

NOTE: More on earthquake fatalities in Australia

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An average of about 10 000 deaths a year have been recorded this century as a result of earthquakes worldwide. Most of these resulted from the collapse of human-made structures. Secondary effects of earthquakes (landslides and tsunamis) have made a lesser but significant contribution to the total.

McCue & others (1990) asserted that no earthquake-related deaths had occurred in Australia before the Newcastle earthquake, but Doyle (1991) recalled the mention (Everingham, 1968) of an earlier event which resulted in the death of a miner. Everingham noted that in the event at Kalgoorlie of 28 August 1917 (given incorrectly by Curlewis as 29 August 1917 in the *West Australian* of 25 January 1940):

An earth movement occurred towards midnight resulting in a fall of rock in the Great Boulder (mine). One man (Jack Flanagan) was killed and several injured. The fall of rock occurred at the 2250 ft level where ten men were working in a stope when a peculiar rumbling noise was heard. There were slight earth tremors followed by a loud report and a large mass of rock fell from the roof of the stope. The stope immediately below was also affected and altogether it is estimated that about 1000 tons of rock fell and heavy timber was smashed like matchwood.

Curlewis stated that the Kalgoorlie 'tremor' was felt as far as Albany but, according to Everingham, an earthquake felt near Albany by the Breaksea lighthouse keeper was two months earlier, on 10 June 1917, and at a different time of day, between 6 and 7.30 pm. The 'tremor' at Kalgoorlie was felt only locally and caused damage in the mine, and was therefore almost certainly a rockburst rather than a tectonic earthquake.

Recent evidence has come to light that shows that, even if the Great Boulder mine casualty was attributed to an earthquake (which we dispute), the unfortunate miner was not the *first* Australian earthquake casualty. The evidence concerns interpretation of cause of death following an earthquake.

The State Coroner of New South Wales, enquiring into the deaths at Newcastle, concluded that a thirteenth victim lost his life as a result of the earthquake when he suffered a fatal heart attack. The coroner's finding has a bearing on an earlier earthquake we have investigated as part of an ongoing study into the historical seismicity of Australia. The Warooka earthquake, named after the Yorke Peninsula town which suffered most damage on the night of Friday 19 September 1902, is the second largest earthquake in South Australia since European habitation (McCue, 1975; Everingham & others, 1982). The Adelaide newspaper *The Advertiser* of 23 September 1902 reported from Warooka that

At a few minutes past 8 o'clock the inhabitants were startled by a strange rumbling noise, and immediately afterwards experienced a most violent shock, closely succeeded by another one of equal violence. Women and children rushed screaming into the street, cows bellowed, horses stampeded as if mad . . . The buildings shook violently, pictures and ornaments being hurled to the floor, and it seemed as though

the whole township would be destroyed . . . It is indeed a wonder that no lives were lost. Had the shock come a few hours later, when all were in bed, several fatalities would undoubtedly have had to be recorded. As it was a number of miraculous escapes were experienced.

The paper also carried two stories from Adelaide:

A death after the shock

The earthquake which caused such general alarm on Friday evening had a most serious effect upon many people. Men and women susceptible to nervous attacks suffered, and are still suffering, greatly as a result of the earth tremors. A death, which was accelerated by Saturday³ evening's shock, occurred during the evening. Mrs Walker, who resided at Eastwood, and who for some time past had been under the care of Dr. Sweetapple for heart troubles, received such a shock, when the house began to rattle that she expired almost immediately. Several women are reported to be in a semi-unconscious state, the slightest noise having a most distressing effect upon their nerves. Other people are suffering to a greater or lesser extent, and it will be some time before many recover from the excited state into which they have been thrown.

Another death

On Monday morning Mr. S. J. Heinrich, of High-street Kensington, reported to the Marryatville police that Mr. Charles Masters, a retired farmer aged 70 years, who resided with him, had died suddenly that morning. For his age he was a strong, healthy man, but the earthquake shock which occurred on Friday night seriously upset him for the time being. He appeared to recover from the shock, but on Sunday evening complained of being unwell and retired to bed. When visited at 6 a.m. on Monday he seemed in good health, but an hour later he was heard to be groaning and he died before medical aid arrived.

We may therefore conclude that the 1902 earthquake claimed two lives and that Mrs Walker and Mr Masters are the earliest known casualties of Australian earthquakes. Whether Aborigines suffered a similar fate will probably never be known, but the risk from rockfalls was not negligible, as the following extract from the *Maitland Mercury* of 30 June 1868 shows:

The late earthquake — The effects of the recent convulsion have been hitherto noticed only in connection with the damage done to buildings, but we are told that in Cabbage-tree Gully (a depression among the range of mountains bordering the Paterson) the earth-wave has left marks of its progress of an entirely different character: there huge rocks have been split and rent, and stones which for years have been embedded in the soil are upheaved and overturned.

Doyle's (1991) brief discussion on rockbursts is interesting, but rockbursts cannot be considered the same as natural earthquakes in the context of fatalities and risk. Mining is a dangerous occupation and the risks engendered by mining are presumably accepted by miners and their employers. Earthquakes do not have the same causal link with human activity. Their risk could be avoided to some extent if people in areas most at risk moved away from plate boundaries (San Francisco to Denver or Wellington to Auckland). In Australia the difference in assessed hazard varies only marginally throughout the country and an earthquake could occur anywhere. We can do nothing

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³ As given earlier in the report, this presumably should be Friday.

about earthquake hazard, but we can reduce the subsequent risk of injury or loss of life according to how much we are prepared to pay for better earthquake resistance in our structures and better building codes.

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Peter Gregson provided extracts on the fatal accident in the Great Boulder Mine from early Western Australian newspapers. Cynthia Hunter found and drew to our attention the extract from the *Maitland Mercury* of 30 June 1868.

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