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Bro. Dr. JOHN JOB CREW BRADFIELD
CMG, DSc, ME, M Inst CE, MIE Aust.
(1867-1943)

The name John Job Crew Bradfield, will be forever associated with such engineering masterpieces as the Sydney Harbour Bridge and the Story Bridge in Brisbane. He was born on Boxing Day, 26 December 1867, at Sandgate in Queensland.

His parents, John and Maria Bradfield and family arrived from England in January 1857 and settled in Ipswich. They were joined in 1859 by Maria's brother, William Crew and her sister Susan with husband Charles Pennell. John senior was a brickmaker and he set up in business with his in-laws.

The business prospered until 1867 with the family providing bricks for the Post Office, Telegraph Office, the National School, Ipswich Grammar and the Bank of New South Wales amongst many other buildings. The brick building boom began to falter in 1867 when J. Bradfield junior was born and collapsed altogether in 1871.

Due to the difficult times, the toddler, Jack, as his family called him, went with his eldest brother Dick, a blacksmith/wheelwright, his uncle Charles Pennell and Aunt Susan when they took up some land at Kalbar in the Fassifern scrub. Jack had his first schooling at Engelsberg. He returned to his family in Ipswich and attended the Little Ipswich School and North Ipswich State School and, at the age of twelve in 1880, took up an Ipswich Grammar School scholarship. Jack was a good student and his scholarship was extended to the full five years and he passed all ten subjects at senior level and was Dux of the school. He was awarded the medal for chemistry.

He won a Queensland government university exhibition and, in 1886, matriculated at the University of Sydney.

He graduated a Bachelor of Engineering in 1889 and won the University gold medal, the Levy scholarship for chemistry, the Smith prize for physics and the Sulman prize for architecture.

He commenced work as a draughtsman with the Queensland Government Railways but, following retrenchment in 1891, he returned to Sydney and joined the New South Wales Department of Public Works as a temporary draughtsman.

Bradfield was an Associate of the Institution of Civil Engineers, London and graduated a Master of Engineering with first class honours and the University medal in 1896.

In 1924, Bradfield received the first degree of Doctor of Science in Engineering awarded by the University of Sydney. His thesis was entitled:- *The City and Suburban Electric Railways and the Sydney Harbour Bridge*.

The concept of building a bridge across Sydney Harbour was first suggested by the convict architect Bro. Francis Greenway in 1815. Many other proposals followed including a prize-winning design by the civil engineer and first Grand Master of the Grand Lodge of Mark Master Masons of New South Wales, Most Wor. Bro. Norman Selfe. The suburb of Normanhurst honours his name.

A crossing by either bridge or tunnel from Dawes Point to Milsons Point eventually became a hot political issue.

In 1911, Dr John Job Crew Bradfield, designing engineer in the New South Wales Public Works Department, began work on an underground railway and harbour crossing scheme. His ideas were accepted and legislation was introduced in the New South Wales Parliament in 1916.

The First World War delayed matters and it was not until 24 November 1922 that the Sydney Harbour Bridge Act received the Governor's assent.

On 24 March 1924, the tender of Dorman Long and Co. Ltd., of England for £4,217,721 was accepted after the first sod had been turned on 28 July the previous year.

During the construction, when the two halves of the arch were about to be joined, a 112 km/hr gale struck Sydney. Bradfield and his team could do nothing but watch the swaying structure and pray that it would not crash into the harbour. The cables held and construction continued. The two halves of the arch were joined on 19 August 1930.

On 29 March 1932, the great bridge was officially opened by J.T. Lang, Premier of New South Wales.

The bridge is a steel arch of the two-hinged type with a steel deck suspended from the arch and five steel truss approach spans on each side.

The arch span is 503 metres, the second longest in the world. The longest, by a mere 61cm, is in New York. Some 6 million rivets were used, the longest weighs 3.5 kg and is 395 millimetres long and 101,559 rivets were rejected by the inspectors and had to be replaced.

From the beginning, there was controversy concerning the question of who really designed the bridge. Ask a local to name the designer and the reply will be Bradfield. Ask a civil engineer and the reply will probably be Sir Ralph Freeman, the English consulting engineer to Dorman Long and Co., the British construction firm who won the contract to build the bridge.

