled the Muldiva Silver Mining and Smelting Company. There was little to show for the expense of investors' money at Muldiva, Montalbion, Glen Linedale or California Creek except for expensive machinery. When Glen Linedale ore turned out much poorer than anticipated, smelting was suspended in April 1891 pending rearrangements to finances and the addition of the California Creek properties to the Oberlin company's assets, but it came to nothing. Small operating margins, distant directorates, primitive and expensive transport, over-estimation of ore deposits and the lack of sustained exploration programmes paralysed the companies.56 Thereafter, Moffat assumed control of both the Gladstone at California Creek and the Gordon and Oberlin at Glen Linedale and the crushing machinery. He operated the plants intermittently during the 'nineties before dismantling them for re-erection at Koorboora and Mount Garnet.57

As the depression eased, Moffat was the only entrepreneur with adequate capital remaining in North Queensland able to embark on new development work. With copper prices gradually rising, he chose to concentrate on his prospects at Chillagoe and Mount Garnet. Operating small furnaces at Calcifer and Girofla (Mungana), Moffat treated £10,000 worth of copper, but realised that he had insufficient capital to fully exploit the lodes. In 1897, he invited two Melbourne businessmen, Charles Chapman and James Smith Reid, both respected figures in the mining industry, to float the Chillagoe properties. It

55. Moffat to Seby Ord, 12 June 1891, Letterbook 1890-92, p.199. Moffat was critical of the Cornish mine managers, Rowe and Rogers, with good reason. Rowe had actually prohibited further exploration at the Gordon, and after his departure, new lodes were soon discovered. Similarly, at California Creek, John Agnew found new traces at the Gladstone in 1891. See Moffat to Virtue, 26 June 1891, ibid., p.211.

56. The companies failed to lobby actively for construction of the Herberton railway to overcome the transport problems, preferring immediate exploitation of the lodes. Although many smelters and batteries were erected in the district, these were of little service in the long run, for no sooner was there a hitch in mining development at one site than a rush to another area would occur, and the same problems of transport, treatment and mine development would re-emerge.

57. A.R. 1897, p.103; 1899, p.73.
was the most ambitious venture undertaken in North Queensland prior to World War I, and had the blessing of the Queensland government. Under the Mareeba to Chillagoe Railway Act of 1897, the Chillagoe Company was granted 2,000 acres of mineral leases, authorised to construct a railway and smelting plant costing over £300,000, and empowered to work the railway at rates fifty percent above government charges. The venture attracted international attention culminating in a share boom in 1900. However, by the time the smelters were completed in May 1901, the company had accumulated formidable debts and was compelled to reconstruct. Contrary to popular belief, Moffat like his fellow directors sold the bulk of his shares at considerable profit. 58

At Mount Garnet, where Moffat had held leases since 1890, work was commenced in 1896. When completing the sale of the Chillagoe properties, Moffat arranged for Chapman and Reid to inspect the sixty acres of freehold. The Mount Garnet company was incorporated in Melbourne in September 1899 with Moffat as managing director. Expensive mining plant was erected, and the smelters were fired in January 1901. However, the venture was short-lived. Treatment difficulties, high transport costs, a lack of liquid funds, insufficient ore reserves, the collapse of the open-cut and falling metal prices combined to force its closure. The railway was completed just as the crisis beset the company, and with the smelters and mining plant was passed into receivership. 59 Investments in other copper mines at Haunt Holloy. and Mount Elliott in the Cloncurry district, would prove more rewarding for Moffat; but it was tin mining which was to sustain his reputation as the north's mining magnate.

58. For example, Bolton, A Thousand Miles Away, p.284, argues that he "could have cleared at least two-thirds of a million", but he "kept his shareholdings in tact". R. Bedford, Naught to Thirty Three (Sydney 1944), p.255 adopts a similar line. A search of the share registers of Chillagoe Railway and Mines Limited and the New Chillagoe Railway and Mines Limited shows otherwise. Company File 149 Book 9; 264 Book 10, Q.S.A.

59. Company File 288 Book 9, Q.S.A.; A.R. 1901, p.74; 1902, p.69; Cairns Argus, 9 September 1896; Cairns Post, 9 December 1902.
In the wake of the copper failures at Chillagoe and Mount Garnet, the tin fields were revitalised by new discoveries at Smith's Creek (Nymbool) in December 1901, by expanded operations at Eureka Creek, and by the influx of Adelaide capital. The lodes at Smith's Creek were located by James and William Donahue, but after preliminary testing which revealed highly favourable assays, the property was acquired by an Adelaide syndicate which in turn floated the Smith's Creek Proprietary Tin Mines No Liability with a capital of £100,000. Early yields led to a boom in the company's scrip, but as soon as the tramway and smelter was constructed to consolidate operations, the lode was lost below the 100 feet level. The directors were obliged to mortgage the machinery and to liquidate the company in 1908. Smith's Creek produced 1,500 tons of tin valued at £100,000 during its brief life.  

Eureka Creek was not a recent discovery. The principal tin lodes - Ivanhoe, Gladstone, Lass O'Gowrie and Kitchiner - were worked with primitive machinery as early as 1884. A battery operated between 1888 and 1893, crushing ores mined by tributors and prospectors, but was removed to the Star of the South near Irvinebank, after which all ores were carted to the Loudon mill for treatment. Extensive leases

60. For details of the Smith's Creek operations, see: A.R. 1903, p.75; 1904, p.69; 1905, p.69; 1906, p.74; 1907, p.73; 1908, p.75; 1909, p.85; Wild River Times, 3 January 1902, 15 January 1903, 26 August 1908; W.E. Cameron, The Herberton Tin Field, G.S.Q. publication 192; W. Lees, The Copper Mines and Mineral Fields of Queensland, Part 2 (Brisbane 1907), pp.21-2; R.L. Nash, Australasian Joint Stock Companies Year Book (Melbourne 1902), p.423. The Adelaide syndicate had a capital of £7,200 in 600 shares and paid only £2,750 and 150 fully paid shares for the property. On floating the public company in May 1902, the syndicate retained 60 percent of the 100,000 shares and issued only 15,000 to provide working capital. Share quotations reached forty-three shillings in late 1903 before tumbling, but not until after the syndicate had profited handsomely.

61. Queensland, 28 June 1884, p.1027.

62. Cairns Argus, 1 November 1893.
in the district were acquired by the South Australian company, North Queensland Tin Mining Corporation in 1900. By agreement, and for a consideration of 360,000 £1 shares, the company passed the properties and fixed assets to the Stannary Hills Mines and Tramway Company Limited, an Adelaide-based concern with a nominal capital of £650,000. The new company soon took advantage of the tramway clause in the recently passed Mining Act of 1898. Surveys were commenced for a narrow gauge tramway from Boonmoo, along Eureka Creek to Stannary Hills, thence over the ridge to a terminus at Watsonville. The first tramway to be constructed under the provisions of the Act, which allowed passengers and general goods to be carried as well as minerals, the line was opened to Stannary Hills in May 1902. Instead of taking the tramway to Watsonville, it was decided to construct a branch line to Rocky Bluffs on the Walsh River where the battery was located.

In all, the Stannary Hills company spent £120,000 in three years on tramways, plant and buildings and mine development. Its principals boldly acclaimed the tin mines as the largest group worked by one proprietary in Australia, and were confident of strong ore supplies in the future. The twenty-head battery at Rocky Bluffs, called "Jumping Moses", could be kept fully engaged on ore from the company's mines, without outside supplies. Certainly it was an impressive operation. The mill was equipped with modern machinery, and the battery was sited a quarter of the way up the cliffs from the Walsh River. Construction

63. The company's assets included: Ivanhoe lease ML1403, Black Rock ML1404, Iona ML1405 and Hornet's Nest ML1407 totalling 320 acres, Ronald Valley ML1718 (including Young Australia and Ironclad) of 13 acres, Caledonia ML1417 (fifteen and a half acres), Lowlands ML1371 (twenty acres), ML360 (eighty acres), Machine Area at Rocky Bluffs (ten acres), 213 acres of Tramway leases from Boonmoo to Stannary Hills and Watsonville, Water Rights Nos. 227, 229, 230 and 264 each of twelve sluice heads and No. 222 for ten sluice heads together with plant, machinery, ore at grass. Company File 203 Book 10, Q.S.A.

64. Ibid.; Cairns Post, 21 April 1900.

65. Ibid.; Cairns Post, 8 May 1903.

66. Ibid., 3 March, 12 May 1903.
was no easy task as sand and gravel had to be carted uphill by horse teams and bricks transported twenty-one miles before being dumped six hundred feet down to the battery site. Some initial difficulties were recorded in the first half-yearly report: the battery was unable to cope with the ores at grass, and the large outlays on machinery precluded any immediate dividend. The initial assays of 71 percent tin were exceptionally high and misleading as an indication of the mines' prospects: as with most other mines on the tinfield, the initial production was purely exploitive. However, the company expanded in July 1903 by purchasing the Arbouin mine.

The Stannary Hills company was highly successful while tin prices remained high; but after the collapse of the market in late 1907 its influence declined. Between 1904 and 1911, when the company closed down, output was valued at £275,352. In 1912 it was taken over by John Darling and Company, Adelaide flour millers, but all activity at Eureka Creek had ceased by the 1920's. Other ventures financed by outside capital were less fortunate. The whole field had been "mellon hole" tested by migratory miners working in conjunction with companies. Moffat knew there were few untouched deposits but the Coolgarra Federal Tin Company, the Arbouin Hills Tin Mining Company No Liability, the Cuprite Consolidated Tin Mines No Liability, and the New Era Company disregarded past results and after substantial outlays, plunged to bankruptcy. For his part, even Moffat experienced mixed results. His Coolgarra Tin Company Limited reopened workings at Return Creek in 1899 and erected a new battery. Crushing was continuous from March 1901 to September 1903, with output valued at nearly £25,000. Low grade ores forced Moffat to lease the mines to gougers, although the mill reopened between 1906 and 1908 before being dismantled. Operations at Koorboora and Gurrumbah were more profitable.

67. Ibid.
68. Ibid., 21 July 1903.
69. Compiled from A.R. 1904 to 1911 inclusive.
70. A.R. 1908, p.75.
P51: Vulcan Mine [A.R. 1902]
P52: Stannary Hills company's mill on the Welsh River [A.F. 1903]
At Koorboora, which had been worked since 1893, success was largely due to the managerial skills of William Waddell who organized the vigorous development of the Iolanthe, Shakespeare, Old Vulcan, Portia, Fairplay, Tennyson and Nellie mines. A dam was constructed in 1897, and the second-hand reduction works were complemented by ten heads of stamps two years later. Lack of water was a constant problem and each dry season supplies for the battery were maintained by pumping from the mines. Koorboora ores assayed three percent average, which was only worthwhile when tin prices were over £50 per ton. The operation however was boosted by the output of Wolfram from the Neville mine. The Gurrumbah battery's tin was hauled from Gilmore on the Mount Garnet railway after Moffat acquired the leases from the Dalziell Brothers in 1905. As the Gurrumbah battery peaked in output just as tin prices began to slide, work was reduced to one shift by the end of 1908, and residents were moving to Gilmore where the Tommy Burns Syndicate was opening up a rich lode.

Irvinebank and the Vulcan were the mainstays of Moffat's operations, at least until 1907 when the ore in the seemingly inexhaustible Vulcan mine suddenly almost halved in value. In fact the value of the Vulcan output fell from £61,618 to £12,805 over the ten years to 1914, and assay averages dropped correspondingly from 10.2 percent to 4 percent. Moffat responded with a vigorous testing and development programme at Herberton, Irvinebank, Koorboora and Coolgarra. New leases were taken up: the Jumna Extended, Falstaff, Southern Star, Hamburg, Zeus, Alhambra South, Bolivia, White Rose, Tornado East, Dixon, King Edward, Sunlight and many more; and an aerial ropeway

71. See MWO 12B/35 passim, Q.S.A. for details of leases; *Wild River Times*, 23 June 1896; *A.R.* 1897, p.104; 1902, p.71; 1904, p.72; 1905, p.69.
72. Gurrumbah School File EDU/21181 Q.S.A.
74. MWO 12B/36, pp.58, 59, 64, 72, 80, 87, 92; MWO 12B/37, pp.5, 36, 42, 47, 50. Q.S.A.
costing £3,500 was built to the Governor Norman mine. Although low grade, the Governor Norman yielded £61,400 worth of tin for the Irvinebank company between 1905 and 1914. As if the fall in metal prices and decrease in assay values were not pressing problems enough, industrial dislocation, caused by dissension between mine managers and recently unionised miners, became widespread. Because it paid out so much of its profits in dividends, Vulcan mine, previously considered a small man's show in which the local working miner could own a small parcel of shares, was not particularly vulnerable. Stannary Hills was also affected by strikes which forced the closure of the Rocky Bluffs battery in 1909, but the company cushioned the impact by railing ores to Irvinebank for treatment. The Amalgamated Workers' Association was responsible for a demarcation between entrepreneurs and miners quite alien to past experience and in no small way contributed to the field's demise.

After the troubles of 1907-08, the fate of the Irvinebank company was sealed. Diminishing returns and continuing low metal prices might have been offset temporarily by selective mining and reduced operations, but it was unlikely that sufficient profits could be earned to meet outlays on communications. While Irvinebank was disadvantaged for over two decades by the lack of economical transport, it was the decision to build a tramway from the Stannary Hills line to the Irvinebank smelters, thirteen and a half miles through rugged terrain, which over-taxied company finances. Construction commenced in August 1906 under the supervision of Robert Frew and the lien finally reached Irvinebank in March 1907, the official opening taking place on 29 June 76. Compiled from A.R. 1905 to 1913 inclusive.

77. The rivalry between the Stannary Hills and Vulcan companies was keenly felt by Moffat, but sound business principles dictated that his Irvinebank company should treat Stannary Hills' ores as the Vulcan's output was declining. For details of production and values of tin produced by the companies, see A.R. 1905, passim.

at a huge picnic at the All-But, close to the town.\textsuperscript{79} Between 1900 and 1908, over £175,000 was outlayed on private railways by companies in which Moffat and the Irvinebank company were principal debenture holders. Ironically, Moffat, whose hallmark was patience and caution, over-committed the Irvinebank Mining Company financially in his forays after the retreat of the Chillagoe Company.

At the Queensland National Bank's insistence, Moffat was replaced in 1912 as manager of the Irvinebank company by his longtime partner, J.H. Reid. Aged, benevolent and surrounded by relatives within the company, he urged Reid to accept the Bank's demands to avoid its direct intervention.\textsuperscript{80} Changes in management strategy were not slow in coming. Unpopular retrenchments ordered by Reid highlighted Moffat's reputation as a generous employer. To provide full employment, Moffat had been operating all outlying districts on a small profit basis. Stream tin operations at the Tate Tin Mines were maintained even though output was usually around thirty tons.\textsuperscript{81} The Irvinebank company retained ore buyers at Lyndbrook and Almaden railway stations for the tin scratchers of Fossilbrook, Fluorspar and other remote sites even when tin prices were low, but Reid changed these arrangements. Moreover, he adopted a policy of realising and divesting assets to liquidate outstanding debts. To this end, low grade ore dumps throughout the field were scoured to maintain continuous milling at all treatment works. Reid's strategy was interrupted by the collapse of the European market in 1914, forcing the shut-down of mills at Irvinebank, Koorboora, Wolfram Camp and Mount Carbine; but undeterred he and Moffat successfully negotiated government takeovers of the Mount Garnet and Mount Molloy railways, and a £20,000 assistance grant for the Irvinebank operations. Finally, Reid liquidated the

\begin{itemize}
\item \textsuperscript{80} O.H. Woodward, Autobiography, Unpublished Manuscript, p.128 (in possession of his brother-in-law, Brisbane).
\item \textsuperscript{81} A.R. 1907, p.72; 1908, p.75.
\end{itemize}
Irvinebank company and disposed of the battery, smelter and tramway at Irvinebank to the state as a public enterprise in 1919. This revealed no less than £37,447.15.4 owing to Moffat personally. 82

John Moffat presided over a mining empire which exported more than £4 million worth of base metals. His continuous prospecting, development of remote lodes and near monopoly of the prime leases made his name synonymous with mining in the far north for thirty years. It was partly due to his style that the Walsh and Tinaroo fields held the attraction of prospectors, miners and companies co-existing; and over the years several thousand men relied on Moffat for their livelihood: the Irvinebank company alone had seven hundred workers on its payroll in 1907. It was no coincidence that mining withered and contracted after his departure from the region.

82. Debts due to the Estate of John Moffat, enclosed with inventory. N.S.W. Supreme Court Probate Documents No. 97758.
"THEY STUMBLE THAT RUN FAST": IN THE WAKE OF THE CHILLAGOE COMPANY

Dr. K.H. Kennedy

At Chillagoe, one hundred and forty miles west-north-west from Cairns, tourists are invariably impressed by the ruins of the smelters and the weathered flue running up the hillside to an imposing brick stack which stands as a monument to the most ambitious mining undertaking in North Australia prior to the rise of Mount Isa. The Chillagoe Company, launched late last century, dominated base metal mining in the north in the pre-World War I years. When formed, it was one of the largest companies in the country: only the British Broken Hill company, the Broken Hill Block 10 company and the Sulphide Corporation matched its authorised capital. It built nearly 300 miles of railway, a huge smelting complex and controlled mines over an area of 10,000 square miles. Its enterprise attracted the attention of Melbourne and London investors; and its failure and eventual collapse after no fewer than four financial reconstructions had severe repercussions on the northern mining fields. In sixteen years, the Chillagoe Company accumulated losses of £5.8 million, but its activities also spurred other copper developments at Mount Garnet, Einasleigh, Mount Molloy, O.K. and Cardross. But for Chillagoe, these mines would have remained undeveloped because of their remoteness and would never have attracted the substantial capital investment to open up the lodes. Their history reflects the fortunes of base metal mining at the turn of the century, and reveals many of the factors common to the Australian copper industry which caused the closure of over half the mines in this country by the outbreak of war.

In his 1898 annual report, P.F. Sellheim, Under Secretary for Mines, lamented that the development of Queensland’s mineral resources was jeopardised by unscrupulous promoters and naive speculators chasing windfall profits. Although conceding the need for substantial capital investment in North Queensland, he was greatly troubled by the increasing tendency among Melbourne and Adelaide promoters to float public mining companies before testing and developing even the surface
ore bodies. Too often had he witnessed instances "where not one-tenth of the subscribed capital found its way into bona fide mining operations". Instead, promoters were receiving the lion's share of the subscribed capital, "as a rule out of all proportion to the intrinsic value of the undeveloped property". Such practices he claimed led to "an unavoidable failure from the start"; and "when to this unreasonable handicap the frequently unnecessary and exorbitant directors' fees and numerous other items of this kind [expensive machinery] are added", the likelihood of many public mining companies rewarding their shareholders was very slim.¹ Sellheim's remarks, timely because of the speculative frenzy in base metal scrip which had gripped southern investors, went virtually unheeded. The 1898 Mining Act, consolidating laws and regulations, was deemed suitable restraint on shysters and adequate protection for management, miners and investors. Sellheim died soon after, in October 1899, but before long his successors were to be plagued by malpractices, such as the North Chillagoe Mines Scandal,² and misfortunes against which Sellheim had cautioned. Indeed the fate of the high-flying Mount Garnet company epitomised Sellheim's grievance.

Mount Garnet, one of Queensland's early copper finds, was located in 1883 by Albert Vollenweider, who secured a freehold title to the property. Seven years later, it was acquired by John Moffat, only to lie idle until the resurgence of copper prices in the late 1890's. Eventually, favourable geological reports and new world demands for copper influenced Moffat to open up the Mount Garnet lodes. In late 1896 a small party of miners were put to work on the outcrops, and, in October 1898, Moffat and his Melbourne-based associates in the Chillagoe venture launched the Mount Garnet Freehold Copper and Silver Mining Company.³ The authorised capital was £200,000 in £1 shares, of which

¹ A.R. 1898, p.1.
³ For details on the registration of the company, see, Company File 288 Book 9, Q.S.A.
P53: Dam and Pumping Station at Chillagoe Company's Smelting Complex

[J. Parsons]
96,000 were issued as fully paid to the vendors in exchange for the property. Some 35,000 shares were held in reserve, thus leaving 69,000 shares for public subscription to raise working capital. The board of directors comprised some of the most reputable men in Australian mining history: Chapman and Moffat of Chillagoe Railway and Mines Limited; Harvey Patterson, a director of a number of Mount. yello companies, and one of the original Broken Hill magnates; I. Neal Wigg, whose interest closely resembled Patterson's; Colin Templeton, a Melbourne accountant and member of the Adelaide Prospecting Syndicate which pegged Kalgoorlie; and J.T. Lempriere, merchant and mining investor, who was also a principal of Great Central Freehold Mines Limited. But from its very inception, the Mount Garnet company reflected the anxiety of the Melbournians to reap profits, not in actual mining, but on the share market.

Throughout 1899 the company engaged about 150 men on sinking and driving to test the ore reserves. Six shafts aggregating 440 feet were sunk; and nearly 1200 feet of tunnels and drives were completed. By early 1900, it had established an ore body ninety-six feet wide, but of uncertain depth. Assays were encouraging and it was estimated that reserves totalled over 200,000 tons of ore averaging three to twenty-five percent copper with fifteen ounces of silver to the ton. In his characteristically cautious manner, Moffat envisaged utilising abandoned smelting plant from Montalbin and Glen Linedale, but in time the board scuttled his plans and opted to install new large smelters, with 200 tons daily capacity, and powerful mining machinery. In addition, they proposed to dam Return Creek to provide adequate water for the treatment plant. These decisions were the first step in perilously over-capitalising the company as, aside from the reservoir, the smelting plant cost £40,000 and nearly £30,000 was absorbed in equipping the mine with electric light above and below ground, electric firing machines, self-closing doors and safety cages. Multi-tubular boilers, a powerful double

4. See chapter 6 for further biographical details.
cylinder hoisting engine, stone crushers, air compressors, a sawmill, a substantial brick assay office and a water pumping station represented an unparalleled extravagance in the Walsh and Tinaroo district. Significantly, ore reserves at grass in readiness for the initial smelting campaign were meagre; sinking and driving had slowed considerably; and most important no increase in the estimated ore reserves was recorded.  

