



"Imagine a sudden wall of water up to 20 metres high coming down from Murrurundi at enormous speed" . . . Dr Conaghan with a "fossil wave".

Photograph by PETER RAE

Rock doctor catches up with our prehistoric surf

By JAMES WOODFORD

One of the things that scientists know for certain about the waves which dumped billions of tonnes of sandstone on Sydney was that no-one was around to catch them.

Dr Patrick Conaghan, a senior lecturer in the School of Earth Sciences at Macquarie University, believes a succession of catastrophic, massive flood waves, possibly 20 metres high and up to 250 kilometres wide swept down from an ancient lake that stretched from Murrurundi, north of Sydney, to the Carnarvon ranges in central Queensland.

His theory about how Sydney got its sandstone can be perfectly illustrated by recently discovered "fossilised waves" in cliffs above the Wolli Creek valley.

At the time of the flood-waves, in the Triassic period about 237 million years ago, the South Pole was somewhere west of Walgert.

in north-west NSW, and Australia was still part of the super continent of Gondwanaland.

The Sydney basin was a sandy river-plain vegetated by ferns and seed-ferns and inhabited by amphibians, reptiles, fish and freshwater sharks.

"Imagine a sudden wall of water up to 20 metres high coming down from Murrurundi at enormous speed . . . on a front up to 250 kilometres wide," Dr Conaghan said.

"Imagine that it would tear the whole landscape apart - and that's what it did."

The water came from what Dr Conaghan calls Lake Napperby, which occupied what is now the Gunnedah basin to the north of the Sydney basin. Periodically, glaciers and small ice caps in the New England Highlands east of the lake suddenly released bursts of glacial lake water.

Dr Conaghan compared this to emptying a full bucket of water into another full bucket, causing an instantaneous spill.

As far as he was aware, the catastrophic flood deposits of the Hawkesbury sandstone were about 235 million years older than any other similar deposits in the world. The rocks have been dated from plant micro-fossils of spores and pollen.

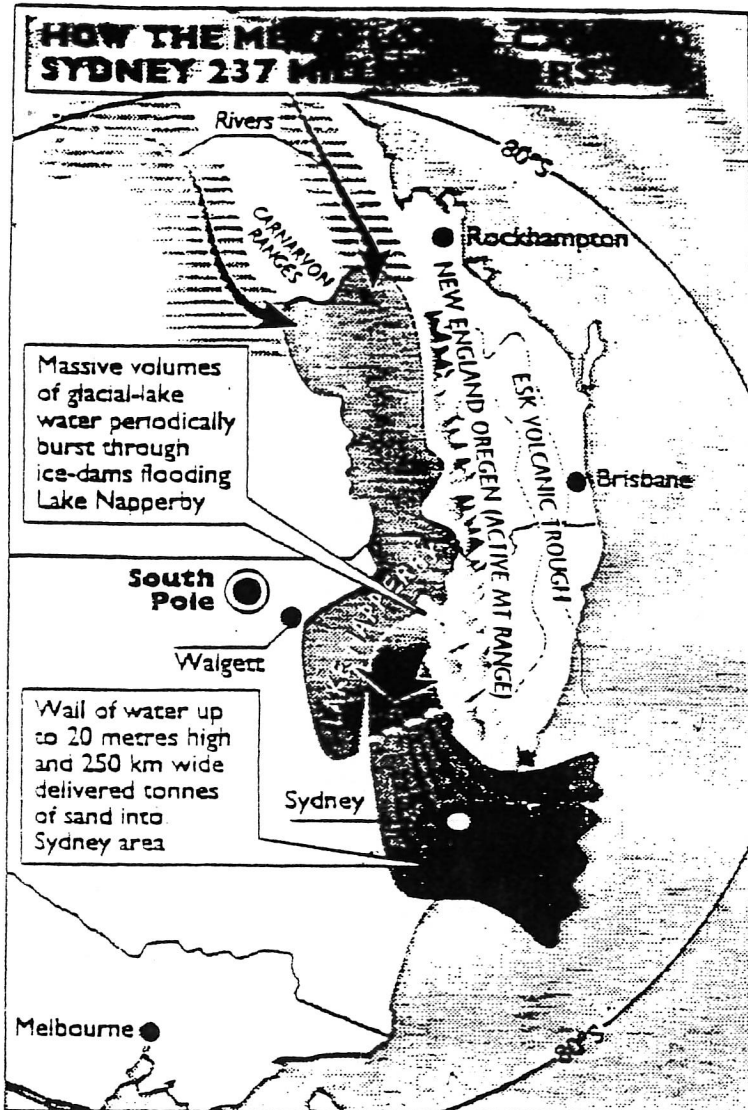
The fossil waves at Wolli were formed as the floodwaters began to recede.

The waves, which geologists call recumbent cross-beds, record the distortion of sediment layers caused by the massive floods and are found around the world.

But Dr Conaghan said the Wolli waves, which were three metres tall, were twice as large as any other known.

Dr Conaghan was shown the cliff where the waves are pre-

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served by members of the Wolli Creek Preservation Society. They are in a weed-infested area of Earlwood that is littered with bricks and rubbish.

He believes the waves should be given heritage listing because of the insight they give into the palaeogeography of the Sydney region.

The flood-waves, super-concentrated with sand and mud, sporadically devastated Sydney's Triassic geography and plants and animals for nearly two million years.

The initial force of the floods left kilometre-long layers of almost structureless sediment which were up to tens of metres thick. Today, these layers are quarried to produce almost flawless sandstone used for building.

The source of this sandstone had puzzled Dr Conaghan and other geologists for decades.

Such sediment is extremely rare if not absent in the deposits of other rivers around the world. Also, Dr Conaghan said the volumes and velocities necessary to explain these types of sediment flows must have been huge.

It was the discovery of Lake Napperby a few years ago by researchers from the University of NSW and the Geological Survey of NSW that allowed him to put his theory of the origin of Sydney's sandstone.

In the days after the peak of these periodic flood waves, the area from Mittagong to the Hunter Valley was inundated with fast-flowing water. These receding floodwaters continued to transport large volumes of sediment for many days.

It was in these secondary sediment deposits that the recumbent crossbeds formed at places such as Wolli Creek.