Laurence Ennis, the Director of Construction, thought that Dorman Long should have some of the credit since they had engaged Freeman and that Dorman Long's engineers had been involved in much of the drudgery of the detail design.

The answer depends on the definition of the word, design.

Did Joern Utzon design the Sydney Opera House with a series of sketches or was it Ove Arup and Partners, the consulting engineers who translated Utzon's vision into reality?

Certainly Freeman had submitted modifications to Bradfield's conceptual design which Bradfield had approved just as Ove Arup did for the Opera House.

The bridge contract stated that the contractor was required to take full responsibility for the design and construction of the bridge. Bradfield argued that this meant that Dorman Long had to satisfy themselves as to the effectiveness of his design. Freeman and Dorman Long argued that they had, in fact, made the design, which bore little relationship to Bradfield's original.

So if one means the conceptual design then the answer is Bradfield but if it is the detailed structural design, the answer is Freeman.

It is interesting to note that Bradfield claimed to be the designer of Brisbane's Story Bridge even though he had been engaged as the consulting engineer just as Freeman had been for the Sydney Harbour Bridge.

Bradfield and Freeman were both small of stature and arrogant but as engineers they complemented each other. Freeman was bold and confident, Bradfield, cautious and painstaking.

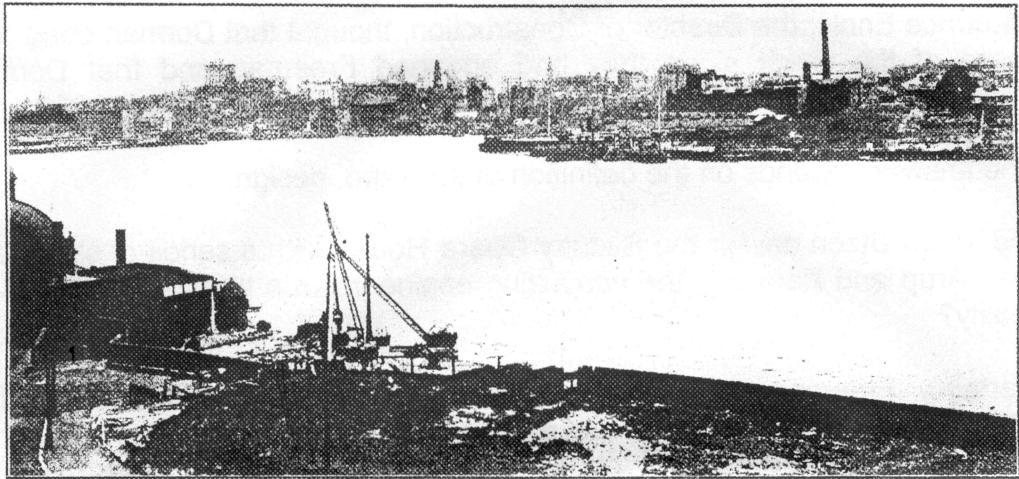
Fifty years later, Ellyard and Wraxworthy wrote:-

There it stands, an arrogant statement in steel; a memorial to a little man,
who had the audacity to think big, and the ability to do something about it.

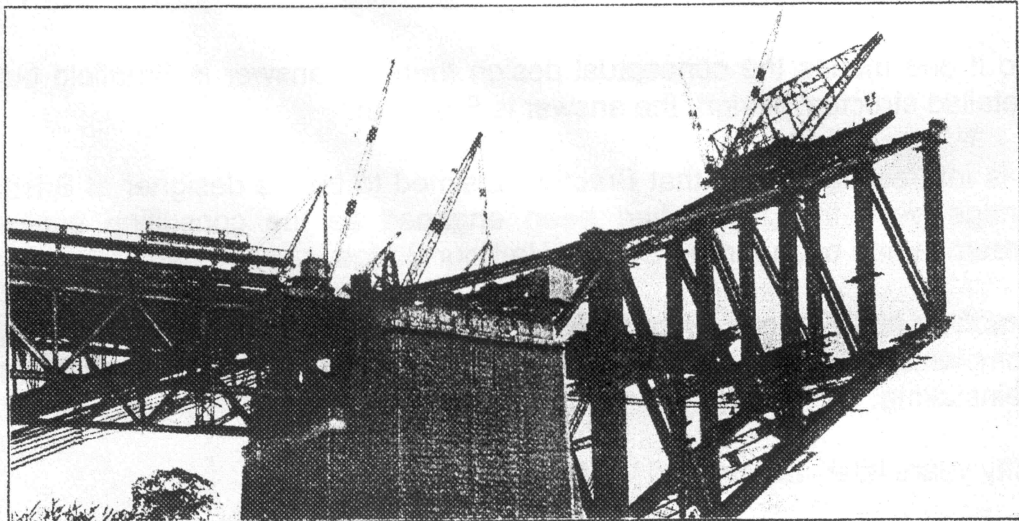
Laurence Ennis became the first Honorary Member of the Institution of Engineers Australia in 1932 so the man whose design draughtsmen had calculated, with slide-rules and elementary adding machines, the size of every piece of steel and the number and diameter of every rivet, received due recognition.