The transport factor, which troubled Moffat from the very outset, became the focus of attention. Mount Garnet's isolation presented great difficulties as the closest railhead was Mareeba, 80 miles distant. Machinery had to be hauled by wagon over makeshift roads, while coke and essential supplies were carried by camel from Lappa Junction, temporary terminus of the new railway to Chillagoe. To complete their grand design for the Mount Garnet mine, the board decided to build a railway from Lappa Junction to Mount Garnet in conjunction with the Chillagoe Company. Although the two companies had interlocking directorates enthusiastic to monopolise all mineral traffic in the northern districts, there were two obstacles to be surmounted. First, any formal agreement would require legislative sanction: Robert Philp, Premier and Secretary for Mines, who had championed the Chillagoe railway concession, obliged the board by introducing a bill authorising a branch line to Mount Garnet, which received assent in late December 1900. Second, while under the terms of the formal agreement the Chillagoe Company was responsible for the ten mile section to Halpin's Creek, the Mount Garnet company was committed to raise capital to meet the balance. By the issue of debentures totalling £56,700, bearing a

7. The agreement, dated 19 December 1899 authorised the Chillagoe Company to construct and maintain a branch railway from Lappa to a point ten miles in the direction of Mount Garnet. The Chillagoe Company was given a seven year carriage monopoly on all traffic; and was permitted to charge rates up to 50 percent higher than government rates. For details of the agreement, see "Agreement as to rail traffic: The Chillagoe Railway and Mines Limited with Mount Garnet Freehold Copper and Silver Mining Company Limited", *Blake and Rigall Papers*, University of Melbourne Archives.

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P56: Mount Garnet Reverbatory Furnace, with Wade's coke-laden camels in foreground

[A.R. 1902]
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Hefty six percent interest, the project was finally secured. However, the decision was to contribute substantially to the company's liquidity problems.

For nearly eighteen months the stock market was optimistic: "Garnets" steadily increased from 60/- per share in June 1899 to peak at 84/- per share in October 1900. But rumours that all was not well weakened confidence and initiated a slide in share quotations. Whispers of high zinc content in the ores and of financial mismanagement hastened the run. The directors tried to stem the bear market by denying that Mount Garnet ores were refractory and emphasising that delays in the smelting campaign were the result of a change of policy by the metallurgist to gear the plant for more efficient treatment of ores. Their painstaking explanations were partly negated, however, by efforts to raise additional capital. In October 1900, 12,500 reserve shares were placed in London to provide more working capital: an option was signed on the parcel at £3 per share, which would yield £49,500 less brokerage and other charges. As the smelter was not blown in until January 1901, the option was re-negotiated on less favourable terms. In event only 2,500 shares were taken up, which the directors passed off as "owing to the collapse of the London market generally". But the implications of their failure to place the balance of the reserve shares were ominous: there was a shortfall of funds for the railway and any profits earned in 1901 would have to be allocated to redemption payments on capital plant.

Mount Garnet's prospects improved in 1901. After a faulty start, the smelters treated 35,616 tons of ore for copper and silver valued at £163,000. The railway was proceeding at a rapid pace, having been opened to California Creek, sixteen miles short of its destination.

Over 700 men were employed by the company whose reputation was enhanced considerably by official comments: the Under Secretary for Mines noted that Mount Garnet was "the foremost copper mine in the State", while the local mining warden forecast that "the life of this mine is assured for very many years". But to the despair of the directors, the year ended on a sour note. Copper prices fell from £72 per ton to £48 per ton at a time when large parcels of copper matte were in London awaiting realisation. Moreover, in late October 1901, the mighty Chillagoe Company collapsed, sending shock waves through the northern mining industry.

Despite these setbacks, the company sustained operations throughout the following year. In total, 43,284 tons of ore were treated for 2,057 tons of copper and 486,651 ounces of silver, valued at £164,267. Suddenly, but not unexpectedly, the end came. The main shaft, down 181 feet, tapped a sizeable ore body - but it was refractory, high in zinc and thus uneconomic to treat by conventional means on site. Further, the open cut section of the mine collapsed, creating another financial impost if clearing work was to be undertaken. Finally, the company admitted it was unable to meet its interest and redemption commitments. As the local warden recorded, "mine authorities are not in a financial position to take the line over from the contractors who have temporary control of freights and fares". To exacerbate matters, drought caused a severe outbreak of typhoid in the township: sixteen people died after drinking water from the nearby creek into which the community's sewerage was emptied. A sympathetic pledge by the company to harness the huge Return Creek reservoir with a five mile long pipeline provided little solace for the despondent community.

15. Ibid., p.68.
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Predictably, the morass of mismanagement attracted recriminations from shareholders. At the company's annual meeting, angry investors clashed with embarrassed directors, resulting in the removal of several board members. Soon after, the debenture holders and the railway contractors made overtures for a reconstruction of the company. In response, the new chairman, J.M. Higgins, a business associate of Chapman and one time metallurgist at the Dry Creek works in South Australia, advanced a scheme to float a new company by writing down existing capital, extending the debenture conversion date and establishing a sinking fund. Higgins acknowledged that the old company was heavily over-capitalised on machinery and smelting plant, that exploration had been sadly neglected and that pressing commitments to a £15,000 bank overdraft would have to be discharged. However, he was confident that, in view of a favourable report by a mining expert, Peter Brander, which described prospects as "very encouraging", he could make amends. After all, even the Under Secretary for Mines suggested that the crash and past "mistakes and misfortunes [did] not necessarily imply condemnation of the mines".

Optimism was not enough. Unable to place 100,000 shares which was a condition of the reconstruction proposal, the company was compelled to bear the ignominy of the railway's debenture-holders issuing instructions to foreclose. The mine and smelting plant thus passed to the contractors, Willcocks and Overend. The mine was leased to the New Chillagoe company, and the smelters were dismantled, later to be removed to O.K. The township was virtually deserted as workers and their families drifted to other copper centres throughout the north or to the sugar-cane districts on the coast.

Copper lodes at the confluence of the Einasleigh and Copperfield rivers were located and tested by Richard Daintree as early as 1867. Near the surface outcrop, a shaft was sunk to crosscut the ore body at

17. A.R. 1902, p.17.
a depth of thirty feet and a drive proved the lode of "spongy metallic copper" some twenty-three feet in width. Despite the high copper content of the samples, Daintree abandoned the mine as transport costs in so remote an area dictated that the deposits could not be worked at a profit. The government geologist, R.L. Jack, inspecting the mine thirty years later, acknowledged this major obstacle. But the advent of the Chillagoe Company gave Einasleigh a new lease of life. In 1899, British capital financed new work, the erection of winding gear and a small water-jacket blast furnace.

Einasleigh Freehold Copper Mines Limited, registered in London, had an issued capital of £180,000, but a working capital of only £40,000 as the properties cost £140,000 to acquire. In 1901, it engaged seventy men and treated over a thousand tons of ore for copper and silver valued at £5,010. The enterprise, however, was shortlived. Operations were suspended in March 1902, partly because of the slump in copper prices, and partly because of extravagant management and over-capitalisation. Outlays on freight alone absorbed the profits from ore treatment: the conveyance of coke by camel from Almaden cost £14 per ton; lime cost £2 per ton; hauling copper matte to the railhead cost £7 per ton, which, when added to £5 per ton smelting costs, wages, and expenditure on the mine, rendered the venture uneconomic at prevailing copper prices. Moreover, the London board incurred unwarranted expenditure on surface plant, a manager's residence, imposing company offices, and even a traction engine which was abandoned for want of suitable roads, aggregating nearly £50,000. With nearly eighty percent of its issued capital allocated to the mine's purchase and the working capital squandered by an absentee board, the company suffered from the same pitfalls as many Australian mining companies by neglecting prospecting and mine development, and overcapitalising the properties.

20. Ibid.
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The Einasleigh company's major obstacle was still transport. In 1901, it commissioned a survey for a tramway to connect the mine with the Chillagoe railway at Almaden, and the following year, despite the mine's closure, approached the Queensland government with a proposal to construct the line, arguing it would benefit the entire Etheridge region. W.H. Woodhead, the company's managing director, suggested that should the government guarantee interest on half the cost of the line, the company would provide free mail services from Almaden to Georgetown, and accede to a right to purchase on favourable terms. Two classes of debentures would be issued, totalling £300,000, secured by mortgage over the property and the railway, to finance the scheme.21 Having already suffered political harassment over his private railway policy and the embarrassment of the collapse of the Chillagoe and Mount Garnet companies, Robert Philp refused the offer.22 Twelve months later, the Einasleigh company submitted a further scheme to connect the mine by railway to Croydon, sharing half the cost with local authorities en route, under the Railway Guarantee Act, but the government again declined.23 Within months, however, the new Morgan administration entered into a series of drawn out negotiations with the Chillagoe Company to construct a railway to the Etheridge goldfield.

For nearly five years, Einasleigh remained idle. Finally in 1907, with the boom in base metal prices and the commencement of the Etheridge railway, the district revived. The Einasleigh company was reconstructed as New Einasleigh Copper Mines Limited. With a working capital of £41,000 and an additional eighty acres of leases adjoining its freehold property, it was confident of success despite a financial commitment inherited from the old company of £32,000 in

mortgage debentures at six percent to be discharged by December 1911. The board announced its determination to emphasise prospecting and mine development in its first year, although work was hampered when all miners deserted to the new rush on the Oaks goldfield. When the government geologist, W.E. Cameron, visited the mine in early 1908, he observed that the main shaft had reached a third level below 200 feet and that cross-cutting had revealed an extensive lode below the 170 feet level. Large sums were expended, but still no significant tonnage was despatched to Chillagoe. However, during 1909 and 1910, output increased remarkably: over 31,000 tons were railed to the Chillagoe smelters, and the location of a new ore body at the third level confirmed Einasleigh's status as an important copper mine. These developments gave rise to new enthusiasm, and the London directors immediately revised their policy.

Gambling on projected improvements in copper prices, the board outlaid large sums on a new headframe, new boilers, a new compressor and water pumps, new offices, and a rail siding. Further, it ordered an elaborate concentration plant, including an Elmore flotation unit, at a cost of £10,000 to treat sulphide ores on site. No sooner was the plant installed than it proved a failure, financially crippling the company. But as the Chillagoe Company was relying heavily on Einasleigh ore to sustain its smelters, all was not lost. Unable to raise additional capital, the directors sold the mine to the Chillagoe Company in late 1911 for £35,000 in cash, 170,000 shares paid to nine shillings and the assumption of the debenture debt. The Einasleigh board welcomed the bargain, while the Chillagoe

27. A.R. 1911, p.78.
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directors were confident that they had made a sound investment. 28 Between late 1911 and 1913, production figures certainly seemed to vindicate their judgement: Einasleigh was the mainstay for the Chillagoe smelters providing 15,793 tons in 1911, 24,418 tons in 1912 and 24,480 tons in 1913. However the end was at hand.

When the government geologist, L.C. Ball, visited the mine in late 1913, he observed that the demands on Einasleigh were "indirectly the cause of its undoing, for in order to keep up with the smelters' requirements, development was neglected". 29 The daily production rate had decreased by fifty percent, and new work at lower levels was economically marginal. Because the original outcrops were near or in the bed of the river and thus subject to flooding, the main shaft had been located on the elevated south bank adjacent to the footwall. As the ore shoots dipped away from the vertical shaft, cross-cutting at successive levels involved increased distances to the ore bodies and thus higher mining costs. All reserves had been exhausted above the 400 feet level, and, in Ball's words, costs were "alarmingly high". A twenty percent fall in copper prices forced the company to close the mine on 18 August 1914. 30 The closure of the Chillagoe Company and the dislocation of the metal market after the outbreak of war plunged the region into depression. Only a government take-over could revive mining, and yet four years later, the local mining warden lamented: "it is regrettable that while high prices were ruling for individual metals, opportunity could not have been embraced for working the Einasleigh". 31

As an asset of the Chillagoe Company, whose debenture-holders were negotiating with the Queensland government for a state take-over, the mine's potential was closely scrutinized by parliamentary committees

of inquiry until finally in November 1918, it was acquired along with the Chillagoe smelters and the railway network as a state enterprise. In 1919, Einasleigh was re-opened by a work force of 80 men. A shortage of explosives and then a strike in February-March 1920 delayed full production for a time. Despite large outlays by the state, Einasleigh yielded only thirty thousand tons of ore between 1920 and 1922. A harbinger of the failure of the Chillagoe state enterprise, the mine was abandoned in 1922, the machinery was dismantled and railed to Chillagoe and the two hundred people relying on the Einasleigh mine vacated the township. Only a few remained to service the outlying cattle properties.

The Mount Molloy copper mine is situated twenty miles north-east from Mareeba on the old teamster track to Port Douglas. Discovered in the early 1880's, it was first worked by Pat Molloy in 1885. Molloy shipped sacks of hand-picked oxides from Port Douglas to the Aldershot works at Maryborough and also to Germany. Why he eventually abandoned the mine is not clear, but low metal prices would have been a major factor. The mine was idle until 1891 when it was taken up after Molloy failed to renew his lease by the veteran prospector, J.V. Mulligan, in partnership with James Forsyth, later MLA for Carpentaria. They worked the mine at a profit before off-loading it to a Melbourne syndicate for £6,000. Samples shipped to Melbourne by one of the syndicate's directors proved virtually devoid of metal, and following further expenditure and an unfavourable report by an independent mining engineer, the company was liquidated. Ironically,

32. For details of Einasleigh as a state mine, see A.R. 1919, p.65; 1920, p.67; 1921, p.58; 1922, p.54.
33. There is conflict over both the discoverer and the date of discovery. The popular story has been that Molloy stumbled across the outcrops near Rifle Creek while searching for strayed bullocks. In a report compiled in 1905, it was asserted that it was one of Molloy's employees who noticed the outcrop and conveyed the information to Molloy. Similarly, G. Pike, *Pioneer Country* (Mareeba 1976), p.177 dates the discovery as 1885, while E. Weinberg, "Mount Molloy Copper Mines", Q.G.M.J. 6 (June 1905), p.270 claims it was 1883. Neither Bolton nor Lees indicate a date of discovery.
P59: View of the Einasleigh Mine [Q.S.A. A/9218]
they were within only feet of the ore shoot, and crosscutting would have revealed the lode.

Forsyth reclaimed the mine, but undertook little work until after the Chillagoe Company was floated. In 1902, he negotiated its sale to the Mount Molloy syndicate, comprising Moffat and his Irvinebank associates. Further testing revealed rich patches of thirty percent copper, and influenced the syndicate to undertake extensive mine development. With copper quotations steadily rising in the latter half of 1904, Mount Molloy became a hive of activity. Smelters capable of treating sixty tons per day were erected on Rifle Creek, and were connected to the mine by narrow gauge tramway. Mine development proceeded at a furious pace, and, to offset the level of expenditure, management despatched nearly 1600 tons of high grade ore to Europe which realised over £24,000. Estimated reserves amounted to 42,483 tons averaging nearly twelve percent copper. When the smelters were blown in during November 1904, there was universal confidence in the mine's future throughout the district.

To raise additional funds and to secure the syndicate's investment, the property was floated into a public company. Mount Molloy Limited was registered in Queensland on 28 April 1905 with a share capital of £100,000 in £1 shares, of which 40,000 were issued as fully paid in exchange for the property, and 20,000 were held in reserve. The balance were issued as subscribing shares, paid to fifteen shillings, which would provide a working capital of £10,000. 1905 was Mount Molloy’s peak year. 14,441 tons of ore were treated, yielding copper valued at £101,513. Flushed with success, the directors authorised the acquisition of a reverberatory furnace,

36. Ibid.
converters and new machinery costing nearly £12,000, and declared a 
£10,000 dividend.37 Similarly in 1906, 10,359 tons were treated, 
realising £98,891 worth of copper and a dividend of £15,300.38 The 
boom in copper prices offset the lower output for the year, and 
undoubtedly contributed to the subsequent managerial rashness. 
Confident of sustained returns for many years to come, the directors 
released the 20,000 reserve shares to an English syndicate for £27,500 
to finance a rail link from Mount Molloy to Bibhoora.39 By late 1907 
the line was nearing its destination; suddenly, the enterprise found 
its self in serious difficulties. The collapse of the copper market hit 
Mount Molloy hard.

Although Australian copper prices were dependent on the London Metals Exchange quotations, it was the United States copper market which dictated world prices and thus the London price. In 1906 world demand for copper reached a peak, and production was stepped up in the United States, Spain, Portugal, Chile and Australia to a record output of nearly three-quarters of a million tons. Fearful of over-supply, the New York money market tottered, sparking a slide in copper scrip in 1907. The slump was more unexpected than the price boom the previous year, and its impact impinged on all producers supplying the American and European markets. Mount Molloy's return for the year decreased to £63,740. Yet almost inexplicably, the directors declared a further dividend of £22,500, probably out of ignorance of just how serious the slump was.40 But worse followed. Ore reserves at depth petered out, and insufficient work had been undertaken to locate new ore bodies. In early 1908, the smelters ran a short campaign, and then closed down, coinciding with the completion of the railway.

38. A.R. 1906, p. 73.
40. A.R. 1907, p. 72.
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For the two hundred miners, smelterers and general hands, it seemed that Mount Molloy would follow the familiar fate of many northern mining settlements once the smelters closed. Fortunately, the company acquired valuable timber concessions in mid-1908, and thereafter concentrated on timber rather than mining. In 1909, the company acquired the bulk of shares in the small Anniversary mine near Herberton, gambling that a government railway would soon reach the old mining centre. It was to be a five year wait, during which time the Mount Molloy company reconstructed, increasing its authorised capital and revaluing its £1 shares at fourteen shillings fully paid. The exercise achieved nothing, and on the outbreak of war, the company went into liquidation, recovering portion of its capital by selling the railway to the Queensland government. The failure of Mount Molloy was a disappointment to Cairns businessmen who had formed a stock exchange in 1906 to transact base metal scrip in northern mines. At least, the O.K. prospects sustained their faith in the short term.

In contrast to the experiences at Mount Garnet, Einasleigh and Mount Molloy, O.K. proved a highly profitable mine, in fact the first copper show in North Queensland to declare a dividend and to consistently reward all of its shareholders from its output (rather than a few investors from share transactions). The O.K. lodes were not discovered until September 1901 when a local prospector, John Munro, was attracted by outcrops of black sulphides nearly fifty miles north-west from Chillagoe. After securing a prospecting lease, he formed a syndicate - O.K. Copper Mines Development Syndicate No Liability - comprising several local mining men: John Newell, MLA for Woobakara, Ted Torpy, mine owner and hotelier, and Acheson Overend, a principal of the contracting firm which built the Mount Garnet


railway. With an authorised capital of £45,000, the syndicate initially worked the rich surface ores by open-cut, despatching hand-picked parcels assaying over forty percent copper to the Chillagoe smelters.

In 1904, the O.K. directors resolved to expand their operations by smelting on site. The Mount Garnet smelters were acquired through Willcocks and Overend and reassembled near the mine. They were fired late in November and had the immediate effect of substantially reducing the impost of £3.10 per ton cartage on ores hauled to Chillagoe. Notwithstanding, there were still some 400 camels under Abdul Wade's charge engaged in transporting copper matte to the railhead at Mungana, and coke on the return journey. Unlike most copper developments, O.K. was financed from ore sales: only small sums of working capital were allocated to plant and equipment, and early profits were rechannelled into prospecting and mine development. The government geologist, R.L. Jack, testified to the success of their financial methods after an inspection in 1906:

Practically the only money put into the mine by shareholders was about £5,000 for the erection of the smelting plant, and this amount was paid out of the dividends.

Indeed, the cautious development policy and the economies practised by the directors paid off. Between November 1904 and October 1906, the second-hand smelter treated 23,400 tons of ore, yielding 3,580 tons of copper matte. After spot sales to the influential German metal-brokers, Aaron Hirsch and Sohn, the company announced successive dividends totalling £75,600.

O.K. shareholders were fortunate that the directors were locally based and scarred from over-enthusiastic investment in earlier silver

46. A.R. 1906, p.73.
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and tin mines in the Herberton region. Their creed was financial conservatism, as when the shortlived boom in copper prices occurred in 1906, rather than lining their own pockets, they used the profits to strengthen the company. Only one dividend of £16,872 was declared in 1907; instead £35,000 was diverted to a capital reserve fund. Further, to reduce haulage costs, the directors purchased ten traction engines to replace the camel strings.\footnote{A.R. 1907, p.71.} For a short time, their wisdom was questioned as the wet season temporarily immobilised the fleet, and the remaining horse-teams were seriously overworked. However, the 1908 balance sheet provided ample evidence that, in the long run, traction engines fulfilled their purpose.