The man who might be described as the 'father' of the Sydney Harbour Bridge, retired from the Public Service in 1933 and, as a consulting engineer, worked on the design of the Story and St. Lucia bridges, both in Brisbane, and as technical adviser on the construction of the Hornibrook Highway.

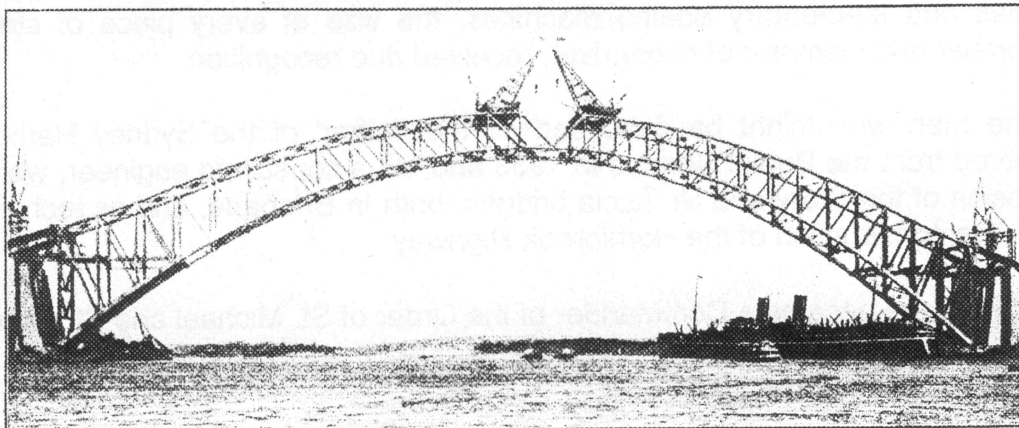
In 1933, he became a Commander of the Order of St. Michael and St. George.



The Bridge Site, looking from Milson's Point to Dawes Point, before erection commenced.



Crepper crane erecting fourth panel, south side. Note cable anchorage.



After the strain of months, the arch is closed, 19th August, 1930, and the Union Jack and Australian Flag fly proudly side by side.

Bradfield was involved in the construction of the Cataract and Burrenjack dams in New South Wales and, in 1942, he became Deputy Chancellor of the University of Sydney.

Bradfield was small in stature with a quiet and humorous disposition and he was undoubtedly one of Australia's greatest engineers.

In a prophetic article written in 1932 he declared:

The bridge will make it possible for upwards of a million people to reside in the northern suburbs, and will provide adequate facilities by rail and road for the transit of this population to and from the city.

The city proper will become a New York in miniature, with skyscrapers exceeding 150 feet, whilst North Sydney and Mosman will merge into a second Brooklyn with property values in places equalling those of the city.

The districts of Willoughby, Lane Cove, Kuring-gai and Hornsby, intersected or bordering on the winding waterways of the Lane Cove River, Middle Harbour, Berowra Creek, Cowan Creek or the Hawkesbury, elevated plateaux with rugged hills and deep valleys will become the most sought-after as residential suburbs.

In the foreword to the official souvenir book at the opening of the Sydney Harbour Bridge in 1932, he wrote:

It is divinely outclassed in beauty and infinitely outspanned by the blue arch of heaven, and God's beautiful bow on the clouds.

He did not overlook the deeds of Australians during the First World War. He suggested:

At times of national rejoicing, when the city is illuminated, the arch bridge would be unique in that it could be illuminated to represent the badge of the Australian Commonwealth Military Forces, the sun and the crown, a fitting tribute to our soldiers, unparalleled in the annals of any nation.

Although a man of vision, Bradfield was also the pragmatic engineer. He gave one of his senior subordinates working on the city's underground railway tunnels, his attitude to industrial relations:

You will be down amongst the tunnellers working in muddy and hazardous conditions.

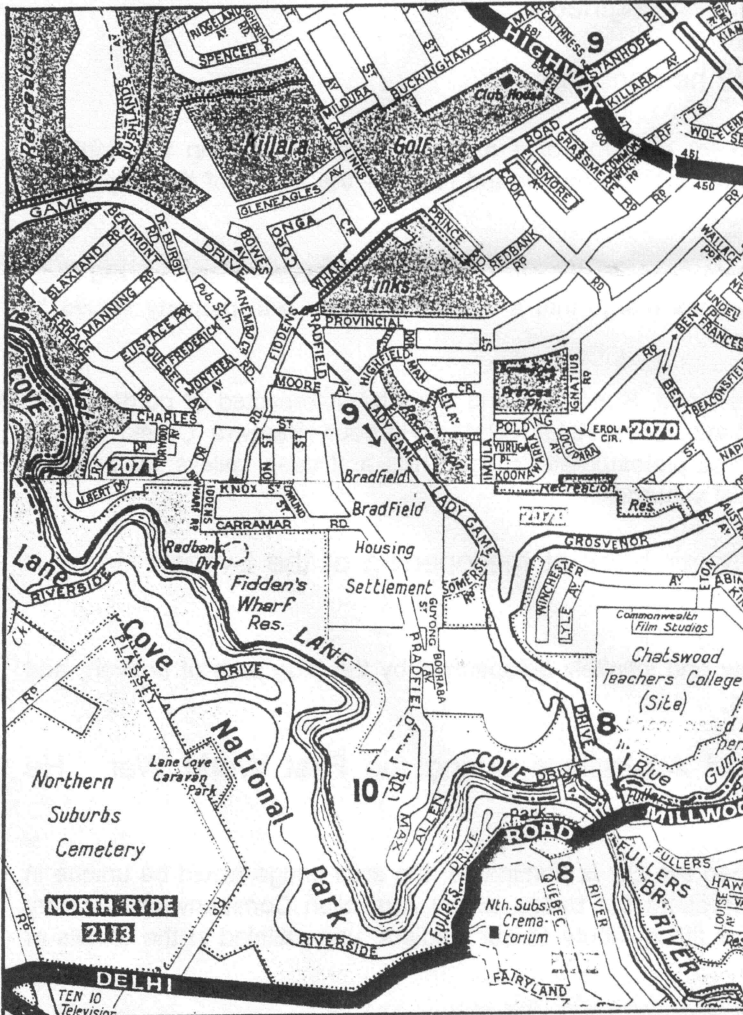
The language can be a bit blue and usually revolves around beer, women and horses. Take no notice of this. With few exceptions they are decent family men.

If you show them respect they will do anything willingly for you; but if you try and boss them you will get nowhere, and neither will the job.

Dr. John Bradfield died at his home in the Sydney suburb of Gordon on 23 September 1943. He is buried in the churchyard of St. John's Anglican Church, Gordon.

The Bradfield Highway is the name of the roadway of the Sydney Harbour Bridge including the northern and southern approaches.

The highway across the Story Bridge connecting the City of Brisbane with Kangaroo Point is also named the Bradfield Highway.



As well as the Bradfield Highway, a northern Sydney suburb was named in honour of Dr. John Bradfield.

Bradfield was an important Sydney Suburb at the beginning of last century, but now it's all but forgotten. It occupied some 600 acres (243ha) along the Lane Cove River.

It served many important purposes over the years.

In December 1938, the first Australasian Scout Jamboree was held there. More than 10,000 scouts from around the world lived in a tent city along Bradfield Road and around 110,000 people visited the jamboree.

In 1940, the RAAF took over the jamboree site and built some 400 huts to become Bradfield Park. Men and women trained or were kept there in readiness until embarking to various theatres of war around the world. Bradfield Road was known to service personnel as the 'Burma Road.'

After the war, Bradfield Park served as a migrant hostel and an emergency housing facility.

The huts were eventually pulled down and the CSIRO National Measurement Laboratory was built.