The township mushroomed after on-site smelting commenced, but always retained "a raw edge of impermancy". As Geoffrey Bolton described the rough-hewn, hessian and galvanised iron settlement that was home for two hundred and fifty miners and smelterers and their families:

\begin{quote}
OK had the name of a brawling, noisy township, where even if a man could not be drunk for ever on liquor, love and fights he could if so minded, go near enough if he was willing to substitute two up for love.\footnote{G. Bolton, \textit{A Thousand Miles Away} (Brisbane 1963), p.292.}
\end{quote}

Law enforcement was scant; there was no gaol and the solitary policeman had to chain his few arrests to a tree. Fever, the scourge of northern mining settlements, took its toll. However, in time, public amenities including a primitive hospital and a school were constructed. With the advent of a Cobb & Co coach service to Mungana, O.K.'s isolation was tempered. As one reminiscence boasts: "C.D. Wardle made history in the North by screening moving pictures at O.K. in 1906".\footnote{Anon., "Mining Days in the Chillagoe District", \textit{Cairns Historical Society Bulletin} 90 (September 1966).}
K.H. KENNEDY

In 1908, the O.K. smelters treated a record 19,970 tons of ore, but the yield decreased to an average seven percent copper content. Despite the directors' efforts to further reduce realisation costs the pattern was repeated in 1909 when the average yield plunged to just over five percent. With the orebody mined to a depth of 260 feet and the surface shows exhausted, the company was taxing its capital reserves to maintain production. By October 1909, the future of O.K. looked bleak: following expensive litigation over its copper sales to the German metal brokers, labour disputes occurred; the employees, now unionised under the banner of the Amalgamated Workers' Association conducted a five weeks long strike before capitulating under management threats to abandon the mine. As it eventuated, only 4,245 tons of ore were treated in a short campaign to June 1910, when low returns influenced the directors to suspend work indefinitely. In his annual report for 1910, the local warden claimed that there were plans afoot to reconstruct the company to effect the treatment of low grade ore on a large scale, but this was only passing speculation and came to nothing. The northern-based directors were realistic: with the high grade deposits worked out, and low metal prices still prevailing, they recovered the mining equipment and dismantled the smelters. The township was soon deserted, left to the ravages of weather and termites. Periodically over the next two decades, small parties of gougers raised a few hundred tons of ore for treatment at the Chillagoe state smelters. When the state enterprise closed down in 1943, O.K. was left to its isolation.

The least known of North Queensland copper mines which sustained a township, smelting plant and a workforce of nearly three hundred at

52. A.R. 1910, p.43.

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its peak production was Cardross. The lodes, located thirty miles west-north-west of Chillagoe, were discovered by two of Moffat's associates, Arbouin and Harkins in 1897. Outcrops occurred along two distinct lines - the "'L' line" and "'A' line", and assays showed promising gold and copper contents. First known as Klondyke, then Bedford, the area was named Arbouin following the formation of a small company, Linedale West Chillagoe Limited, instigated by Moffat and his Chillagoe Company associates, Reid, Chapman and Knox. Throughout 1899 no fewer than ten shafts were sunk on the lines, averaging about sixty feet in depth, and about 1,500 tons of ore were raised and stacked. The mines remained under exemption until 1904 when Linedale West Chillagoe was absorbed by the Irvinebank Mining Company. Thereafter, the Chieftain, Lamington and Laverlock mines on the "'L' line" supplied small quantities of hand-picked ores to the Chillagoe smelters. At the end of 1907, with the fall in copper prices, the mines were abandoned, and the township of Arbouin was left to decay.

In 1909, Alexander Macdonald, whose Mammoth Copper Mines Limited was working leases on Pandanus Creek, interested a Glasgow syndicate, comprising the shipping magnate, Henry Allan and the whisky distiller, Buchanan, in the region. He promoted the Scottish North Queensland Exploration Company to work some of the mines, particularly the Chieftain. In 1911, Mammoth Copper Mines Limited, acquired the leases, and with a £40,000 personal investment by Allan, commenced development on an enlarged scale, erecting a water-jacket blast furnace and purchasing a fleet of traction engines. Soon after, the local mining warden reported ambitious plans to open-cut the Chieftain.

53. For early impressions, see R.L. Jack, "Chillagoe Mining District and Projected Railway", G.S.Q. publication 9, Brisbane 1898, pp.6, 12-14.
54. See Nash, 1902 Yearbook, p.411.
mine to yield an anticipated 5,000 tons of ore per month, which would provide many jobs for miners and swell the population of the small town of Cardross, about a mile south of the deserted site of Arbouin.

The Cardross smelter, relying on the Chieftain and Clansman mines, treated nearly 15,000 tons of ore for 3,000 tons of copper matte, (and a quantity of gold) valued at £100,000, between October 1912 and October 1915. At nearly every turn the company had to contend with adversities: high transport costs, a lack of facilities for converting matte after the closure of the Chillagoe smelters, the collapse of the copper market on the outbreak of the war, financial complications arising from absentee ownership, labour shortages and an inability to secure coke. In 1916, the smelters closed, and only small parcels of rich hand-picked ores were marketed to ore-buyers in Cairns to meet the wages of maintenance staff.

Three years later, it was rumoured that Cardross might revive. Macdonald proposed an amalgamation between Mammoth Copper Mines Limited and the syndicate which held the Mungana leases to secure sufficient capital to sustain a large scale enterprise. The re-opening of the Chillagoe smelters by the state, the tumbling metal prices and Allan's disinterest in investing more of his own funds defeated Macdonald's scheme. Allan was no doubt influenced by the results between 1912 and 1915 when the aggregate expenditure and cost of realisation was almost double that derived from the sale of ores and matte. Finally in 1921 the smelters and mining plant were dismantled and sold, and Cardross was abandoned.

57. A.R. 1912, p.41.
58. For details of production, see L.C. Ball, "The Arbouin Copper Mines at Cardross", G.S.Q. publication 261, pp.4-5, 66-7.
60. Ball, "The Arbouin Copper Mines at Cardross", p.5.
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The closure of the northern copper mines can be attributed to several factors: some were local unrelated events or developments; some were common to more than one enterprise; a few were general problems beyond the control of management. The collapse of the open-cut at Mount Garnet, the failure of the Elmore treatment plant at Einasleigh, the folly of Mount Molloy's directors declaring dividends before consolidating capital reserves, and the expensive legal battle between the O.K. company and the German metal buyers which cost the company nearly £20,000, were but some examples pertinent to individual ventures. More serious was the tendency to overcapitalise mines and to neglect mine development: the O.K. company was the most profitable because its locally based board of directors, freed from the pressures of southern and overseas shareholders, remained aware of these pitfalls. The other companies were overcapitalised in two respects - the valuation of the properties, and the surface plant and infrastructure. As base metal mines require greater financial outlays than gold mines to reach the production stage, the valuation placed on the Mount Garnet, Mount Molloy and Einasleigh properties by their promoters was out of all proportion to preliminary exploration costs and the ability of the known ore reserves to yield dividends on the nominal capital of the companies. At Mount Garnet, the vendors received 96,000 fully paid shares of the 165,000 shares issued; at Mount Molloy, they earmarked seventy percent of the company's capitalisation; at Einasleigh, they secured a similar percentage. This left the companies with insufficient working capital to test, develop and equip their mines. As a result of investor's impatience, surface plant usually received higher priority than mine

61. The case was reported in detail by the *Cairns Post* over three weeks from 23 February 1909.

62. The value conferred on the Einasleigh mine by the terms of the Chillagoe purchase in 1911 only compounded the problem of overcapitalisation.

63. G. Blainey, *The Peaks of Lyell* (Melbourne 1954), p.42 observed the characteristics of the boom at the turn of the century: "The practice of erecting machinery before testing the ore body was almost a first commandment...a company which refused to erect machinery might be left with a few shareholders who collectively were too poor to finance the high cost of mining...."
development to the long-term detriment of the show, which was yet another step towards overcapitalisation. As Danvers Powers, President of the Australasian Institute of Mining Engineers, remarked in 1905:

As an ordinary business transaction few men would go into a venture on the terms to be found in most prospectuses during boom time, and yet for some reason or other people are to be found who run head-long into such ventures.64

Remoteness and transport costs did impinge on profitability in varying degrees. Outlays on cartage, fuels, wages, explosives and machinery increased realisation costs and eroded financial returns on ores treated. In turn this influenced the mining of rich surface ores in the initial development stages, and compounded difficulties when metal prices slumped. Paradoxically, Mount Garnet and Mount Molloy constructed railways, financed by debentures, to overcome expensive camel and wagon haulage charges, but then were unable to meet interest and redemption commitments. O.K. and Cardross opted for traction engines but had to subsequently outlay sums for road improvements - this cost O.K. £10,000 alone in one year. World metal price fluctuations certainly made it difficult to devise long-term managerial strategies, but this was a recurrent problem throughout the base metal industry. Finally, the fortunes of the Chillagoe Company were significant for the smaller northern copper companies, whose existence was owed to its initial activities. Its collapse in late 1901 battered investors confidence, and together with its high custom smelting charges and right to levy rail freight rates fifty percent higher than government lines, persuaded the smaller companies to distance themselves from its orbit by erecting costly on-site treatment facilities. Its closure spelt the end for the two surviving mines, Cardross and Einasleigh demonstrating just how dependent the smaller mines were on the Chillagoe Company's infrastructure and activities. Ironically, had the Chillagoe Company adhered to its original intentions of attracting ores to its smelters by offering attractive financial inducements rather than undertaking mining in its own right to secure a monopoly over the region, it too may have had a different fate.


The Cloncurry copper lodes attracted interest in May 1867 when Ernest Henry announced his Great Australia mine. However there was little capital for mining investment to be had in the southern colonies, let alone Queensland which was gripped by a severe recession. Even the rich Peak Downs copper mine was struggling to fund new plant, and it was only an upward movement in copper prices which saved that mine from closure. Although only 140 miles from the port of Waverley on Broadsound, Peak Downs was handicapped by isolation. Remote Cloncurry, more than two hundred miles from the primitive ports of Burketown and Normanton on the Gulf of Carpentaria, was at a greater disadvantage.

* This paper is an abridged and revised version of "The Profits of Boom" from Lectures in North Queensland History, 3rd Series, James Cook University 1978, pp.1-34.

1. For details on the Peak Downs mine, see H.S., History of the Peak Downs Copper Mine (Brisbane 1888); A. Barnard, Visions and Profits (Melbourne 1961), pp.79-85.
Without adequate communications, Henry had little hope of attracting outside capital. He therefore decided to develop the mine at his own expense, but failed, though not before securing many other properties including Argylla and Mount Oxide which he converted to freehold. In 1884, a Glasgow syndicate acquired the Great Australia mine and commenced smelting. It produced less than 500 tons of copper abandoning operations after plunging into sulphides below the water level. It was fully a decade before a number of factors combined to revive interest in the Cloncurry field.

Rising copper prices, new discoveries to the north, west and south of Cloncurry, and the promise of a railway to the field combined

2. L.C. Ball, Cloncurry Copper Mining District, G.S.Q. publication 215, Part 1, p.9.

3. Details on the activities of the Cloncurry Copper Mining and Smelting Company are incomplete. W. Cameron, Recent Developments in the Copper Mining Industry in the Cloncurry District, G.S.Q. publication 153, has reproduced the following warden's returns:

<table>
<thead>
<tr>
<th>Year</th>
<th>Ore Raised</th>
<th>Value by Assay</th>
<th>Ore Smelted</th>
<th>Copper Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1885</td>
<td>1,340 tons</td>
<td>£18,920</td>
<td>253 tons</td>
<td>60 tons £3,400</td>
</tr>
<tr>
<td>1886</td>
<td>200 tons</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1887</td>
<td>1,010 tons</td>
<td>£12,500</td>
<td>190 tons</td>
<td>£7,500</td>
</tr>
</tbody>
</table>

An average of 250 men were engaged on mining, smelting and charcoal burning.

4. The price rises between 1895 and 1901 are attributable to many factors. The American authority, F.E. Richter, suggested enlarged consumption of copper, "electrical progress, notable activity in mercantile shipbuilding, the rise of the new German and American navies, wars and increased armaments". "The Copper Mining Industry in the United States, 1845-1925", Quarterly Journal of Economics, 41 (1926-27), p.265. Vivian, Younger and Bond's Metal Price Current records standard copper moving from £38.13.9 per ton in March 1895 to £79.5.0 per ton in April 1900.

5. In 1900 a British syndicate was given parliamentary sanction to construct a railway to the gulf, but it never materialised. This followed no fewer than three other schemes between 1880 and 1890 which temporarily promised to break Cloncurry's isolation.
THE CLONCURRY COPPER COMPANIES

with an inflow of British investment⁶ and the activities of Melbourne-based promoters eager to unlock another Broken Hill, Mount Morgan or Mount Lyell.⁷ Two mines in particular were closely scrutinised: Hampden and Mount Elliott. In 1897, Hampden was acquired by a Melbourne syndicate comprising the "Broken-Hillionaires", William Orr, William Knox and Herman Schlapp. They floated Hampden Copper Mines No Liability with an issued capital of £100,000 in 1,000 shares of £100 each, 200 of which were fully paid with the balance contributing and paid to £80. With meagre working capital, the company evaluated its reserves, opened up rich surface lodes, transported small parcels of high grade ore to the Wallaroo smelters for assaying and stockpiled hand-picked quantities. Their intention clearly was to off-load the mine at a favourable time for considerable profit. Simultaneously, John Moffat of Irvinebank fame secured leases over the Mount Elliott property, but performed little work aside from exploratory sampling. As Blainey has observed, the syndicates "refused to imitate the folly of the Great Australia in erecting smelters before the ore reserves of the mines had been proved".⁸

When the government geologist, Walter Cameron, visited the field in 1900, he noted a flush of activity:⁹ surface ores were being systematically mined and despatched via Winton to southern smelters;

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6. The inflow of British money was reflected in the new mining listings on the Melbourne Stock Exchange. In addition it was increasingly common to underwrite mining debenture issues in London, with the result that by 1914, many Australian mines were British controlled (though not necessarily profitable!). See A.R. Hall, The Stock Exchange in Melbourne (Canberra 1968), pp.225-40.


9. Previous published reports on the region included R.C.H. Uhr (1880-85), R.L. Jack (1885) and W.H. Rands (1895).
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the British and Colonial Railway Company was hawking proposals for a railway to Normanton; and new leases were being pegged in anticipation of a boom period. However, Cameron's conclusions were far from encouraging, as he claimed that aside from the Hampden lode, many of the prospects were "too small an extent ever to be of much value". Filed in December 1900, and coupled with falling copper prices and controversy over the land grant railway, the report served to retard the rate of development. It was a further five years before confidence was restored by short-run world market forces and favourable local events.

During 1905 copper prices rallied as world demand reached abnormal levels in Europe, the United States and even China. Output in the United States, which supplied nearly two-thirds of the world's copper, was hampered by labour difficulties, fuel shortages and transport problems. Prices rose from £55 per ton in late 1904 to peak at £109 per ton in March 1907. For established Australian producers, the price increase and strong world demand provided windfall profits; with British money readily available for investment in base metal mines, it also influenced the opening up of new or abandoned mines. In north-western Queensland, developments assumed a frenzied pace, moreso because of the state government's decision in 1906 to extend the railway from Richmond beyond Julia Creek on to Cloncurry.

10. See Queensland Votes and Proceedings 1900, III, pp.925-53. The syndicate included the Scottish directors of the Cloncurry Copper Mining and Smelting Company which had worked the Great Australia mine.

11. Cameron, Recent Developments in the Copper Mining Industry in the Cloncurry District, p.10.

12. World copper prices tumbled from nearly £80 per ton in 1900 to £45.2.6 in January 1902. This was due to a slowdown in European business activity and the release of inventories by large U.S. producers, especially the Amalgamated Copper Company which controlled about one-fifth of world production. See Richter, "The Copper Mining Industry, 1845-1925", p.272.

13. Cf: Chapter 7 for the impact of the price rises on developments and dividends of other northern producers.
P63: Great Australia Copper Mine [A.R. 1907]
THE CLONCURRY COPPER COMPANIES

Syndicates holding properties at Cloncurry now made their move, floating public companies which were registered on both the Australian and London stock exchanges. Hampden Cloncurry Copper Mines Limited was registered in Victoria in March 1906 to acquire from the Orr, Knox and Schlapp syndicate the Hampden mines for £100,000 in £1 shares, half of the registered share capital. Of the remaining 100,000 shares, 25,000 were earmarked for subscribers in Australia, 25,000 were issued to British investors, and the balance was held in reserve. The flotation attracted widespread interest: 57,523 applications were received for the Australian allotment and over 40,000 applications were lodged with London brokers. Soon after, Hampden Cloncurry greatly enhanced its assets by acquiring the promising properties at Duchess in return for 15,000 of its reserve shares and a £15,000 cash settlement. This deal reduced the company's working capital to a mere £35,000, a sum totally inadequate for the development of its base metal properties now capitalised to £165,000. The Mount Elliott properties were floated in Melbourne the same year, but within a few months the company was taken over and reconstructed by British interests. Mount Elliott Limited had a share capital of £750,000 divided into 150,000 shares of £5 each, of which 120,000 were issued as fully paid in exchange for its colonial predecessor's certificates, and the balance was placed in reserve. This new company fired the imagination of British speculators, and within only months they were paying more than fifty percent above par for shares in an enterprise which had produced little more than test parcels of ore.

L.C. Ball, the government geologist, recorded in his comprehensive report on the field a list of companies operating by early 1907. Over

15. *Ibid.*, 8 (January 1907), p.2. The Duchess mine was discovered as late as 1897; it was situated approximately fifty miles west from Hampden.
two dozen companies held properties in the Cloncurry district; collectively they boasted an authorised capital of more than £2,500,000.\textsuperscript{17} What made this upsurge in investment activity more remarkable was that it ran contrary to geological opinion on the value of the field; it occurred with the knowledge that there was every likelihood of a retreat in metal prices in the near future; and it ignored the problems of transport and treatment costs. As late as December 1908, the Under Secretary for Mines reiterated that "any dogmatic pronouncement as to its future is even now premature".\textsuperscript{18}

The financial structure of the Cloncurry copper companies was not sound. A characteristic of company promotion in the base metals industry prior to 1914 was the allocation of substantial equity to purchase mining properties, one which had serious implications for the financial viability of the enterprises: most companies were heavily over-capitalised and constantly in need of liquid funds for working operations. As A.D. Hall has observed, "it was not long before further capital had to be raised or the company reconstructed. Either of which processes usually meant that the capital of the mine concerned was increased".\textsuperscript{19} The first of the Cloncurry companies to experience difficulties was the Queensland Exploration Company which had reopened

\textsuperscript{17} There were seven companies with an authorised capital of £100,000 or more. They were: Hampden Cloncurry Copper Mines Limited (capital £300,000 – properties included Hampden and Duchess); Hampden South Consols Cloncurry No Liability (£100,000 – Hampden Consols mine); Macgregor Cloncurry Copper Mines Limited (£150,000 – Wee Macgregor and Walleroo); Mount Cuthbert No Liability (£240,000 – Mount Cuthbert group); Mount Elliott Limited (£750,000 – Mount Elliott mine); Queensland Copper Freehold Limited (£300,000 – Malbon, Argylla, Crusader, Dobbyn); Queensland Exploration Company Limited (£200,000 – Great Australia, Lady). See L.C. Ball, Cloncurry Copper Mining District G.S.Q. publication 215 Part 1, pp.14-15 and R.L. Nash, Australasian Joint Stock Companies' Yearbook, 1909 (Sydney 1909).

\textsuperscript{18} A.R. 1908, p.12.

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the Great Australia mine in 1907. It over-invested before the railway from Richmond was completed, and, heavily in debt, abandoned operations in 1909. Hampden Cloncurry Copper Mines reconstructed in July 1909 by increasing its capitalisation and concluding arrangements for a debenture issue to be secured against its proposed smelters. Similarly, Mount Elliott Limited was forced to issue its reserve shares in a financial reorganisation, while Mount Cuthbert No Liability credited its 160,000 issued shares at sixteen shillings and made new calls on shareholders in a reconstruction to enable exploration of its reserves. Mount Cuthbert was further disadvantaged for want of a rail link; at least Hampden and Mount Elliott had speedy communications, though they had to pay dearly for them.

By 1910, the southern portion of the field was a hive of activity. The Mount Elliott smelters were blown in during August and produced nearly £130,000 worth of copper in the remaining four months. Over the following three years, 126,822 tons of ore were treated, and returned to the company's shareholders successive dividends £147,518, £165,957.10.0, and £110,638.10.0. Despite a significant decrease on previous years of tonnage treated, the company was able to declare an

22. The railway from Cloncurry to Selwyn was constructed by the government, with the Hampden and Mount Elliott companies sharing half the cost of £200,000 in the ratio 40:60 respectively. Another company, Cloncurry Smelting and Railway Company Limited administered the arrangements.
23. E.K. Carter, et.al., The Precambrian Mineral Belt of North-Western Queensland, BMR bulletin 51, p.320 notes the treatment of 6,631 tons of ore in 1909. This was handled between May and July 1909, and was unprofitable; the plant was rebuilt and extended for the 1910 campaign.
eighth dividend of five shillings amounting to £36,879 in 1914. 24
Hampden Cloncurry Copper Mines had a less spectacular beginning. Its furnaces were not fired until March 1911, and over the corresponding three years, 85,266 tons of ore were treated, with an initial dividend of £140,000 being declared in 1913. Shares in the companies were attractive propositions for overseas investors and by 1912 British and French interests had cornered nearly all of the Mount Elliott shares in addition to large parcels in Hampden Cloncurry.25

The output of the mines, smelter returns and dividends were misleading in terms of the field's future. There was concern over the reserves of high grade ore. The Mount Elliott general manager, William Corbould, was authorised by the London board to negotiate with Hampden Cloncurry for an amalgamation to halt the fierce rivalry which was developing. He argued that it would ensure a more balanced development of the field and would rationalise overheads. But Hampden Cloncurry was luke-warm. Unhampered by London-based directors, and shareholders clamouring for dividends, it had consolidated its prospects in 1911 by acquiring many promising mines in the south and west of the field, and by enlarging its smelters and erecting a new converter plant. The breakdown in negotiations was signalled by the renewal of competition between the two companies to purchase additional mines, and a surprising

24. Details of the dividends are given in the Annual Reports of the Mines Department. It seems however that this eighth dividend was not reported, although the summary of the company's annual report in Q.G.M.J. 16 (March 1913), p.126 records it. Accordingly the conclusion reached by Blainey, Mines in the Spinifex, p.50 and the author's, "The Profits of Boom", p.27, that Hampden Cloncurry ultimately declared dividends £13,500 in excess of Mount Elliott is erroneous. I thank I. Hore-Lacy, C.R.A. office, Melbourne, for drawing my attention to the eighth dividend.

25. See A.R. 1912, p.49. Mount Elliott not only had a Paris office, but followed up the suggestion of a French director, Comte G. de C. de Venancourt, and had the company's annual report printed in French as well.
P64: An early view of the Mount Elliott Mine [A.R. 1908]
P65: Pouring Slag, Mount Elliott
[G.M.J. October 1912]

P66: Copper Converter, Mount Elliott
[G.M.J. October 1912]
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manoeuvre by Hampden Cloncurry in placing an additional 50,000 shares at £2.10.0 each with investors to acquire the Macgregor company's assets for £108,750 and to extend the railway to the Duchess mine.26 Mount Elliott responded by securing options over a number of mines in the north of the field; and by purchasing the Hampden Consols from William Orr.27

In late 1913, the impasse was broken: following a fire in the Hampden Consols, Corbould convinced the London board of the necessity to reopen negotiations with Hampden Cloncurry, not for an amalgamation, but to consider a joint venture to develop the struggling northern and north-western sections of the field, which still awaited a railway from Cloncurry.28 Corbould and Huntley, the Hampden Cloncurry general manager, inspected many northern properties, but the proposal again came to nothing. Instead, Mount Elliott acquired a number of mines through a subsidiary company. In early 1914, it floated the Dobbyn and Cloncurry Copper Mines Limited with a nominal capital of £400,000 in £1 shares. The parent company retained 190,000 of the 300,000 actually issued, with a two year option on the reserve balance.29 The new company lost little time securing the properties of the Queensland

26. Q.G.M.J. 13 (October 1912), p.552. Macgregor Cloncurry Copper Mines Limited held 237 acres in the Ballara district; it had reconstructed in 1911, devaluing its shares and placing new calls on shareholders. Remoteness was a major factor contributing to the company's financial difficulties. One mine which Hampden Cloncurry acquired at this stage was Trekelano: it was to prove to be one of the richest on the field.

27. William Orr was connected with Broken Hill and Mount Lyell. He was a director of Hampden Cloncurry, but was also chairman of Hampden South Consols Cloncurry No Liability. As Blainey comments: "The wily promoter, however, did not play true to form. His main interest was in the Consols mine and as Chairman he rightly believed that the shareholders should accept the highest bid.... Perhaps there were embarrassed faces when Orr took his seat in the Melbourne boardroom of Hampden Cloncurry a few days after the deal." Mines in the Spinifex, p.48.


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Exploration Company and Queensland Copper Freeholds Limited: these included the Great Australia, Argylla, Dobbyn and Crusader mines, and substantially boosted Mount Elliott's ore reserves when the oxidised zone at its principal mine was virtually exhausted. 30

When war broke out in Europe, the Mount Elliott and Hampden Cloncurry companies far outstripped their rivals on the field. The only other companies of significance were Mount Cuthbert No Liability which had delayed constructing its smelter, Corella Copper Mines No Liability struggling to earn profits from the Rosebud group of mines, St. Mungo Copper Mines Limited working the rich lode some eighteen miles south of Duchess, 31 and Mount Oxide Mines Limited which held properties claimed to be the best examples of secondary sulphide enrichment in the north-west, but which was hindered by the mine's remoteness. 32 For want of rail facilities the northern mines lay virtually idle.

The war conferred four years of prosperity on the Cloncurry district despite marketing, transport and labour difficulties. Copper prices soared from a high of £66 per ton in 1914 to £153 per ton in 1916. Thereafter, the Copper Producers Association, a government sanctioned cartel of the major Australian producers, agreed to dispose of their output to the British government at negotiated prices varying from £100 to £130 a ton. This permitted companies to mine and treat medium grade and blended ores at a handsome profit. The Hampden Cloncurry company declared liberal dividends during the war years,

31. St. Mungo Copper Mines Limited was registered in 1909 with a capital of £5,000 divided into 40,000 shares. In seven years, the company mined over 7,000 tons of high grade ore (averaging 23 per cent), which was treated at the Hampden smelters, and returned £15,000 in dividends to shareholders.
1915-18: £40,000, £140,000, £52,500 and £35,000, making a total disbursement since commencing operations of £437,500. Its smelters treated over a quarter of a million tons of ore in this period, averaging over 70,000 tons annually. Management pursued a policy of extending light railways to the company's mines to maintain regular ore supplies and to reduce transport costs. Indeed, the Hampden Cloncurry company was fortunate that its mines were located in the southern and south-western sections of the field, in contrast to Mount Elliott whose most promising mines were over a hundred miles to the north of its smelters.

Two additional smelters were erected to take advantage of wartime conditions. West from Cloncurry, the Corella Copper Company No Liability was active for nearly four years. Formed in October 1912 with a modest share capital of £12,500, this small company acquired properties nearby the Macgregor mines. After calling up more capital from shareholders through a financial reorganisation, Corella erected an aging smelter which between May 1915 and June 1917 processed nearly 24,000 tons of ore before the site was abandoned and the company liquidated. Lack of communications, technical and managerial inefficiency, and high labour costs resulted in a net loss of nearly £50,000 during its brief existence. 33

In the northern section of the field, attention focused on the Mount Cuthbert company whose mines included Mount Cuthbert, Kalkadoon, Mighty Atom, Orphan and Little Wonder. Since 1909 the company had been plagued by financial difficulties. Reconstruction in 1912 to erase a deficit of £15,000 provided only temporary relief. When the state government allocated funds to build a railway in two stages from Cloncurry to Mount Cuthbert, the company's directors formalised plans for the erection of smelters and the vigorous development of the mines.

Although the railway reached the Dugald River in 1913, the second stage took another two years, much to the company's despair. This delay partly contributed to a further financial reorganisation to raise £100,000 (£70,000 of which was a debenture issue) for the smelters and mining plant. Further, the company arranged for Mount Elliott to smelt Mount Cuthbert ores on tribute, and for nearly two years the added cost of rail haulage absorbed sums which Mount Cuthbert could ill-afford. The blast furnaces were eventually fired early in 1917, and in the initial campaign treated over 25,000 tons of copper ore. Had not labour disputes curtailed operations over the following two years, the company probably would have discharged its debts.

Mount Elliott Limited grappled with problems of ore supplies, transport and labour for most of the war. In fact the smelters treated only 49,848 tons during the three years, 1915-17; this was nearly 5,000 tons less than the year 1912 when the company was the field's pacesetter. Anxious to regain its position of paramountcy, the company empowered Corbould to draw upon its financial reserves to restructure operations. As early as May 1914 plans were completed for a central smelting works at Cloncurry to service the mines of the subsidiary Dobbyn and Cloncurry Copper Mines Limited. In January 1915, an amalgamation was effected with Mount Oxide Mines Limited, and representations were made to the state government to extend the railway to the mine via Dobbyn. (The railway was later vetoed by the Public

34. A reciprocal arrangement was envisaged where, if Mount Elliott relocated its treatment plant, Mount Cuthbert would smelt Mount Elliott ores. 13,000 tons of Mount Cuthbert ore was railed to Mount Elliott in 1915-16.

35. For details see Q.G.M.J. 15 (May 1914), p.231.

36. Mount Oxide Mines Limited was a British concern floated in 1912 to acquire the certificates of a Sydney-based company registered earlier the same year. The merger involved an exchange of 90,000 Mount Elliott shares for the company's properties. Ibid., 16 (June 1915), p.260.
Sixteen months later, Mount Elliott increased its capital by issuing another 100,000 shares of £5 each to finance further programmes which included the remodelling of its treatment works, greater expenditure on mine development, the erection of a refinery at Bowen and plans for a nearby smelter drawing on coal from Collinsville.37

As Blainey comments, "most people in the Cloncurry copper belt counted 1918 a wonderful year".38 The Mount Elliott smelters treated 77,452 tons of ore, Hampden 75,301 tons and Mount Cuthbert 36,466 tons; the total output was valued at £1,373,927 and but for industrial dislocation and fuel shortages would have been even higher.39 Mining authorities and Queensland legislators had predicted that world copper prices would remain at a high level for several years because of demands arising from postponed public works programmes and postwar reconstruction of manufacturing industry.40 How wrong they were! The armistice brought about new conditions, plunging the copper industry into recession. In December 1918, the British government (through the British Metal Corporation towards the end of the war) had guaranteed a minimum price of £100 per ton; suddenly it relaxed its controls,

37. For details, see *Ibid*, 17 (August 1916), pp.364-5; 18 (January 1917), p.3. The company pressed the government to open up the coalfields at Collinsville by constructing a railway from the Bowen State Mine to the port; it did not eventuate, however, until 1923.


39. The Queensland government was compelled to requisition the S.S. *Allinga* to haul coal from the Ipswich field to northern ports to alleviate the fuel shortages experienced by the mining industry.

40. For example, J.D. Ryan, President of the mighty Anaconda Copper Company argued in 1915 that because copper was being used on an unprecedented scale in domestic industry, and because Germany would have used its stocks in munitions and would be a force in the market after the war, prospects were excellent. See *Q.C.M.J.* 16 (December 1915), p.601; E.G. Theodore, Queensland Treasurer, suggested that prices "will be maintained at £90 per ton for years after the war is over". *Q.P.P.*, 1916-17, III, p.402.
allowing market forces to redetermine prices. The result was catastrophic for copper miners, prostrating the industry world-wide, as the price depreciated from £112 per ton to £75 per ton in only five months. For Cloncurry producers, this was little more than the cost of realisation.

1919 was a year best forgotten by the management of the three Cloncurry copper companies. Mount Elliott conducted a brief campaign in the first quarter, treating some 20,000 tons valued at £85,405. It was less concerned with profits than with the efficiency of operations which were staged to demonstrate to the directors and visiting American engineers and metallurgists that medium grade ores treated on a large scale could yield promising results. The Hampden Cloncurry and Mount Cuthbert companies postponed smelting until September and October respectively due to low prices in the first half of the year. In total value, the Cloncurry yield for 1919 was £1 million less than for the previous year.

A temporary rallying of world copper prices in 1920 afforded only ephemeral relief: copper quotations on the London Metals Exchange shot up to £122 per ton in February but had dropped to £72 per ton by December. The contraction in economic activity in Britain and the United States in 1920, the inability of Europe to rapidly recover from the war, and higher levels of copper production attained through

41. In the United States, Wilson fixed copper prices for the duration of the war. It was nearly three months before the copper market could reestablish quotations. See Richter, "The Copper Mining Industry, 1845-1925", p.285.

42. O.C. Herfindahl, Copper Costs and Prices: 1870-1957 (Baltimore 1959), p.92 comments: "Cessation of the war left the industry with inventories of copper, refined or in process, that were regarded as very large, especially in view of the suspected large quantities held by governments and the large quantity of battlefield scrap awaiting collection."

43. A.R. 1919, p.56.
P67: View of Reduction Plant Looking West, Hampden Copper Mine
[Q.G.M.J. September 1912]
technological improvements exacerbated the industry's plight. Cloncurry producers were also hampered by local disabilities. Investment capital diminished as dividends ceased; simultaneously realisation costs escalated as high grade surface ore bodies were exhausted. More important, overheads rose when the Commonwealth government imposed tariffs on mining machinery and when workers resisted wage reductions. A crucial factor was the shipping strikes of 1920 which held up supplies of fuel, explosives and machinery parts on the one hand, and denied access to markets on the other hand. That the Under Secretary for Mines should comment that the outlook for 1921 "was not encouraging" was an understatement. Certainly the production figures for 1920 did not reflect how critical matters were.  

Mount Elliott which had suspended operations in March 1919, was confined to development work at Mount Oxide while additional capital was being sought on a tight overseas market to finance new treatment processes for low grade sulphides. It turned to New York financiers through the U.S. firm of Hayden Stone and Company. The smelter superintendent visited America to study innovations, but died abroad, coinciding with the decision of Hayden Stone and Company to withdraw because of exchange rate handicaps. For its part, Hampden Cloncurry which had lost heavily on the 1919-20 smelting campaigns and which was relying solely on the Trekelano mine for ores was hamstrung. Like Mount Cuthbert which was burdened by liquidity problems, Hampden Cloncurry was forced to halt all operations after the Commonwealth Bank withdrew the wartime arrangements of advancing funds on copper awaiting export. Both companies and miners turned to the state for assistance, but the Theodore government, for a combination of

44. A.R. 1920, pp.1, 9, 56. In 1920, the Hampden smelter treated 69,598 tons of ore, while Mount Cuthbert's tonnage was 33,096.  
45. Ibid., pp.57-60.
reasons, was not sympathetic towards the companies, even though in reality, they alone had the capacity to resurrect a dying field. It was not until 1929, in one of the last actions of the McCormack administration, that a royal commission into the mining industry was set up to investigate and recommend government initiatives. But by then it was too late for the Cloncurry copper district, aside from the fact that the government had placed more faith in the Mount Isa silver-lead deposits and the potential of Mount Isa Mines Limited.

During the 1920's, Mount Elliott Limited vainly attempted to revive copper production in the north-west. In 1921, Corbould visited London seeking £360,000 for a new treatment plant and a railway to Mount Oxide, but met strong opposition from shareholders. He resigned, but was back in the north-west two years later inspecting the Mount Isa leases. Three factors were prerequisite to resuming operations: a rise in the price of copper to a minimum of £85 per ton; an amalgamation or at least a joint venture with Hampden Cloncurry to treat ores at a modern, centrally-sited smelter; and additional capital to finance

46. The Queensland Labor government, elected in 1915 pursued an active policy of state intervention in the mining industry. It created several state enterprises and concentrated efforts on assisting the gouger and working miner. In 1919, after setting up an assay office at Cloncurry, it made advances to gougers to encourage them to remain in the area, and later gazetted rail concessions on ores shipped to the Chillagoe state smelters and a minimum price of £75 per ton for copper. Certainly there was little cooperation or amicability between the former miners of the Labor cabinet and the large mining companies with overseas boards which operated in Queensland.

47. After inspecting the Mount Isa leases, Corbould floated Mount Isa Mines Limited and was its first managing director. He was instrumental in attracting new capital to the region and in negotiating the rail link from Duchess to Mount Isa. To underestimate Corbould's perception of mining operations on a large scale working low grade ores is to detract from the very success which Mount Isa can boast.
extensive development of the mines. A survey of the estimated reserves and the financial position of the two companies revealed that they were in difficult straits. Mount Elliott Limited claimed reserves of 1.876 million tons of ore with an estimated copper yield of 4.3 percent; Hampden Cloncurry's totalled 135,000 tons, 42,000 of which assayed 10 percent and the balance 3.1 percent, and 70,000 tons in fluxes. These combined reserves seemed adequate to support a substantial mining concern, but not without large sums of capital, and this is what both companies lacked.\(^{48}\) As neither was viable separately, a rationalisation of interests was the only hope.

Negotiations for an amalgamation were conducted, although the geographical separation of the two boards of directors delayed any prompt agreement. In March 1925 a draft scheme for an amalgamation on the equity basis of Mount Elliott 65 percent and Hampden Cloncurry 35 percent was approved in principle, but was soon after jettisoned when the former board held out for better terms. It had been able to acquire through Brandeis, Goldschmidt and Company the Mount Cuthbert properties and plant for an undisclosed sum, certainly much less than the £500,000 valuation.\(^{49}\) This move strengthened Mount Elliott's bargaining position as the company's reserves were now increased by 193,500 tons assaying \(4\frac{1}{2}\) to \(7\frac{1}{2}\) percent copper, almost double Hampden Cloncurry's reserves. In addition, it effectively isolated Hampden Cloncurry in the southern section of the field where only the Trekelano mine was considered prize-worthy. It can be suggested that it was a calculated manoeuvre to force its old rival from the region, as Mount Elliott abandoned negotiations shortly afterwards. Coming as a shock

\(^{48}\) For details of the financial positions of the companies, see *A.R.* 1923, p.52.

\(^{49}\) Mount Cuthbert had raised £56,000 extra from shareholders in 1919, and attempted a further financial reconstruction in 1922. However, continued annual losses, low metal prices and pressing debenture commitments forced its liquidation. *A.R.* 1923, p.52; 1924, p.52.
even to the board of Hampden Cloncurry, which detected perfidy in Mount Elliott's strategy, there was little alternative but to capitulate. Hampden Cloncurry offered its assets for sale by tender in 1926, and Mount Elliott acquired an option over all but the Trekelono mine. The company was struck from the register in 1928. Ironically, Mount Elliott Limited, which had strived so hard since 1912 to secure a monopoly over the field, was never able to take advantage of it, having strained its credit to the limit.

In 1926, still flushed with the success of their coup, the Mount Elliott board announced plans for a metallurgical plant at Cloncurry to treat ores by an electro-chemical process. A minor financial reorganisation was effected early in 1927 to develop the outlying northern mines and to defray the £80,000 expended on the new works at Cloncurry. The treatment plant, however, was never commissioned and lay idle for three years, ostensibly because metal prices remained depressed.

Finally, in 1929, the Mount Elliott board resolved to increase the capital of the company to £1,750,000 by issuing 800,000 preferred ordinary shares of 10 shillings each, underwritten by New Consolidated Goldfields Limited of London. The offer to subscribers was accompanied by a statement on negotiations with the Queensland government for a road from Dobbyn to Mount Oxide, and special freight rates, in addition to pledges of official support for a petition to the Commonwealth seeking exemptions from duties on machinery imports. In early 1930,

50. Ibid., 1926, p.52.
51. Blainey asserts that the company "had infringed a foreign patent", but no mention of this reason for closing down the plant can be found in official sources, which indicates that the cost factor influenced the decision. There is however mention of planned modifications in 1928 and hints in the 1929 annual report of "new factors involved" whereby the general manager "found [it] impossible to carry out the programme as originally laid down". Q.G.M.J. 3 (February 1930), p.44.
52. Ibid., 30 (January 1929), p.1.
P70: Mount Elliott's Metallurgical Plant at Cloncurry [Q.G.M.J. June 1927]
the company's annual meeting was informed that plans for bringing the field into active operation again had been further deferred on the advice of the new general manager, partly because the government concessions were not forthcoming, and partly because a reassessment of copper prices and overheads rendered the proposition financially dubious. The additional capital raised was redirected into equity in the South American Copper Company Limited, while tribute arrangements were made with local gougers to work the Cloncurry mines. When the extensive inventory of plant and machinery was acquired by Mount Isa Mines Limited for a mere £2,300 in 1943, the delusion of a mighty revival of the district was finally buried. Mount Elliott Limited was liquidated in 1953, the very year Mount Isa fired its new copper smelter.

In retrospect, the failure of the Cloncurry copper companies can be attributed to a number of factors. Clearly, movements in world metal prices were beyond the control of the companies: expanding world output in the 1920's kept copper prices so depressed that in 1932 the giant American producers were obliged to request tariff protection. Labour disputes also cost the companies dearly, but all mining enterprises in Australia were afflicted by labour problems in the decade following the outbreak of war. Strikes affected output per unit of capital invested, causing the 1930 Royal Commission to remark not only that Australia experienced extremely high production costs but also that labour constituted the highest proportion of such costs. Its conclusions, however, were balanced, asserting that "during the history of mining in Queensland extreme conditions imposed by labour have had the effect of closing certain mines, but too often labour difficulties have been used to justify the inevitable

closure of some company that in any case would have been unable to carry on".54

Notwithstanding, there were flaws in management strategy from the outset. First, Mount Elliott's decision in 1908 to construct its smelters at Selwyn was shortsighted. L.C. Ball's 1908 geological survey disclosed that mineralisation occurred over an area of several thousand square miles to the north, west and south of Cloncurry. By locating its smelters at the southern end of the field the company was confining the ambit of its operations. Had it sited them at Cloncurry it would have been able to draw on ores from mines to the north and west to supplement Mount Elliott ores once the rich surface deposits were exhausted. It would also have permitted Mount Elliott to engage profitably in custom smelting during the war years. After 1913 the cost of freighting ores from its northern mines offset the profits from the Hampden Consols. Second, the rivalry between Mount Elliott and Hampden Cloncurry and their failure to amalgamate in 1912 not only proved costly for both companies, but also contributed to the haphazard development of the field. Corbould foresaw the folly of competition but Hampden Cloncurry, having acquired the Duchess, Trekelano and other mines, was confident that it had sufficient reserves to assure its future. When Mount Elliott retaliated by purchasing the Consols and a number of mines in the north and northwest of the field, Hampden Cloncurry outlayed over £100,000 for the Macgregor group to consolidate its position. In short, the rush by both companies to acquire additional properties at inflated prices greatly impinged on their finances and over-capitalised mines in which

54. Report of the Royal Commission appointed to inquire into the Mining Industry of Queensland, Q.F.P. 1930, I, p.41. The general manager of Mount Elliott submitted that the cost of mining plant "was about two and a half times as much as that in any other country" and the cost of production "was one and a half times to twice as much". He blamed high wages, rail freights, port dues and customs duties, all of which related to government decisions, for many of the companies difficulties. Ibid., p.37.
reserves had still not been proven. Had the amalgamation overtures received more intensive scrutiny by the Hampden Cloncurry board, which no doubt reflected the scheme on the grounds of imminent dividends, considerable unnecessary expenditure would have been avoided. As early as 1911, the Under Secretary for Mines remarked: "Combinations may, no doubt, be prejudicial to the interests of the community, but where, as in the present instance, they make for efficiency and economy, they deserve all the encouragement that can be extended to them". Nearly twenty years later, the Royal Commission noted "several examples of misdirected policy resulting in the loss of much capital in mining ventures and subsidiary undertakings...[that] should never have been launched". Third, both companies erred in declaring substantial dividends in the early years of operations. Had dividends been more moderate and portion of the profits transferred to capital reserves, the companies could have financed exploration and new machinery at the mines, transport facilities and new treatment plant to cope with medium and low grade ores, rather than seeking additional funds through a series of financial reorganisations. Once dividends ceased, it was more difficult to raise further investment capital. Though many authorities acknowledged that the future was bound up with extensive low grade propositions, the respective boards were reluctant to devise long term plans. Fourth, the failure of the companies to adopt new treatment methods directly contributed to higher realisation costs, ultimately influencing the closure of all smelters by 1920. The companies relied on conventional methods of ore dressing by gravity mills and smelting by blast furnace. Treatment of ores assaying less than ten percent copper was a dubious economic proposition. Improvements in ore treatment practices especially in concentration plant and reverberatory furnaces had been remarkable since 1910 when copper flotation was successfully employed in the United States. Hampden Cloncurry installed a concentration plant in 1917, and Mount Elliott

56. 1930 Royal Commission, p.22.
K.H. KENNEDY

obtained a small flotation mill from the liquidated Great Fitzroy Mines Limited in the same year. Experiments were inconclusive so the innovations were set aside. However, by the early 1920's, there were few copper producers not employing flotation treatment plants: in the United States over 35 million tons of copper ore were treated in this manner in 1926. Corbould, for one, appreciated the implications of the falling off in the grades of ores, and the need for metallurgical improvements; the London board did not. Evidence before the Royal Commission indicated that machinery was "antiquated" that "the ores available, oxidised and sulphide, could not be dealt with profitably by the methods and processes in vogue when the mines and works closed down". 57 Similarly, the Under Secretary for Mines recognised that the difficulties encountered by the companies after 1920 was "due primarily to the obsolescence of plant and methods of treatment", for which management was wholly responsible. 58

Paradoxically, it was Mount Isa, the one district which Mount Elliott Limited shunned in the 1920's, which re-established the region's reputation as one of Australia's great base metal producers. The history of Mount Isa Mines Limited, especially in its first fifteen years, is concerned in many respects with management avoiding the pitfalls which brought down the Cloncurry copper companies. Through men such as Corbould, Urquhart and Julius Kruttschnitt, it was able to secure a monopoly over the leases, extensively test the ore bodies, obtain the first major injection of mining capital into the state for nearly two decades, provide railway communications, and maintain a tradition of consciousness of metallurgical innovations. There were eleven years of successive profits before the first dividends were declared.

57. Ibid., p.41.

Since coal is a fuel whose demand fluctuates according to activity in other areas of commercial enterprise, the coal industry is rarely able to direct its own fortunes, but must expand or decline in response to forces operating within other industries. Before 1907, when the first moves toward coal-mining were made in North Queensland, coal was imported from the south to supply four northern markets. The first was the shipping trade, which, while it consumed considerable quantities of coal, consisted entirely of coal-carrying ships delivering fuel to scattered ports for consumption by coal-burning ships, and had little economic significance or visibility beyond the wharves of Cairns and Townsville. The second, the expanding railway market, spread its activity throughout the hinterlands, and a tiny third market existed in coal for gas distillation and domestic and light industrial consumption. The fourth market area, large but vulnerable, was the mining industry.

The metalliferous mines of North Queensland required fuel in quantity for steam raising to operate winding gear, pumps and crushing mills, and to fire smelters, refineries and locomotives. This fuel was not necessarily coal; wood was used much more extensively, either dried for burning as locomotive or boiler fuel, or fired to charcoal when higher temperatures were required for smelting. For years the industry burned local timber in huge quantities to power its operations: in 1899 the Mount Garnet company let a contract for 2,000 tons of charcoal only weeks after ordering its treatment plant; in 1910 the Chillagoe smelters consumed no less than 40,000 tons of firewood. None of the sparsely-wooded northern mining areas could sustain that rate of extraction for long, and by 1910 the Irvinebank Mining Company was forced to burn coal exclusively, so costly had firewood become throughout the district.1 The stripped landscape around most mining towns demonstrates to this day the industry's voracious appetite for

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timber, some used as framing in underground mines, but most of it burned in steam plants and furnaces. This effect on the Charters Towers landscape was conspicuous before the end of the nineteenth century, as David Green recorded:

The well-wooded and comparatively flat basin surrounding the small ridges below the Gap, through which the pioneers came, has long since been denuded of its trees. 2

Coal and coke were available from distant coal-fields as alternative and more efficient fuels, but were normally less attractive than the local alternative of timber, which required no complex transport system for its supply, simply the employment of local unskilled labour, on lower wages than coal miners. This reliance on the expedient solution was in keeping with the short-sighted profligacy which characterised many northern mining operations: seen also in the frequent failure to prospect ore bodies, and the practice of selecting the highest grade ore in pursuit of spectacular short-term returns at the expense of sustained viable production.

This improvidence was characteristic of the gold mining industry from its earliest days of ephemeral alluvial rushes to the boom years of the deep mines at Charters Towers, Ravenswood and Croydon. But by the first five years of the twentieth century, base metal mining, especially tin and copper, had come to challenge the ascendancy of gold in places: the Cloncurry, Chillagoe and Herberton fields. The sustained prosperity of the northern mines over many years had deeply ingrained the wanton but profitable habits of picking out the best ore and smelting it with the closest timber.

The reckoning came in 1907. In that year the price of copper plunged from £112 per ton in March to £62 in December. 3 This return was perilously close to, and in some cases below, the cost of extracting

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and processing copper, and the effects on the industry were catastrophic. Small mining concerns closed up, and even the large companies with access to additional capital sought means of cutting costs to meet the newly lowered returns. The options were not many. In an industry in which labour and capital were delicately balanced production could not be maintained with a reduced workforce, and attempts at lowering wages met face-to-face with the new industrial activism. The problem was compounded by the exhaustion in many mines of the higher grade ore bodies, and the daunting cost of prospecting and mine development in search of new ones.

The mining companies were forced to fall back on the lower-grade ore bodies, and to find ways in which to mine and treat them at lower cost. One attractive option lay in more efficient fuel supplies. In 1907 the coal and coke imported into North Queensland came principally from Ipswich and Newcastle. While wood was still the staple fuel, the quantity of fuel imported was considerable: in 1910 the Chillagoe Company alone imported 6,000 tons of coal at £1/18/- a ton through the port of Cairns, and over 10,000 tons of coke at £3/3/-5. In the remote Cloncurry field, coke cost over £6 per ton at the railhead; wood at about £1 per cord was the principal fuel, but by 1909 the available timber in the district was becoming scarce, and the smelters were faced with the alternative of importing their firewood by rail.6 At times coal was bought outside Australia; in 1908 the Mount Morgan company imported 4,000 tons of coal from Germany.7

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5. Ball, Mount Mulligan Coalfield, p.38.
The supply of coke to the district is of vital importance, as there will be required about 50,000 tons per annum, which at present is imported from New South Wales. Queensland coke producers would do well to cater for this trade and so retain it to the State. The Bowen coal field requires to be opened up, so as to produce cheap fuel to enable the companies operating in this field to handle their low-grade ores, for it will be when the companies start to treat their low-grade ores that the copper production should expand by leaps and bounds. 8

Coal deposits were long known to exist in North Queensland. Richard Daintree had reported coal near the Bowen River in 1866, 9 and the Hann expedition in 1872 had found coal samples in the Cook district. 10 Despite occasional limited prospecting, and qualified expressions of optimism:

I see no reason to doubt that this coalfield will one day rank high among the mineral riches of the colony, but that day may be long delayed by the expense of carriage to the coast 11; both coal deposits remained totally unexploited and of unknown extent until after the turn of the century, as the capital investment involved in mining them had never seemed attractive while metal prices were high and fuel was free. Serious exploration on both fields began only after the crisis in the base metals industry. Indeed, the sudden urgency with which coal prospecting developed in North Queensland after 1907 contrasts vividly with the previous four decades of indifference. Between the drop in metal prices and the end of 1912, coal tests and geological surveys were conducted at every site where coal was known to outcrop: the Bowen River, the Laura Basin, Koorboora, Hughenden,

Firewood stock-piled at the Mount Elliott copper smelters
[8.0. M.J. November 1911]
P72: Wood stacked for charcoal burning, Chillagoe district
[Cairns Historical Society]
Further south, the Mount Morgan Company took up leases at Blackwater in search of coking coal. Nor was coal the only possibility canvassed. An old plan for a hydro-electric powered copper refinery near the Barron Falls enjoyed a brief currency, and was again abandoned.

One of the most hopeful coal prospects was not an old outcrop re-investigated, but an entirely new discovery. In February 1907, just as the copper price peaked, coal was discovered under the stark sandstone precipice at Mount Mulligan on the moribund Hodgkinson goldfield. This find was potentially of great benefit to the base-metal industry, as the Mount Mulligan deposits were not remote and inaccessible as were the Bowen and Cook coal-fields, but a mere 30 miles from the Chillagoe Company's railway and in proximity to several established mining towns.

The Irvinebank Mining Company moved first. Leases at Mount Mulligan were taken up by John Hoffat, principal of the Irvinebank Company, and exploratory work was under way in the months of the copper price plunge. Moffat, however, had no need of haste, as a short-term solution to the fuel problem at Irvinebank was provided by the completion in 1907 of a tramway linking the smelters with the Chillagoe railway network, which, apart from reducing transport costs, ensured a new, immediate source of cheap firewood. As the local mining warden noted:

14. Q.G.M.J. 8 (April 1907), p.161. In 1897 the Chillagoe Company had unsuccessfully applied for a lease at the Barron Falls with the intention of erecting a generating plant to power a copper reduction works.
15. A.R. 1907, p.87.
The extension of the Stannary Hills tramline to Irvinebank has supplied a long-felt want. Previous to its being built the difficulty of obtaining a sufficient supply of firewood for the mines was severely felt. 16 Moffat was fully aware of the pitfalls that massive capital investment at Mount Mulligan would involve, for he was content to renew his leases over the next three years, merely testing the deposits and sampling the coal, without engaging in serious development work. Realising the potential of the coalfield, he was prepared to wait until a bigger fuel consumer was predisposed to undertake the development of Mount Mulligan, earning him the benefit of coal royalties without the risk of major investment. His strategy did not escape notice by the Under Secretary for Mines, who observed:

The whole denudation of timber-land around Irvinebank, and the increasing cost of firewood in most of the other mining centres of the Herberton and Chillagoe fields, invest the consideration of a cheap and effective fuel supply with peculiar interest, but probably few persons outside the district recognise the possibilities of the apparently extensive coal deposits under Mt. Mulligan... 17

In 1910 the Chillagoe Company seized the bait. Large, prestigious and inept, the Chillagoe Company was reeling under a succession of misfortunes. The copper price fall had caught the company in the midst of a lavish expansion campaign, with a railway under construction to its distant mines at Einasleigh and Forsayth, and major redevelopment of its smelters at Chillagoe nearing completion. 18 Preferring to buy ore from small concerns rather than operate its own mines, the company's ore supply dwindled severely when the gougers were forced out of business after 1907. Its subsequent attempts at economy in labour conditions were frustrated by the new and militant Amalgamated Workers' Association. 19 Hence, the prospect of a short railway branch line

16. Ibid., p.73.
18. A.R. 1907, p.70.
connecting the smelter with a cokeworks at Mount Mulligan was appealing: the company estimated it could land Mount Mulligan coal at Chillagoe for less than £1 per ton, and coke below 35/-.

Paradoxically, this prospect also involved a further massive investment of capital at the very time when the company's liquid reserves were already inadequate to meet its commitments.

By 1911, the Chillagoe Company had registered leases surrounding Moffat's, and commenced active development work in the coal-seam. Simultaneously it approached the Queensland government for financial assistance with the project and began to lobby for construction of a railway. The campaign was taken up vigorously by the business community of the Cairns district, and for 18 months the editorials of the *Cairns Post* thrilled forth the benefits Mount Mulligan would bring the North:

> If...the transcontinental line connects with the western terminus of the Cairns line, and a short line 29 miles in length is constructed between the Mount Mulligan coal field and the Chillagoe line, abundant supplies of cheap and excellent steaming coal will be available at a point where it will be most required....as soon as the Panama Canal is open for traffic, Cairns will be the most direct port connected by rail with the rest of Australia for all European and American shipping....It will act as a distinct inducement to much of the shipping to make Cairns its terminal Australian port.

Obtaining the support of the Queensland government however, was not an easy matter. Suspicion engendered by the unstable record of the Chillagoe Company influenced the state to undertake prolonged testing of Mount Mulligan coal and a comprehensive geological survey of the coal-field. These delays frustrated the company management, for

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20. J.S. Reid to A.J. Thynne, 21 March 1916, 16/172/14, PRE/A541. Q.S.A.

21. See plan of leases in Ball, Mount Mulligan Coalfield.

22. *Cairns Post*, 26 October 1912.

23. Ball's survey, which gave rise to his report published in 1912 (G.S.Q. 237).
whom time was vital: it was late in 1912 when Parliament approved the Mount Mulligan railway proposal, and May 1913 before construction was underway. Copper and lead prices were still depressed, and the Chillagoe Company's financial problems forced its reconstruction in 1913 to meet the added burden of the development of Mount Mulligan.

Reconstruction came too late as shortages of operating funds closed the Chillagoe smelters early in 1914 and the Mount Mulligan mine stopped production in July. The base metals industry of the district collapsed, and remained moribund for six years. Absurdly, the railway arrived in Mount Mulligan a month after the mine closed, but full coal production re-commenced in 1915 with almost all the mine's output being sold to the railway market. Ironically in that year the World War's demand for lead and copper brought the first significant climb in metal prices since 1907.

Prospecting activity in the years 1909-1912 had shown the Laura Basin and most of the smaller North Queensland coal outcrops to be uneconomic for exploitation. But the Bowen River seams were proving of excellent quality, and promised huge reserves. Tests on the Bowen River Coal Company's lease in 1912 and 1913 sparked a rush to the field: five syndicates had registered 17 leases straddling the Bowen outcrops by the end of 1915. At least two of these syndicates were composed of Charters Towers mining interests, seeking alternative avenues of investment as the deep gold-mines of the Towers burrowed their way to bankruptcy in the dying days of the gold-field.

The optimism of 1915 was given promise of permanence by political developments in that year. The state elections returned Queensland's first stable Labor government, under T.J. Ryan, with its policy of state participation in mining enterprises. The intervention of the

26. Mining Warden, Bowen: Register of Mineral Leases April 1889-September 1921. MWO 118/9 Q.S.A.
P73: Unloading coke from the hold of the S.S. Urilla at Cairns, 1923
[Cairns Historical Society]
Ryan government in North Queensland mining brought orderly development to the scramble for cheap fuel, and coincided with the rise in metal prices that accompanied the First World War. Having established the size and quality of the Bowen River coal deposits, Cabinet, in a bid to establish a state mine, seized the initiative in August 1915, entering the rush for leases there by refusing a number of private lease applications and reserving the four square miles involved for state operations. Before the end of the year, a parliamentary select committee had approved a railway from Bowen to the coalfield, and construction commenced early in 1917. (In a monumental piece of dithering, the committee first sat for one day and recommended against the railway; the members had not bothered even to read the report on the proposed line by the Commissioner for Railways. Four days later the same committee submitted a second report based on another one-day hearing, reversing its earlier recommendation.)

Chillagoe Limited saw the advent of the Ryan government and its state mining policies as a heaven-sent solution to its financial problems. Consolidating its position at Mount Mulligan by acquiring rights to Moffat's leases for a progressive royalty payment of £50,000, the company approached Ryan in 1915, asking nearly £1 million in return for state acquisition of its North Queensland metal mines, railways and smelters. Ryan was eager to buy, but not at that price: in a masterly side-step, he negotiated the state purchase directly with the trustees for the company's debenture holders in London in 1916. The moment was opportune: in 1916, wartime demand sent the price of copper to £153 - the highest level it had ever reached. The allure of copper was seen in the output of the Cloncurry

field which in that year fetched over £1 million - topping the value of the state's gold output. 32

It seemed that Mount Mulligan was to satisfy all who had invested in it. Moffat's patience had been rewarded by Chillagoe buying out his leases and Chillagoe Limited retained the Mount Mulligan coal mine and the fuel contract for the railways and smelters - prospects which seemed destined to boom mightily. Simultaneously, the government had negotiated the purchase of the infrastructure of an entire mineral industry to be operated as a state enterprise. But the dreams faded during three years of frustration, as the Legislative Council, opposed to Labor's program of state enterprises, repeatedly rejected Ryan's legislation for the purchase of Chillagoe Limited's assets. The purchase Act eventually received assent on 15 November 1918, four days after the armistice which ended the metals boom: the market had already peaked, and begun its decline.

At the Bowen River, the competition for leases subsided into a long wait for railway construction to be completed. The state and the various syndicates did what development was possible with no access to a market. Extraction was limited, as the coal showed a tendency to spontaneous combustion when stockpiled on the surface for sustained periods. Construction of the forty-nine miles of railway took five years and the delay had exhausted the capital of most of the speculators long before the line opened in 1922. By the end of 1919, a further nineteen leases had been forfeited to the state for non-payment of rent, 33 and the surviving syndicates amalgamated to form the Bowen Consolidated Coal Mining Company. 34

The long delays at Chillagoe and Bowen caused casualties in the besieged base metals mining industry as well. The copper boom at the

32. A.R. 1916, p.11.
33. Entries noting forfeitures in MWO 11B/9 Q.S.A.
34. A.R. 1919, p.37.
height of the war encouraged the Mount Elliott Company to build a refinery at Bowen: prematurely motivated by the proximity of cheap fuel, the company invested heavily in the project, which operated only spasmodically, and closed before the Bowen railway reached its destination on the coalfield. Copper refining in North Queensland was to await the opening of Mount Isa Mines' Townsville refinery in 1959. The economics of metal production were complicated. Despite wartime copper prices, the fuel problem compounded the Mammoth Company's difficulties, forcing the closure in 1917 of its smelters at Cardross, and marking the end of an era for the copper producers of the Cairns hinterland.

At Cardross, the smelters were given a short run, fired by iron-wood, which was considered satisfactory. The great obstacle is the impossibility of procuring coke as fuel, which would be solved by the erection of coke ovens at Mount Mulligan.

A checklist of the mining industry of North Queensland in 1920-21 no longer contained many of the company names that had headed the stock exchange reports in the grand early years of the century. As the guns fell silent in Europe, the falling demand for metals forced prices back to the levels of the bleak years from 1907 to 1914. By 1919, the Irvinebank Company's smelters, mines and tramways had been purchased by the state in an endeavour to resuscitate the declining tin industry. The entire Cloncurry copper field went into recession; a scheme to amalgamate the companies came to nothing; and the last ingot of blister copper left Cloncurry in 1920. When the Mount Cuthbert and Hampden Cloncurry companies stopped their mine pumps in 1922, the field was finished. But the Labor government, not faced with the demands

of shareholders, persevered with its program of state intervention in
the mining industry, and the Chillagoe smelters and mines, badly run
down in six idle years, returned to production in 1920 in what was to
prove a costly exercise, accumulating losses of nearly a million
pounds over the following seven years.

While the Bowen River field awaited its slowly-advancing railway,
the Chillagoe Company's coal mine at Mount Mulligan returned to vigorous
operation. The purchase agreement of 1918 included generous terms for
state finance for Chillagoe Limited's development of the mine: £60,000
was advanced to the company for the completion of coke ovens which had
been under construction since 1915. Further grants were made throughout
1919 and 1920 for improvements including new surface plant, workers'
housing, water catchment and more efficient underground haulage,
secured by state mortgages on the company's property at Mount Mulligan. 40
The Manager at Mount Mulligan, James Watson, had responded to the chronic
shortage of skilled labour by developing the mine on what were highly-
mechanised principles at the time, incorporating a longwall method of
extraction throughout much of the mine, with coal-hewing done by
electric coal-cutting machines. During 1920, Mount Mulligan produced
nearly 24,000 tons of coal, mainly intended for the state's railways
and the Chillagoe smelters, while Bowen River produced a little less
than 4,000 tons which could not be sold. But the local mining warden
claimed that the Bowen River deposits were superior in all respects,
and vastly so in quantity, to those of Mount Mulligan, and prophesied
that coke from Bowen would one day sweep Mount Mulligan from the market:

For years, all smelting operations at Chillagoe,
Irvinebank, and Cloncurry have had to be carried
out with coke brought at great expense from
Newcastle. A considerable saving in smelting
operations at these centres will be effected as
soon as the railway to the [Bowen] coalfield is
completed and open for traffic. 41

40. Mortgage and other financial documents in JUS/54-56 Q.S.A.
P76: Entrance to Bowen Consolidated Mine, 1920  [Delamothe Collection]
THE ORIGINS OF THE NORTH QUEENSLAND COAL INDUSTRY

On 19 September 1921, the name of Mount Mulligan became a household word when a massive explosion in the coalmine killed all 75 men working underground. The greatest land disaster in Queensland's history, the explosion was attributed by the subsequent Royal Commission to lax supervision of safety regulations, induced partly by the mine's reputation for safety in being free of methane. Apart from its cost in human life and suffering, the disaster spelled ruin for Chillagoe Limited. Eking out a threadbare existence on state mortgages, the company was unable to absorb the costs of the explosion's damage at a time of depressed coal demand: the Mount Mulligan mine passed to the state in 1923 when the company was wound up.

Under state management, the Mount Mulligan mine underwent a brief period of modernisation and development. Underground and surface workings were improved, and the cokeworks, after agonising years of construction and experimentation, fired in 1922. These developments promised financial relief for the state on operations both at Chillagoe and Mount Mulligan:

A very costly factor in the running of the smelters has been that of fuel, and the completion in June next of the coking plant at the Mt. Mulligan colliery will mean a saving in this connection of £50,000 per annum, as it is expected that coke from this mine can be landed at Chillagoe at £3 per ton as against £5 per ton, the cost of getting it from the south. In addition to the saving on coke, of which 1,500 tons are consumed per month, a further economy will be effected by the use of coal instead of firewood.

The promise was never fulfilled. Ironically, state ownership, having earlier saved the Chillagoe mining district from extinction, closed the Mount Mulligan cokeworks. The level of coal output from Mount Mulligan's thin seams did not permit the supply of fuel both to the railways and the coke market. The trains had the higher priority, and the

44. *A.R. 1921*, p.2. Note that Chillagoe was relying on firewood for fuel as late as 1922, when this report was written.
Mount Mulligan cokeworks fired for the last time in May 1924. For the rest of its life, the bulk of the mine's yield went to Queensland railways for local use, and the Chillagoe smelters bought their coke from Bowen. The arrival of the railway at the Bowen River - henceforth Collinsville - put an end to any question of rivalry between the two North Queensland coal-mines. Given access to the market, Collinsville's production soared: its two mines produced 104,000 tons of coal in 1924 and improved this rapidly in succeeding years. The completion of the North Coast railway from Brisbane to Cairns, and the opening of the Mount Isa mineral field in 1923 confirmed Collinsville's geological advantages and its ascendancy as North Queensland's major coal producer. Simultaneously, Mount Mulligan produced its highest ever output of 44,000 tons in 1924, but thereafter dwindled in significance assisted by a period of corruption and mis-management in the operation of the mine, not checked until 1927. Intensified depression late in the decade made the mine's position even more precarious, and when the Country-Nationalist coalition came to power in Brisbane in 1929, an early decision was made to close the Mount Mulligan mine. Negotiations led instead to the coal-mine being taken on tribute by the miners; a scheme extolled by the Government Mining Journal:

Mount Mulligan today is an object lesson of what workers can achieve by co-operation. The miners employed are jubilant at the success they have attained.

No-one in Mount Mulligan was jubilant. The miners had merely succeeded in snatching survival from the jaws of extinction, and in doing so condemned themselves to eighteen years of the austerity of tribute mining. The Mount Mulligan coal-mine survived until 1957, when a combination of abysmally inefficient production, reduction in the Cairns coal market due to dieselisation of the railways and

45. A.R. 1924, Table B. Collinsville coal was at first consumed by the bunker trade, railways, sugar mills and mines. After 1933 when the Bowen cokeworks were built, the largest buyer of the mines' output was Mount Isa Mines.

46. Mount Mulligan suffered the fringe of the Mungana Affair: see overall treatment in K.H. Kennedy, The Mungana Affair (St. Lucia 1978) and specific Mount Mulligan aspects in Bell, The Mount Mulligan Disaster, pp.231-8.

hydro-electric power, competition from the Bowen Basin, and spontaneous combustion in the mine forced its closure.

The Collinsville state coal-mine operated as a major coal producer supplying the Bowen state cokeworks until the 1950s, when it was beset by technical difficulties, culminating in a major accident which killed 7 miners in 1954. Both a comprehensive report on the Queensland coal industry in 1949 and the Royal Commission into the mine's operation after the disaster of 1954 strongly criticised the mining and marketing practices at Collinsville. After a period of industrial unrest early in 1961 the government decided to cut its losses, and sold the state coal mine to Dacon Collieries in April of that year; ending the state intervention in the North Queensland coal industry that had begun under the Ryan government. Mount Isa Mines' subsidiary the Collinsville Coal Company, has now absorbed both companies on the Collinsville field: North Queensland's only coal mines are now operated by a major copper mining company to supply cheap locally produced coke to its smelters. The very raison d'être of the North Queensland coal industry from its hesitant beginnings in 1907 has taken seventy years to realise.

P77: Loaded ore wagon on the ramp at the Hampden-Cloncurry company's smelters

[Q.G.M.J. September 1912]
The dominant emphasis in railway construction in Queensland has been the encouragement of export industry. Construction of the colony's first railway westward from Ipswich, not Brisbane, represented a victory for the wool producers over urban interests which wanted railways for passenger travel and commerce. The promise to build a railway west from Rockhampton almost simultaneously - the price of political support for the southern proposal - not only confirmed the ascendancy of rural export interests but also initiated the decentralised railway pattern with far-reaching consequences. In the case of the mining industry, the major impact of railways was reduced transport costs, a factor imperative for economic survival. Mining railways not only provided cheaper, more efficient and more reliable communications, which in turn reduced the cost of living in remote areas, but also influenced the development of certain fields and prolonged the life of others. In North Queensland, over a thousand miles of track were laid down between 1880 and 1930 primarily to service the mining industry. Not all the lines were state undertakings; on the contrary, some lines were privately owned and operated, while others were financed by mining companies and operated by the government. By 1930, however, this network of mining railways was the property of the state.

The initial burst of construction, from Ipswich and from Rockhampton, over-tax ed public finances and plunged the colony into crisis. It was the discoveries of gold at Gympie, Ravenswood, Charters Towers and on the Palmer, and of tin at Stanthorpe, which aided recovery and largely formed the basis of a new prosperity. With additional sources of revenue to service its debt payments, the government recommenced railway extensions, paradoxically to pastoral areas, ignoring the demands of the mining industry in its allocation of railways for nearly a decade. Finally, in 1873, a preliminary survey of an extension to Stanthorpe was approved; this was followed by surveys from Maryborough to Gympie in 1874, from Bundaberg to Mount
Perry in 1875, and from Townsville to Charters Towers in the same year. However, the influence of pastoral interests was still strong. Instructions were issued in 1874 to survey lines to the mining field at Clermont and the graziers' town of Springsure; the surveyor reported that the railway should proceed westward to Emerald Downs first, and in event the survey to Clermont was deferred. So entrenched was the pastoral influence that when W.E. Murphy, member for Cook, proposed in July 1877 that funds from supplementary estimates be allocated to survey a railway route from Cooktown to Byerstown to open up the Palmer and Hodgkinson fields, he was surprised by the government's acquiescence.

The proliferation of surveys gave the impression that the government was anxious to accommodate the needs of the remote and mushrooming mining camps, but it opened a Pandora's box. The arrival of government officials with barometers and quadrants not only quickened the hopes of settlers and miners but also energised numerous Railway Leagues which in turn bombarded legislators with petitions and deputations. As their expectations had to be satisfied if the government was to retain electoral credibility, the Thorn ministry responded by submitting to parliament proposals for no fewer than six lines, four of which were the mineral railways surveyed between 1873 and 1875, while the remainder were extensions to service pastoral regions. The government contended that the claims of all six districts were more or less equal and that the proposals should be considered en bloc. Approved by the assembly on 8 November 1876, the measures encountered opposition in the Legislative Council which insisted on voting on the proposals seriatim. When the railway from Maryborough to Gympie was rejected by nine votes to ten, the government promptly withdrew the proposals. Nine months later, the new Premier, John Douglas

2. *C.R.* 1885, p.135.
NORTH QUEENSLAND MINING RAILWAYS

piloted the measures through both houses on 30 August 1877. In the interim the projected line from Townsville had lengthened from a mere ten miles — all that had been adequately surveyed for parliamentary approval — to fifty-two miles, thus extending it to within thirty miles of both Ravenswood and Charters Towers.

Preliminary work on North Queensland's first railway began at the end of 1877, but whereas construction continued unabated on the central line, and contracts were let for sections of the four southern extensions during 1878, progress from Townsville was slow. Track laying and ballasting of the first fifteen miles of railway commenced in earnest in early 1879 on the basis of small-contracts under the supervision of Robert Ballard who had controlled the bulk of similar construction in Central Queensland. A single contract was let for the subsequent twenty miles in August 1879, and this first section, thirty-five miles to Reid River was opened for public traffic on 20 December 1880, eighteen months after the completion of the two extensions to pastoral areas, but in advance of the lines to service the mining centres of Gympie and Mount Perry. The railway to Charters Towers was eventually completed towards the end of 1882. Even before the line was officially opened on 4 December that year, there was a heavy demand on rail services as teamsters were unable to cope with the increased traffic in goods and machinery, as the prospect of cheaper and more reliable communications coincided with increased expenditure on mining.

Uncertain of the field's permanency, and with the financial strain of building six lines simultaneously, economies were practised where possible. As a result, the line was marked by steep grades and light earthworks. In 1885, the government had to outlay funds to eliminate

5. For details, see Q.P.D. XXI, pp.1229-70, 1320-34, 1340-6, 1355-9; XXII, pp.200-18.
7. C.R. 1877, p.34; 1878, p.46.

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a number of the steepest pinches, and to build a four mile deviation over the coast range only five years after the line opened. The original track, with an average gradient of 1 in 30 for nearly two miles, was a severe bottleneck. This ascent is now used as the highway, while the 1887 deviation was itself replaced by an eight mile deviation in 1962. Clearly the economies had been shortsighted in the light of subsequent traffic over the line, as, despite high wages and expensive operating costs due to limited loading capacity, the line returned all expenses plus an average of five percent on capital in the years 1882 to 1887.

No sooner had the Townsville to Charters Towers railway been completed than parliament approved a branch line, twenty-four miles long, to Ravenswood. Construction commenced at the end of 1882, but the line was not opened until 1 December 1884 due to delays by the contractor. As a gold producer, Ravenswood had been overshadowed by Charters Towers, and it was more the political muscle of J.M. Macrossan, member for Townsville and then Minister for Works, than its gold yield which secured the rail link. There was discussion on the feasibility of extending the Ravenswood line south to Blair Athol and Clermont, but the proposal was never fulfilled. Instead, the Charters Towers line was extended west by sixty-five miles, past the old Cape River diggings, towards Hughenden. For its part, the Ravenswood branch line contributed to the field's steady prosperity although gold output and population showed no marked response until 1897, the starting date of fifteen years of sustained production and wealth. As quartz output on North Queensland's reefing fields involved on-site treatment, the main impact of the railways to Charters Towers and Ravenswood lay in the transportation of plant of sufficient scale to treat low grade stone.

10. For details on construction and deviations, see Queensland, 18 July 1885, p.105; C.R. 1881, p.86; 1886, p.122; Queensland Railway Department, Weekly Notice 47/62.


By 1877, when parliament approved £3,000 for a survey for a railway from Cooktown to Byerstown, the Palmer River district had already yielded over three million pounds worth of gold. Surprisingly the local member, W.E. Murphy, was not unanimously applauded by his constituents for his efforts, as the *Cooktown Herald* ridiculed the idea, claiming that punts across rivers and better roads were more pressing needs.\(^{13}\) Even though Byerstown was in a most miserable condition, mostly occupied by Chinese, and a railway would involve expensive bridge work over the rugged terrain, the survey was commenced. However, it was not completed for several years, during which time the route was substantially revised. When a more practicable route crossing the Normanby River was located, the survey proceeded westward to Laura rather than south to Byerstown, which seemed forgotten. Beyond Laura, the line was to extend south to Lone Star Gap and on towards Maytown, despite precipitate country encountered at the main dividing range. (An alternative route direct to Palmerville, with a branch to Maytown was also considered but was rejected).\(^{14}\)

Plans for the first section of the Cooktown railway were approved in October 1882 after Macrossan assured his colleagues that there "was no more important district in the whole of Queensland" than the one to be tapped by the proposed line.\(^{15}\) The government called tenders in August 1883, and awarded the contract to George Bashford the following February. This leisurely pace made Macrossan's praise of the region sound hollow, but in his defence, his resignation from the ministry in early 1883 no doubt influenced the downgrading of the Cooktown railway's priority.\(^{16}\) The section to Laura was opened on 8 October

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13. *Maryborough Chronicle*, 10 October 1876 (quoting *Cooktown Herald*).
14. For details of the survey, see *C.R.* 1878, pp.59-60; 1882, p.103; 1883, p.93; 1884, pp.105-124.
1888, only days before the plans for the subsequent section, thirty miles long, were tabled in parliament. Hugh Nelson, Minister for Railways, explained that the government was committed to a short extension and the construction of an expensive bridge across the Laura River to afford teamsters access to the line. However, he admitted that there was little likelihood of the remainder of the section, which would include eight tunnels and would bring the railway within twenty miles of Maytown, ever being completed. Nelson's prediction was well-founded. The Laura River bridge alone was built, but rarely used, while work on the extension towards Maytown was indefinitely suspended as the Palmer failed to reach its expectations as a reefing field. The Palmer was thus left without cheap transport, and Maytown residents were required to pay between 37/6 and 40/- per cord of firewood and similar usurious rates on other goods hauled by local teamsters.

The postponement of the railway, and the unwillingness of the government to spend capital on an apparently declining field, doomed the Palmer. R.L. Jack, government geologist, lamented in 1898 that "the reefs have never had a fair trial, although many of them more than deserve it", and suggested that haulage costs to the field, averaging £40 per ton when reefing was attempted, discouraged vigorous mining activity. His list of crushings suggested that many claims were abandoned despite favourable results because of a lack of efficient mining machinery and high transport overheads.

17. Q.P.D. LV, pp.780-6.
18. Ibid., p.782. The price included the cost of the wood, but this was insignificant compared to the freight component. The local member estimated that if the railway was completed firewood could be delivered for twelve shillings per cord, less than one-third the prevailing rate.
19. R.L. Jack, "Report of a Visit to the Palmer Goldfield", Votes and Proceedings 1899, 1, p.553. Similar claims were made about the Hodgkinson field, but the construction of the Mount Mulligan railway through Thornborough caused no such transformation.
P78: Ores train departing Day Dawn Block and Wyndham mine for the Burdekin Mill at Sellheim [A.R. 1903]
P79: Flooded Crossing, Mormanton to Croydon railway, before 1900  [N. Johnston]
In contrast to the Palmer, the building of the railway to Croydon was achieved before there was any time for doubt. Gold was discovered in November 1885, and the richness of the reefs spurred the Griffith ministry in October 1887 to request parliamentary approval for the diversion of funds away from the railway from Normanton to Cloncurry— the first section of which had been approved in the previous session—for a line from Normanton to Croydon.\textsuperscript{20} Eager to share the wealth of Croydon, the government jettisoned established procedures. For economy, it adopted George Phillips' patent steel sleeper, and to overcome delays in calling tenders, it entrusted supervision of construction to Phillips as well.\textsuperscript{21} The line proceeded at rapid pace: the first section was opened in May 1889; and the entire link with Croydon, across flat, favourable terrain, was completed in July 1891. Croydon experienced twenty years of prosperity after the advent of the railway, which overcame situations like that of December 1887 when carriage rates by teamsters over the ninety miles from Normanton was quoted at £25 per ton and when three hundred tons of machinery were stored at Normanton until the end of the wet season.\textsuperscript{22} There were still the handicaps of relying on small ships which could navigate the shallow Norman River and of meeting expensive lightering charges on goods and machinery, but these were never as serious or as costly as the teamsters. The Normanton to Croydon railway was the last isolated line constructed by the state, and but for the stability of Phillips' method of construction would long since have been closed. A justifiable proposition over the twenty years to 1911 when the gold yield rapidly declined, there has been little traffic since to warrant its existence.

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The railways built to service goldfields all proved to be successful where they reached their objective. Lines to base metal

\textsuperscript{20} Q.P.D. L, pp.1273-8; LII, 1273-82, 1465-8.
\textsuperscript{21} C.R. 1888, p.8.
\textsuperscript{22} Mackay Standard, 23 December 1887.
fields, however, encountered mixed results. The line to the Stanthorpe tin field was profitable, but that to the Mount Perry copper prospect did little to encourage government investment in similar propositions, as mining was virtually abandoned just as the line was completed, and revenue from timber traffic exceeded that from mining. 23 The first experience in North Queensland with a railway to a base metal field was no more encouraging, but was no fault of the mining industry. After protracted investigations and heavy politicking by northern interests, parliament approved the first section of a line from Cairns to the Herberton tin fields on 30 October 1885. 24 The route encountered adverse and treacherous terrain, and John Robb's schedule-of-prices contract for the ascent over the coastal ranges finally cost over one million pounds instead of the anticipated £290,984. 25 The difficulties eventually surmounted, the line opened to Mareeba, still thirty-five miles short of Herberton, on 1 August 1893. Meanwhile, discoveries of copper at Chillagoe, the mining prospects of the Etheridge and the visions of Cairns businessmen of a railway stretching to the Gulf, led to increasing demands for a railway to Georgetown, via Herberton. Topographically absurd, this scheme was advocated to placate the tinfield interests. 26 When the competing claims of the numerous mining districts were considered, the Nelson ministry, rather than choosing a route, opted for the simple solution of inactivity partly because of the financial depression of the 1890's and partly because the extravagance on the range section deterred immediate public expenditure.

In the late 1890's a new impetus for railway construction was provided by the returns from copper smelting in the Chillagoe region. Exploitation of these deposits began in 1894 when John Moffat, the North's most enterprising mining magnate, erected a second-hand smelter

26. For details, see Herberton Advertiser, 24 May 1889; 9, 30 May 1890.
at Calcifer, and, despite costly haulage over one hundred miles of unformed track to Mareeba, was able to make a modest profit.\(^27\)

Chillagoe's isolation was highlighted soon after by the ravages of the babesia parasite on adult animals which practically brought transport to a standstill. Clearly, if the region was to be unlocked, a railway and a substantial central smelter were prerequisites to further profitable operations. The rise in copper prices in the late 1890's, plus his monopoly of the prime leases, allowed Moffat to raise sufficient private capital to build what the government could not provide. Two Melbourne businessmen, C.W. Chapman and J.S. Reid, joined Moffat to launch the Chillagoe Company which in turn acquired Moffat's leases and drew up plans to build a railway from Mareeba to Chillagoe, a large smelter at Chillagoe and wharf facilities at Cairns. In late 1897, Moffat, Chapman and Reid hurried to Brisbane and successfully hawked their proposals to the Nelson ministry which adopted the private railway as a government measure.\(^28\)

The Labor parliamentary opposition unsuccessfully attempted to delay the Mareeba to Chillagoe Railway Bill, contending that the line should be constructed under the provisions of the Railway Guarantee Act, making the company responsible for half of any deficiencies, but also with a right to share in the profits. Their aim was to retain government control of the line, but aside from the question of how to find capital for the project, the Guarantee Act afforded the government little protection in the event of the company failing. For its part, the Chillagoe Company offered to build the line without any promise of land rights, other than the extension of their 2,000 acres of mineral leases from the usual twenty-one years term to fifty years, on which the company would pay double the prescribed rental. The Bill also gave

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\(^27\) North Queensland Herald, 15 August 1894; Wild River Times, 11 October 1894.

\(^28\) John Moffat, Evidence, McEacharn v Chapman, February 1901 re Mount Garnet (in possession of G. Bond, Jamboree Heights). It was usual practice for bills for private railways connecting with government lines to be introduced as government bills.
the Railways Commissioner running rights over the line, with a right of purchase after fifty years at a price not exceeding the cost of construction plus ten percent. However, one contentious clause, allowing the company to charge rates fifty percent higher than government rates, understandably gave rise to strong criticism. The Labor party, out-gunned by government numbers and weakened by wavering in the ranks, persisted in its opposition to the measure, disdainful of the unanimous resolutions of support for the project from public meetings at Cairns and Mareeba and from local authorities in the region, but to no avail. The Legislative Council, that frequent blocker of government railways, surprised many members by the enthusiasm of its support for the proposal, which, from their viewpoint, would relieve the government of the burden of financing a line for an industry relying on uncertain world prices, and which would reverse at the same time the losses on the Cairns to Mareeba line.

The share market concurred with the enthusiasm of one legislative councillor, William Forrest, who compared Chillagoe with the great Anaconda mines in the United States, as Chillagoe scrip rocketed in price, returning handsome profits to the company's promoters, who, unlike Moffat, had invested little actual capital. Financed by a debenture issue in London, the railway was completed in July 1901. Withdrawal of approval to construct its smelters at the Barron Falls, reliance on bullish estimates of ore reserves, over-capitalisation of its properties and an unenviable reputation for mismanagement contributed to the company's downfall after no fewer than four attempts at reconstruction between 1902 and 1913. For its part, the Chillagoe railway returned operating profits every year after its opening, but these were offset by losses on the company's operations as a whole. The acquisition of the line by the Ryan Labor government in 1918, after

P80: Company locomotives at the Chillagoe sheds  [Queenslander 1904]
the intransigent upper house had delayed the legislation for more than two years, was a god-send to the debenture holders of the company.

The railway itself conferred substantial benefits on the region beyond the company's activities. Its route passed close to the wolfram mines at Bamford, and improved access to the Hodgkinson goldfield and to the western extremity of the Herberton mineral district. More important, it was the life-line for mining towns which were connected by branch lines or tramways. Under the Mareeba to Chillagoe Railway Act, the company was empowered to construct spur lines up to ten miles long, and lost little time taking advantage of this provision, not to connect the mines around Chillagoe, but to tap the Mount Garnet field, squeezing out Randolph Bedford's Chillagoe Bedford and Mount Garnet Limited which proposed a line via Atherton. The Mount Garnet Freehold Copper and Silver Mining Company Limited, whose board included several directors and large shareholders of the Chillagoe Company, constructed smelters to exploit the Mount Garnet lodes, and in 1899 persuaded the government to sanction a private railway from Lappa Junction to Mount Garnet (of which the first section to Halpin's Creek was owned by the Chillagoe Company). The new Premier, Robert Philp, himself a mining promoter and a confidant of John Moffat, vigorously supported the proposal and, as a trade-off, promised a government railway to the disappointed residents of Atherton. The Mount Garnet line proved a damp squib after the smelters closed in 1902; the Atherton line was opened in 1903, and was extended to Herberton in 1910 - too late to have any impact on tin mining in the district - and later on to Ravenshoe to service timber and dairying country.

Following the Chillagoe Company's lead, other companies sought government approval to construct private railways. In 1902, the Adelaide-based Stannary Hills Mines and Tramway Company was authorised to build a narrow-gauge line, fourteen miles in length, from Boonmoo to its mines on Eureka Creek and to its battery on the Walsh River, under the provisions of the Mining Act. Later, this tramway was

extended to Irvinebank by the Irvinebank Mining Company. Both tramways became government property after John Moffat's death in 1918 when the state purchased the Irvinebank Company's assets as part of its state enterprise programme. The tramway closed in 1936 when road transport became the preferred alternative. In 1907, Mount Molloy Limited constructed a line from Biboohra to its mines and smelters twenty miles north. The cost of the railway in addition to their smelters - those at Chillagoe were not suitable for Mount Molloy ores - was too much for the company. Completed in 1908, the line carried far more timber than copper, and was eventually acquired by the state in March 1917 at a fraction of its initial cost.

The largest mining field in North Queensland, covering nearly fifteen thousand square miles, was the Etheridge, still under-developed at the turn of the century. Its principal towns were Georgetown and Charleston, whose residents claimed that the goldfield had not been given a fair chance. A railway and capital investment in deep reefing would reveal its potential and unlock its reefs. In 1892, parliament approved construction of a railway from Mareeba to Georgetown on the Land Grant Principle, as the government had no money during the depression of the early 1890's; but likewise, nor did investors, and the railway never materialised. In the north-east section of the Etheridge, copper had been located at Einasleigh, where a London-based concern erected a smelting plant, and in 1902 proposed a tramway from its mine to connect the Chillagoe railway at Almaden. The collapse of the Chillagoe boom, however, torpedoed its plans to raise the necessary capital and forced the mine's closure. Two years later, when the Chillagoe Company looked beyond its own mines for ores to keep its smelters open, the Etheridge breathed again. Base metal deposits at Einasleigh and near Percyville and gold mines near

33. For details, see Cairns Post, 11 March 1902; Townsville Daily Bulletin, 5 July, 26 August 1907. The narrow gauge was specifically adopted to traverse the Eureka Creek Gorge.
34. Wild River Times, 23 September 1908.
35. Cairns Post, 8, 22 April, 23 September 1902; Croydon Mining News, 9 October 1902.
Georgetown and at Charlestown were scrutinised for potential ore supplies for the Chillagoe smelters. However, like Chillagoe in its infancy, the Etheridge was still hampered by a lack of suitable transport facilities. Negotiations for a rail link were commenced with the Morgan government: they were to be drawn out over two years. The Chillagoe Company, embarrassed by its lack of ore reserves, was not in a strong bargaining position, while the government was not prepared to extend the same degree of assistance as the Nelson ministry had in 1897. The state Treasurer, William Kidston, who, in 1897, wanted the company to "give the Government a guarantee against loss of interest on its construction", finally concluded an agreement which was to mark the transition from privately owned mining railways to privately financed but government controlled railways.

The Etheridge Railway Act of 1906 provided for the government to guarantee a return to the company of 2½ percent interest on the capital cost of the line, and to purchase the line from the debenture holders within fifteen years at a price twenty-eight and four-seventh times the average net earnings over the five years preceding the date of purchase. It was an interesting deal: if the railway did not pay at all, the government would purchase the line at half its cost; if the line turned in good profits, the company would make money on the deal. It was thus in the company's interest to maximize use of the line, although critics suggested that it would encourage phantom traffic to swell the purchase price.

Construction commenced in 1907 and the line was completed in stages, not to Georgetown as originally intended, but to Charleston (which was then renamed Forsayth). Once again the Chillagoe Company was to be disappointed by its ore reserves, and traffic was far below expectations. Georgetown neither got the line from Cairns, nor one from Croydon - this proposal was rejected by the Legislative Council.

38. *Croydon Mining News*, 18 October 1907.
The closure of the Chillagoe smelters in March 1914 not only doomed the Etheridge as a mining field, but also cut short the interval to the government takeover of the railway. The Chillagoe and Etheridge Railway Act of 1918 effected the government purchase of the Chillagoe Company's assets, including its railways at prices much below cost. As a government network, the lines have been used for cattle rather than minerals, and are noted for losses, not profits.

The final mining line in the Cairns hinterland was a government railway to the Mount Mulligan coal deposits, the opening of which provided a new source of fuel for the ailing mining industry. The long and expensive shipment of coal from southern Queensland was eliminated, but too late. However, the line to Mount Mulligan completed over three hundred miles of railway built solely for mining as a result of the activities of the Chillagoe Company.

The Cloncurry copper mines, discovered in 1867 by Ernest Henry, remained largely neglected for forty years due to their vast distance from the coast. Periodically schemes were advanced for railway communications to link the region with a port on the Gulf, but all of them came to nothing. The promised Transcontinental Railway, intended to pass within a few miles of Cloncurry, was dashed with the defeat of the McIlwraith government in 1883. Three years later, parliament approved the construction of a government line, just as the rising township of Croydon was clamouring for a railway. The line was diverted to Croydon, and Cloncurry had to remount its campaign for a railway. In 1890, the government resurrected the Normanton to Cloncurry railway, and delivered rails and fastenings to the Gulf port;

40. For details on this proposal, see Votes and Proceedings 1881, II, pp.279-88.
41. Q.P.D. L, pp.1273-8.
P82: Stannary Hills Tramway at Eureka Gorge
[4.R. 1902]
but the line was never built. Ten years later, a private line was proposed by an English syndicate, but did not proceed. Finally, the government approved an extension of the line from Richmond, and almost overnight changed the economy of the field.\footnote{42} The same rails, bought for the Normanton to Cloncurry line and unused for fifteen years, were despatched from Normanton by ship to Townsville and hauled west for use on the hastily constructed extension. By following the contour of the land and temporarily deferring bridge work, the line was rapidly pushed through to Cloncurry by Christmas 1907.\footnote{43} Townsville, and not the unreliable Gulf ports, became the Cloncurry field's outlet.

The important deposits on the Cloncurry field, with the exception of Henry's Great Australia mine, lay between fifty and one hundred miles to the south, west and north of the township. The first major extension to these deposits was to the south, from Cloncurry through Hampden to Mount Elliott. Enabling legislation was introduced by the Kidston government in April 1908 to validate an agreement whereby the government would build the line and meet half the cost, the other half to be shared proportionally between Mount Elliott Limited (60%) and Hampden-Cloncurry Copper Mines Limited (40%).\footnote{44} After fifteen years, the companies were to be reimbursed one half the value of the line, as assessed by its earnings over the preceding five years. Always operated as a government railway, it was a further step from the Etheridge railway towards the present system of a company providing the entire cost of construction and being reimbursed from earnings. Moreover, the government reserved amounts equal to 3½ percent interest on its capital investment before paying any interest to the companies on their contribution. But, in common with other private lines, charges for freight were fifty percent above the normal rates on government railways. To the Labor party, the line was what Bowman described as a "shandy-gaff railway", not a genuine state line. The extension to Mount Elliott was officially opened on 15 December 1910.

\footnote{42} See, G. Blainey, Mines in the Spinifex (Sydney 1960), pp.35-44. 
\footnote{43} Townsville Daily Bulletin, 22 July, 13, 14 December 1907. 
\footnote{44} Q.P.D. CI, pp.664-8, 768-801.
Thereafter, most branch lines in the Cloncurry district were built by the state. To the north of Cloncurry, an extension to Mount Cuthbert was approved in 1911. The first train left Mount Cuthbert on 13 October 1915, nearly a year before the line was properly completed and officially opened for traffic. This line was extended a further twenty miles north to Dobbyn, but never reached its destination, Mount Oxide, due to the collapse of the Mount Cuthbert Company after the end of the First World War.

To the south-west of Cloncurry, an extension from Malbon to Dajarra was constructed as part of the unfinished Great Western Railway. Although it serviced the Duchess mine en route, it was not a mining railway. It was however the artery for spur lines to Ballara, Trekelano and Mount Isa, all of which were built with substantial contributions from the mining companies. The Ballara line was proposed by Macgregor Cloncurry Copper Mines Limited and negotiated by Hampden Cloncurry Copper Mines Limited which acquired the former company's properties in 1912. The company wanted to build the 22½ miles of branch line on the same terms as the Mount Elliott railway, but whereas the earlier line passed through pastoral country, the Macgregor spur terminated in rugged terrain, and had little prospect of general traffic. The government agreed only to loan the rails to the company, upon payment of five percent interest as annual rental, and reserved a right to purchase at any time. Thus, if the company defaulted, the rails could be recovered, experience having shown that they could be re-used elsewhere. Construction was commenced in 1913, and it was soon demonstrated that the government's caution was justified. Like so many syndicate lines hastily built to tap mines whose ore reserves were untested and lay largely in the minds of the company's promoters, the Macgregor line was not successful. Its

46. C.R. 1920-21, p.38.
47. In 1976, a further spur line was built to Phosphate Hill, again with contributions from the mine's operator. It closed, presumably temporarily, just over two years later, illustrating that mining railways remain risky even today.
cost and operating losses, together with further expenditure on a seven mile branch line, to the Trekelano mine in 1917, in no small way contributed to the Hampden company's financial difficulties.

The last major rail link in the north-west was built from Duchess to Mount Isa after the demise of the Cloncurry field. Discovered after the onset of the post-war depression in world metal prices, the deposits were opened up by Mount Isa Mines Limited, which by 1925, had secured a monopoly of the leases in the district. Labor was in power, and there were to be no more syndicate railways. Under strong pressure from the company, and encouraged by senior cabinet ministers who held a financial interest in Mount Isa, the government instructed a royal commission on public works to examine possible routes. It recommended construction of a fifty-four mile extension from Duchess, subject to the company agreeing to guarantee the government against losses on the line to the extent of £100,000, over ten years in annual installments. The company agreed to the terms: it was desperate for a railway. There were reservations that it was "a particularly doubtful project", but Theodore and his fellow ministers, McCormack and Jones were more confident, having invested in Mount Isa shares, and having determined that the Chillagoe state smelters would be kept open by Mount Isa lead ores. The Duchess to Mount Isa Railway Bill had a speedy passage through parliament and construction began in May 1926. Temporarily delayed by shortages of loan funds, the link was completed in May 1929.

The extension greatly expanded traffic on the Great Northern Railway whose fortunes had slumped with the mining depression. The

49. The Trekelano spur was built under the Mines Act, without assistance from the state.
52. Blainey, Mines in the Spinifex, p.77.
53. Q.P.D. CLIII, pp.142, 658. Part of the line was in use for a year before the opening. Queensland Railway Department, Weekly Notice 38/28.
branch line to Mount Isa itself showed no profits and the company accordingly paid its share of the deficit, while the government reaped profits on the long haul from Duchess to Townsville. In 1929 the government relinquished its first mortgage and bill of sale to enable the company to raise capital by debentures. During the thirties, a unique rate structure, which varied according to metal prices, was introduced whereby the government shared with the company in the fluctuations of the world market.\textsuperscript{54} This rate structure not only cushioned the impact of falling prices, but reduced any possibility of the company suspending operations, which in turn, indirectly benefited the state. Over the last fifty years, according to Blainey, Mount Isa Mines has paid dearly in freight costs for the rail link. Had the railway to the north-western mining fields been constructed from a Gulf port, survival in the 1920's and 1930's would not have been as agonising for mining companies and gougers alike, and railway freights would not have proved such a costly impost on the mining industry in the region. However it should be pointed out that it has been the absence of a serviceable port on the Gulf which left the company no alternative but to export through Townsville. No doubt they would have constructed such a port if it was economical; as it happened the company was not obliged to guarantee any funds for the reconstruction of the Townsville to Mount Isa line in the 1960's.

The fuel problems encountered by the Cloncurry copper producers inspired the construction of North Queensland's only other mining railway.\textsuperscript{55} Though only 49 miles in length, the line to the Collinsville coalfield has proved invaluable to Mount Isa. Money was first voted for the railway in 1884, but it was not completed until

\textsuperscript{54} After repeated representations by the company, suffering the effects of low lead prices, a freight rate was approved by the government which reduced charges on coal, coke, lead and zinc concentrates if the lead price was less than £22 per ton. Rates higher than those ruling previously were applied when it rose above that amount. C.R. 1932-3, p.25.

\textsuperscript{55} Mining railways such as Greenvale and Phosphate Hill, constructed since 1930, are outside the scope of this study.
August 1922, six years after construction was commenced. It was totally dependent on government finance; and the saving in the cost of shipping coal from southern Queensland for the government railways alone more than equalled the interest bill on its construction cost. The low priority accorded the line contrasts with the rapidity with which private lines to mining areas proliferated.

Geoffrey Bolton has argued that the railways of North Queensland were the result of "piecemeal expediencies, too little planned with an eye to future pastoral, agricultural, or industrial development." His explanation, however, understates the contribution of mining railways to reducing isolation, to developing a system of ports, and to opening up hinterlands for industries other than mining. For its part, the state could not be accused of gambling vast sums of money on northern mining railways in the same manner which it had in southern Queensland on extensions to pastoral and agricultural areas which have rarely returned a profit on capital outlay. Indeed, the Cooktown railway excepted, the government had the good fortune to build all the mining lines which were worthwhile. Those lines built privately without the slow deliberation of public projects eventually fell into government hands at prices well below their cost.

Two Royal Commissions into the mining industry, in 1897 and 1930, reported that the lack of suitable transport had been a major impediment on the financial success of many mining operations. The findings seemed to support the contention of R.G. Johnson, a leading Melbourne sharebroker with substantial Queensland interests, who argued in the prestigious Australian Mining Standard in July 1898 "that without proper means of transit anything beyond surface mining cannot be carried to a successful issue". Johnson claimed that, especially for base metals, railways were "a first and indispensable condition of

56. Brisbane Courier, 29 August 1922.
57. C.R. 1920-21, p.43; 1921-22, p.31.
mining. Yet the investment of too much working capital and over-commitments to debentures for private railways to reduce transport costs contributed substantially to the decline of mining in the Walsh and Tinaroo, Chillagoe, Etheridge and Cloncurry districts. Too often base metal companies were inclined to pick the eyes of the fields, mining the rich outcrops and shallow lodes to satisfy clamouring shareholders and to meet interest payments on the outlays on transport and treatment infrastructure. Had they been able to devote more capital to prospecting and to systematically developing large-scale operations on ore of medium to low value rather than paying exhorbitant amounts for the properties and overcapitalising their mines and operations, the demise of these fields might have been arrested. Further, if the companies such as the Chillagoe Company had been as successful as the political opponents of the mining industry feared, apprehensions about mighty empires controlled by mining giants might have been well-founded. As it turned out, with the depression in the mining industry in the inter-war years, the government was compelled to subsidise not only small parties of gougers but also the losses on freight rates which its policy of railway acquisition had incurred.

59. *Australian Mining Standard*, 7 July 1898, p.3063. Johnson overlooked the equally important condition of metal prices: whereas gold prices were fixed, base metals were subject to monthly fluctuations and the base metal mining companies invariably geared their activities to the state of the metals market.
Many writers of Australian history have propagated the delusion that the chronological sequence of events they have discerned in the south-eastern cities hold true for the whole of the continent. Architectural historians imply that when Europeans settled Australia they followed an unvarying logical sequence of evolution in the construction of their houses throughout the colonies:

His first house was of wattle and dab, his second pisé, his third of bark sheets, his fourth a log cabin, his fifth of axed slabs. Then the nails and sheets of iron and glass began to arrive from England or from a previously settled colony. Fully fabricated houses came for his leaders. Bricks were made, stone was quarried, cement, steel, pulpboards and plastics followed each other from overseas. That was the white man's order of structural progress. As late as 1900 whenever he started a new town in the back blocks he followed the sequence through. 1

Most of this process would have been utterly incomprehensible to a Palmer River miner of the 1870's. Nor would even the most observant Charters Towers burgher of 1910 have been able to distinguish about him buildings in the Georgian, Regency, Classical Revival, Victorian and Queen Anne styles, as the text-books on "Australian" architecture would have him surrounded. Few of the houses of North Queensland mining towns were ever afflicted with the picturesque primitivism found in Richard Daintree's photographs, 2 nor did they ever aspire to the fashionable historicism of southern cities. Instead, most emerging northern towns included houses with a standard pattern of timber and iron construction, based on industrial methods imposed partly by the environment but more by a shrewd fraternity of builders and merchants; and having set the pattern, retained it little changed for three or four decades.

2. See for example "The Old Bark Hut" in G.C. Bolton, A Thousand Miles Away (Brisbane 1963), facing p.145. This photograph was probably taken near Rockhampton in 1870.
Where labour and time consuming huts of slab and bark were built in other parts of Australia, they were an expression of isolation from technological resources, and of an energetic determination to create substantial housing. These two elements rarely occurred in combination in North Queensland mining settlements for long. Instead the northern miner - essentially a gambler, and an impatient one - was reluctant to spend time constructing a dwelling until the permanence of the field had been well proved. This confirmation in almost every case led quickly to the harnessing of industrialised transport and manufacturing techniques for mining, and their availability to the house-builder. Thus, except for a short interval identifiable in the early years of the deep gold-mining towns, access to an imperial commercial infrastructure gave rise in North Queensland to forms of housing determined more by the technology of the northern hemisphere than by local environmental considerations such as climate and materials. Indeed, local circumstances were ignored whenever possible, rendering the whole concept of "vernacular" housing in the region questionable, and in need of careful definition. 3

Whereas throughout history the construction of habitation had normally been accomplished by arduous labour on the building site, the Industrial Revolution wrought changes in this ancient application of on-site effort. These changes were reflected in European settlement throughout North Queensland after the 1860's: shortage of labour induced the adoption of more systematic building methods, and new industrial techniques supplied cheaply prefabricated materials, readily transported to distant places and capable of assembly by semi-skilled workers. Varying degrees of prefabrication had been adopted in the construction of Australian buildings since early European settlement.

3. "Vernacular" is a word borrowed from the study of language and used loosely by architectural writers to describe regional as opposed to metropolitan tendencies, e.g: "native or local style...folk building to be distinguished from guild building" (J. Harris and J. Lever, Illustrated Glossary of Architecture (London 1969), p.73); "designed by an amateur...guided by a series of conventions built up in his locality...local materials would be used as a matter of course" (R.W. Brunskill, Illustrated Handbook of Vernacular Architecture (London 1978), p.26). Its applicability to any significant number of North Queensland houses is doubtful.
Houses in North Queensland Mining Towns, 1864-1914

But by 1860, decades of European expansion into the hinterlands of new continents, and consequent demand for easily erected habitation, had honed British technology to a high level of efficiency in the supply of ready-to-erect building components. The industrial system which backed European settlement in North Queensland was proficient in the manufacture of buildings derived more from the requirements of the factory than from those of the site: "construction processes that would shift the major component of labor from the crude area of field operations to the controlled, and increasingly mechanised, conditions of the factory." 4

The first large-scale European penetration of North Queensland was achieved by some thousands of alluvial miners and entrepreneurs, predominantly male, young and unmarried, born in the British Isles, but with some years of experience on other Australian mining fields. 5 Their urge to follow the rumour of a new rush led to almost universal adoption of the most portable and easily constructed form of habitation - the tent. In 1876, three years after the establishment of the Palmer Goldfield, 92% of its inhabited structures were tents. 6 In the early weeks of the Palmer rush, the new port of Cooktown was a canvas city, with its few relatively substantial buildings constructed of sawn timber, roofed with canvas or shingles. 7

Subsequent developments in building were related to the changing economic circumstances of the settlement; dependent themselves partly on geology, and partly on the success of the community in defeating the problem of isolation. The great majority of the alluvial settlements in the North never amounted to more than a scattering of tents; when the gold

5. In the Register of Births for the Palmer District, 1874-78, 77% of the fathers listed, and 76% of the mothers, were born in Britain, Ireland or Northern Europe; but 78% of their marriages had taken place in the Australian colonies. (Register held at Cooktown Courthouse).
6. Fifth Census of Queensland (Brisbane 1877) Table 12, p.14. This compares with 14% tents among the total habitations of the Colony.
7. Panoramic photograph in John Oxley Library.
ran out within weeks or months, or when word arrived of a better prospect elsewhere, they were deserted within hours, leaving almost no long-term evidence of human occupation. The miners' transient lifestyle is described in a great number of nineteenth century sources: the surviving diaries of such miners are studded with statements like "I intend to clear out if I don't get something soon"; "I think I'll make for Gilberton". Even the smaller reef-mining towns were subject to these vagaries. In 1891 the failure of the mines at Grass Hut caused "a stampede away from the new township, leaving a couple of streets of nearly new houses and two hotels, a store, and butcher's shop to follow at their leisure."

But when the location of deep reefs promised a stable long-term future for the community, a change occurred in its composition and ethos which expressed itself in the forms and materials of its buildings.

Reef-mining brought three changes which altered the community's expectations in housing: over a short period it induced a confidence in sustained prosperity which supposed a larger and more permanent residence than the tent of the nomad. At the same time it reorganised the casual labour basis of alluvial mining; with miners being forced first into syndicates for shallow reefing, then as depths increased beyond the capabilities of horse-drawn whims and fibre ropes, into wage or piece-work labour for large mining companies. The resulting division of labour and scheduled leisure time allowed both skilled and unskilled builders more opportunity to work at the construction of houses. With these changes, underground mining brought also an infrastructure which in requiring the services of efficient shipping and overland transport, sawmills, foundries, smiths, plumbers and carpenters, could also accommodate the formation of a domestic building industry.

Of these three conditions attendant on underground mining - confidence, labour and access to materials, the first was normally achieved before the others. The miner became sensitive to the shortcomings of life in a tent,

P84: Encampment at Cooktown during the first Palmer rush 1873-74
[Oxley Library]
P05: Slab and bark buildings on the Charters Towers goldfield

[J. Manion]
and sought a more commodious dwelling before materials and skills were available in sufficient quantity to meet his requirements. Thus in the relatively short period between the achievement of long-term prospects and the establishment of a reliable commercial infrastructure, the few instances of large-scale primitive building appeared in North Queensland, concentrated in the reefing towns. Ravenswood and Charters Towers miners built extensively in bark, and sometimes in slab, for a few years in the 1870's, before improved transport made weatherboards and corrugated iron available to all. By 1880, the Ravenswood warden reported: "The town has much improved in appearance and the miners seem more inclined to settle permanently, and one sees very few eyesores in the shape of tumble-down humpies and calico domiciles." Even in their first years, buildings of any pretension in both towns utilised industrially manufactured components. The few existing photographs show the same primitive developments in Gilberton and Maytown, but both towns were short-lived. Croydon was another settlement which might well have undergone a primitive period, but the arrival of the railway provided access to industrial products only five years after the discovery of the deep reefs. The evidence of house-forms in that critical period is slight.

From the outset the coastal towns had access to imported sawn timber and corrugated iron, and the pattern of North Queensland's domestic architecture was established in Bowen and Townsville in the 1860's. The immediate adoption of sawn timber-framed houses is demonstrated in early photographs of Cooktown, Cairns, Townsville and Bowen, and was anticipated, if not directed, by the founders of some of these ports. J.M. Black and Robert Towns, in planning their vision of Townsville as a private entrepôt, intended to monopolise the supply of imported sawn timber to builders, and were most anxious about the ability of the sawmill at

10. A.R. 1880, p.23. The link between industrial building materials and reef mining is suggested in the light of the warden's comment: "'Fossicking' here is almost out of date, and those who do pursue it find it difficult to make a living." Ibid.

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Bowen to undercut their prices. The structural techniques adopted in the earliest houses persisted nearly unchanged until the early twentieth century, although building forms and detailing underwent regional and temporal variation.

The house that arose from these timber components had walls structurally composed of light studs, usually 50 x 100 mm (2 1/2 x 4"), mortised into top and bottom plates and clad with chamferboards on the inner side, leaving the studs and diagonal braces exposed externally. Similar techniques had seen service throughout the Pacific before the 1860's, and had their origins in building practices evolved in early nineteenth century Britain and North America. While timber construction methods were among the earliest used in building, these normally involved the structural use of relatively few widely spaced heavy posts, with the intervening spaces being filled by various forms of infill or cladding. The new technology differed radically in relying on a structure of light, closely-spaced posts, or studs, with the load thus evenly distributed along the whole wall surface. This stud-frame wall, calling for a larger number of smaller, standardised components, was a product of the Industrial Revolution both in requiring factory methods to produce these members and in demanding the service of large numbers of cheaply produced nails to hold them together. It also accommodated a decline in craftsmanship, since by spreading the structural load over a greater number of vertical members, the wall was more forgiving of faulty joinery in any one of them.

Reliance on mass-production in wall framing has frequently been ascribed to the USA, where the "balloon frame" is reputed to have been

12. "Chamferboard" is the name used throughout Queensland for a form of cladding nailed flush to the studs and overlapped by means of rebates or chamfers on each board. It is similar to "shiplap" or "German siding" (J.S. Scott, A Dictionary of Building (Harmondsworth 1974), pp.158 and 211); and is illustrated in Brunskill (Handbook, p.65) as "lapped boards".
HOUSES IN NORTH QUEENSLAND MINING TOWNS, 1864-1914

developed in Chicago in 1833, spread across the continent in the following two decades, and eventually brought to Australia. The origins of the stud frame are probably more complex. Industrialisation and shortage of timber were bringing about a decrease in size and a closer spacing of wall posts in the north-eastern USA well before 1833; the same process was probably occurring in Britain for the same reasons in the late eighteenth century. Light timber framing was in use in military and recreational buildings throughout the British Empire, and was being accepted as a suitable house material in the colonies. Adopted throughout the Pacific basin, the stud frame varied in detail, particularly in the size of its components and the nature of its joinery; but it should not be identified with the skew-nailed "balloon frame", its simplest variant, which was reviled by British builders as "'jerry' of the worst description".

Stud-framing as employed in North Queensland from the mid-1860's differed in several respects from the variants found elsewhere. First, in its near-universal adoption: photographic evidence, and the few early houses surviving, suggest that only rarely was any other walling technique adopted in North Queensland towns. Brick was used occasionally; stone and earth were almost unknown. There was never the diversity in construction technique shown in Beaufoy Merlin's near-contemporary photographs of Hill End and Gulgong, where over 30% of the houses were

15. See "A Portable Cottage for the Use of Emigrants and others", in J.C. Loudon, Encyclopaedia of Cottage, Farm and Villa Architecture (London 1833), pp.251-257; and examples described in Herbert, Pioneers, pp.4-29.
17. A small proportion of brick houses were built from the earliest years - probably the first being Black's house in Townsville, part brick and part timber. Only one stone house (in Cooktown - now vanished) and one of earth (an adobe house in Georgetown, still standing) are known in North Queensland towns, although others almost certainly were built.
of local primitive materials — slab, bark or earth. Second, the North Queensland frame embodied much lighter materials than those elsewhere specified for stud frames, had no nogging between the studs, and was normally trussed against racking by two light braces let into the inner face of the studs against the chamferboards. This simple bracing contrasted with the heavier decorative forms of x-braced framing found in Southern Australia and New Zealand; only occasionally built in North Queensland. The x-braced wall consciously imitated the traditional British half-timbered wall. The most conspicuous North Queensland variation in the stud frame was the practice of lining the wall internally, and leaving the frame exposed on the exterior. These exposed frame walls were built wherever the light timber wall was adopted, but nowhere in such numbers as in North Queensland, and only rarely elsewhere on walls unprotected by a verandah.

All of these variants represented an elimination of unnecessary material — North Queensland’s timber wall was the stud frame reduced to its lightest and cheapest essentials. Undoubtedly the preference for exposed frames was partly a climatic consideration in a region where little insulation was expected of a wall; but it ignored the other climatic extreme of the region — the rainfall. Complex bare woodwork invited water collection and subsequent wet rot.

The most common early house-form was a cottage comprising two rooms, together measuring about 3 x 6 m (10' x 20'), roofed with a transverse gable clad with corrugated iron. Verandahs up to 3 m (10') in width shaded the front and rear of the core rooms, and the whole structure was elevated on round timber stumps 1 m (3') or less in height. The kitchen, bathroom and lavatory were housed in individual buildings a short distance

18. K. Burke, Gold and Silver (Harmondsworth 1973). This statement is based on the photographs selected by Burke.

19. North Queensland studs were normally 2" x 3" or 2" x 4"; compared with 2" x 5", 3" x 4" or 2" x 4" in New Zealand in the 1840's, (P. Coutts, "Old Buildings Tell Tales", World Archaeology 9 (1977), p.217);2" x 6", 4" x 4" or 4" x 6" in the USA (Ellis, Carpentry, facing p.270, and G. Woodward, National Architect (New York 1969) passim).
The timber two-roomed cottage
P86: Miner's Cottage at Ravenswood c.1900
[Mrs. A. Bowden]
An unusually small cottage at Irvinebank
P88: Corrugated Iron Cottage at Petrord  [P. Bell]
to the rear of the house. Depending on the prosperity of the occupant and the proximity of a timber mill, the verandahs may have been decorated with fretsawn brackets in stylised foliage designs. The verandah balustrades were at first usually of timber, cross-braced to form a repeating x-pattern; in the 1880's a balustrade of vertical 25 mm (1") dowelling set into rails became fashionable. Demand for space usually led to the enclosure of the rear verandah within a few years, and by the late nineteenth century it was commonplace for what had been the rear verandah in the earlier cottages to be enclosed with timber walls at the time of construction, although retaining its skillion roof.

Higher transport and labour costs in more remote areas often led to these cottages being built in corrugated iron. The framing for iron houses was usually 100 mm (4") square timber posts at corners and openings, with belt rails and braces. Unlike chamferboard, iron cladding was normally nailed outside the frame. These iron cottages, still standing in large numbers in North Queensland, are the most common single house-form in former mining towns. Frequently they have been altered in form by subsequent extension: through the addition of verandahs on one or both sides, the lengthening of the building to the rear of the original verandah, and the enclosure of verandahs to form rooms.

Stability and continued development encouraged the construction of larger houses. There had been a few more pretentious dwellings erected in coastal towns shortly after first settlement, usually by merchants with a vested interest in demonstrating the permanence of the town: J.M. Black and William Aplin both built large houses on Melton Hill in 1864.\(^{20}\) Ironically both houses' timber was sawn in Bowen, a port whose attractions as a commercial centre both men were eager to deny. Subsequent events in the domestic architecture of the ports were dependent on the progress of their hinterlands.

\(^{20}\) Plans of Black's house at Townsville City Council, City Architect's Department. Aplin's mentioned in Reminiscences of Benjamin Toll, unpublished typescript, Delamothe Collection, James Cook University Library.
Architectural development reflected not only a vague notion of long-term prosperity, but also a measurable change in the population structure of the mining towns. By 1881, the population of Charters Towers was estimated at nearly 60% women and children; in the succeeding five years an influx of invested capital and the completion of the railway from Townsville commenced an upsurge in building, with houses of a new type predominating: the family home with four rooms. The four-roomed house had a core nearly square in plan, with a pyramid roof, and verandahs at front and rear. By about 1890 the practice was established of attaching the kitchen to the rear verandah. Decorative details were standard on houses of this form—verandah brackets and mouldings on chamfered posts, fretsawn ventilating panels in ceilings and over internal doors, sheetmetal ornament in the form of trimmed edges on roof ventilators and window hoods, and finishing pieces on corners of roof guttering all became almost mandatory. But the materials and methods of construction were still those established in the 1860's. By the 1880's North Queensland houses were often painted white, as Garran observed:

...the township at first glance from a distance might be mistaken for an encampment under canvas. The little white cottages of wood and galvanised iron shine under the tropical noon like snowy tents. The advantages of white paint in reducing heat absorption were well understood—several northern building companies advertised Patent Refrigerating Paint.

More substantial housing in Charters Towers and Townsville was part of a general replacement of older buildings as the effects of the great mining boom of the 1880's were felt throughout the community:

21. A.R. 1881, p.9. Charters Towers' population was 33% female at its first Census in 1876.


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The timber four-roomed house
P80: Elevated four-roomed house at Cairns, 1903  [B.K. Harris]
P90: Mass-produced sheetmetal ornament, Charters Towers [P. Bell]
Locally hand-cut sheetmetal edging at Kidston  [P. Bell]
HOUSES IN NORTH QUEENSLAND MINING TOWNS, 1864-1914

So rapidly are new and handsome edifices replacing the buildings in which the 'pioneers of the wilderness' labored and lived that it will be impossible to recognise the Townsville of five or six years ago in the well-built city that will be in existence in but a short time to come...Successive fires have cleared away most of the blocks of tumble-down wooden shanties...and almost all the rest have been pulled down by their owners in order to make the most of the valuable sites for business purposes. 24

This building boom did not occur simultaneously in other northern towns. Croydon was scarcely discovered, and Ravenswood was gloomily contemplating its mundic ores - both towns underwent a similar reconstruction in the late 1890's. Despite its earlier promise, Bowen had been eclipsed by Townsville and the Great Northern Railway, and was stagnant. Cooktown was in slow decline, the Palmer reefs having proved incapable of matching the field's alluvial returns. Cairns, the newest of the ports, achieved no great significance until the early twentieth century; in the 1880's it was a rather dismal township ringed by mangroves:

...with the exception of some of the government buildings, utility and economy alone have been considered, elegance being reserved for a later development. 25

Even in the more prosperous towns the new grandeur was limited in extent. A few notable residences were built - Edmund Plant's Thornburgh in Charters Towers by far the most impressive; but it was not usual for those made wealthy by the mines to display their affluence on the site:

It has been too much the practice for colonists on becoming wealthy to cease to be colonists altogether, and to remove their establishments and their families to the mother country, drawing their incomes from colonial investments but spending them at the other end of the world. 26

Those who stayed adopted a suitably enlarged version of the four-roomed house as their residence, with an entrance porch, central hallway, optional bay windows to the front rooms, and kitchen and servants' wing attached to the rear. Even the houses of the most prosperous employed exposed frame timber walls and an iron roof, differing from the common house only in their scale and the presence of a few embellishments. However, the more modest four-roomed house never entirely replaced the two-roomed cottage: although the house was generally a later form, there is no sharp demarcation between the two; and they probably reflect differing levels of affluence within the community at any one time, rather than a general change in affluence over time. Since most building activity ought to have occurred in times of prosperity, a divergence in building styles might be expected, as there would have arisen simultaneously a demand for larger and more elaborate houses; and cheap and simple accommodation for new miners and their families. In more remote areas the four-roomed house remained exceptional: the iron cottage was the typical house on the Chillagoe, Etheridge and Cloncurry fields throughout the mining years.

Further, there existed a remarkable degree of standardisation among the houses of northern mining towns. The number of house-forms was limited, and the materials and construction methods varied relatively little from one town to another over a period of thirty or forty years. This suggests an ignorance of, or more probably a resistance to, contemporary developments in metropolitan Australia. North Queenslanders remained impervious to the stylistic movements characterising the late Victorian and Edwardian periods in the South.27 Austere necessity probably imposed much of this standardisation on the northern building industry. While it might seem paradoxical to describe the commercial activities of a gold-mining region as austere, the building industry's economy of operation was governed not by the town's output of wealth, but by the costs of labour, materials and transport. Labour was both

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A mining agent's house in Charters Towers - one of the few brick houses of the region [D. Roderick]
P93: Thornburgh in Charters Towers was the most elaborate house of the mining era

[ Thornburgh College]
scarce and expensive in every mining town. For example, wages for a Queensland carpenter had been optimistically described as "8s to 9s per day" in an 1873 immigrant's handbook, but within twelve months the Etheridge gold commissioner reported: "it is impossible to procure labor at any price even Chinamen are not to be had." Ten years later, carpenters in Georgetown earned £1 a day.

The cost of materials placed further constraints on the builders' imagination. Imported goods of all kinds were sold on the mining fields "at prices suggesting a city in a state of siege." Transport of materials from the coast could add £30 a ton (and sometimes much more) to their landed cost. In Ravenswood before the arrival of the railway, corrugated galvanised iron which sold in Brisbane at about eightpence per linear foot or £27 per ton, fetched 1/3 per foot, about £70 per ton. In 1876 the Queensland National Bank sold 60 leftover sheets of iron in Maytown for nearly £52 - a price of about 2/6 per foot or £137 per ton. This price must be considered in terms of the cost burden imposed on a community such as Maytown by its isolation: the bank had earlier in the same year paid freight of £112 a ton on building materials from Cooktown.

29. Commissioner's Report for January 1874, 74/1367, WOR/A81 Q.S.A.
30. Brisbane Courier, 2 February 1884, letter from "Contractor". This compares with wages in the local mining industry of about £4 per week.
31. W. Lees, Goldfields of Queensland: Chillagoe...Hodgkinson issue (Brisbane 1899), p.31.
32. The rate of £30 per ton recurs widely: Maytown, 1876 (annotation by F.D.C. Stanley on tender document in 77/5357 WOR/A140); Georgetown, 1884 (EDU Z 1020); Croydon, 1887 (EDU Z 701), Q.S.A. But wet season conditions and profiteering carriers sometimes raised the rate as high as £200 per ton. (Queenslander, 28 February 1874, referring to Palmerville).
33. Account from Alfred Shaw, Brisbane, 25 November 1880, in EDU/Z1472 Q.S.A.
34. C. Becke to Secretary for Education, 28 May 1872. 72/829, EDU/Z2309 Q.S.A.
The staggering cost of labour and building materials in inland towns made sea freight a relatively small component of the final building cost — about £3.10.0 per ton from Brisbane to Cooktown in 1874. Hence the ability of southern builders to reduce the labour cost component by industrialised methods enabled them to offset the small sea freights and to compete on the northern market with prefabricated buildings. The colonial government, which often imported its buildings, and wealthier institutions such as banks and churches were able to take advantage of this situation. The costs for the Customs buildings at Cooktown were estimated at:

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Framed and ready to ship (ex Brisbane)</td>
<td>£580</td>
</tr>
<tr>
<td>Shipment</td>
<td>£200</td>
</tr>
<tr>
<td>Erection at the Endeavour</td>
<td>£120</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>£900</strong></td>
</tr>
</tbody>
</table>

In 1887 the Queensland National Bank shipped prefabricated components, three carpenters and its Clerk of Works from Brisbane to Normanton to build its branch offices at Croydon and Cumberland. Croydon's remoteness from the east coast ports by land made it an ideal market for southern merchants, as the increased shipping distance scarcely affected the landed cost of materials. As late as 1895, Maryborough and New Zealand pine cost 30/- per 100 super feet in Croydon, while locally sawn timber was only 1/- cheaper.

One northern enterprise managed to compete with great success by adopting industrialised techniques locally and maintaining a slim advantage on freights. John and Matthew Rooney established themselves in Townsville in 1882 as Rooney Brothers, architects, builders and contractors, and in partnership with James Harvey immediately founded Rooney and Company, timber merchants. The two firms, utilising a fleet

36. F.D.G. Stanley to Under Secretary for Public Works, 9 April 1874, 74/1586, WOR/A81 Q.S.A.
37. F.D.G. Stanley to Under Secretary for Public Works, 20 December 1873, 73/5351, WOR/A81 Q.S.A.
38. Queensland National Bank: Premises Register.

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P94: Rooney's timber yard on Ross Creek, Townsville
Advertisements for precut houses supplied by Brisbane firms [N.Q.R. 1916]
of eight coastal vessels and the most modern milling and planing machinery available from Britain and California, fed their mills with timber from Maryborough, Hobart and San Francisco as the market demanded. In time, they dominated the North Queensland building industry. Riding the crest of railway construction, they ousted the last of the bush carpenters from the railway towns, and built as far afield as Port Moresby and Croydon. But they had no monopoly: the firms of Thomsen and McCready in Townsville, Craven and Toll in Charters Towers, Petersen in Herberton, Severin in Cairns and McGregor & McKee in Croydon adopted similar methods with fewer advantages; all built similar houses. Firms in mining-dependent towns were unlikely to risk time or money in experimentation.

This disciplined and competitive market, constrained by costs and constantly threatened by southern invasion, seems to account for much of the conservatism and standardisation of the northern building industry. The ascendancy of the successful North Queensland builders was challenged anew in 1903 when the Brisbane firm of James Campbell and Sons launched an aggressive sales program in provincial Queensland, offering "Redicut" houses, utterly standardised and prefabricated, landed at a price few northern firms could match. Brown and Broad joined the market soon after with an identical product. Rooneys succumbed within a decade, their decline accelerated by the death of Harvey, organiser of the timber works, in 1904, and the loss of Matthew Rooney in the wreck of the S.S. Yonga in 1911. The heirs of the firms reconstructed to continue as Rooneys Limited in other commercial fields.

Most northern mining fields were in decline by the end of the first decade of this century: even Charters Towers, Ravenswood and Croydon were by then dependent on their very deep mines, and facing ever-higher

41. James Campbell & Sons, Redicut Homes (Brisbane n.d.).
production costs. Pastoral and agricultural industry had grown in significance, and as the mining towns dwindled in size and number, their houses were dismantled for re-erection in the expanded sugar and cattle towns. The new ready-to-erect houses built in this economic climate were simple, sober buildings. Partitions and some exposed walls had vertical tongue-and-groove boards secured by rails, with simplified joinery. Decorative details were staid or had vanished entirely: stark little brackets with no internal fretwork replaced the generously foliated ones of the 80's and 90's. The skillion verandah with its curved roof iron disappeared; the verandah roof became a straight extension of the core roof, forming the hipped gable and the expanded "bungalow" which dominate the streets of Cairns. This type of house, almost identical by 1910 from the hands of either a local builder or a Brisbane mail-order firm, was encouraged to some extent by the Workers' Dwellings Scheme, under which a worker with an annual income under £200 could apply for a state loan of up to £300 to build a house on his own land. 42 "Radicut" homes were specifically designed for approval under the scheme, and local builders found it prudent to conform to accepted designs. 235 Workers' Dwellings had been built in North Queensland by mid-1914, 43 helping to establish a state-wide conformity which erased the few distinctively regional characteristics of the northern house.

From 1864 until 1914 there predominated in North Queensland a form of house construction which, while never a vernacular development in the full sense, was a distinctive variation of several widely-practised techniques. The northern miner's usual house was neither a rustic hut, nor a boom-style mansion: more often it was the intelligently egalitarian product of far-away industrial processes, necessarily designed to meet the demands of isolation, transience, commerce and occasionally the North Queensland environment.