The name Bradfield Park was dropped around 1970. The site is now the suburb of West Lindfield.

Bro. Dr. John Job Crew Bradfield was made a Mason at Ipswich, Queensland in the United Tradesmen's Lodge No. 288, Grand Lodge of Ireland on 9 May 1889.

He was passed Fellowcraft on 6 June 1889 and raised a Master Mason on 8 August 1889.

He called off on 29 January 1891.

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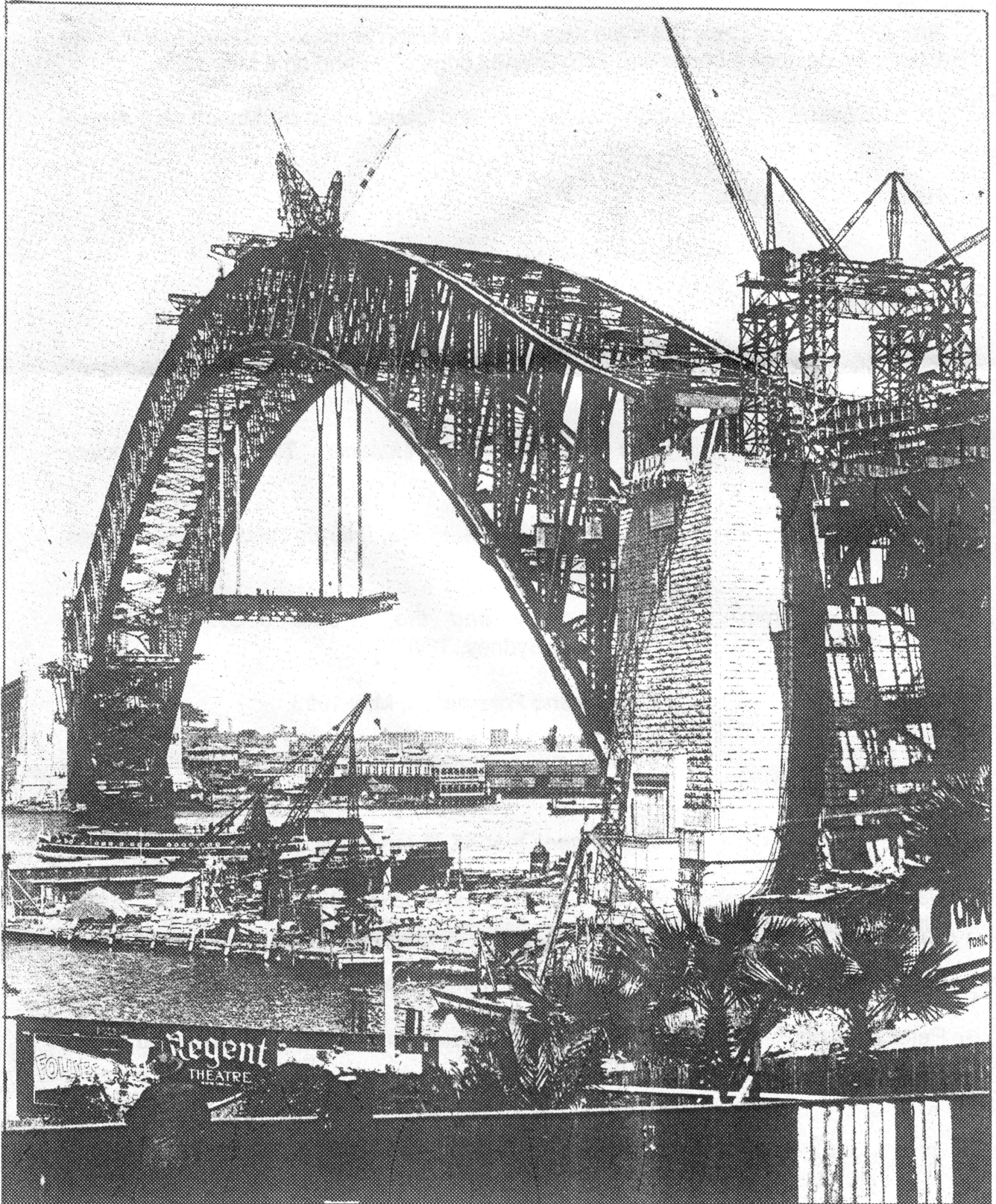
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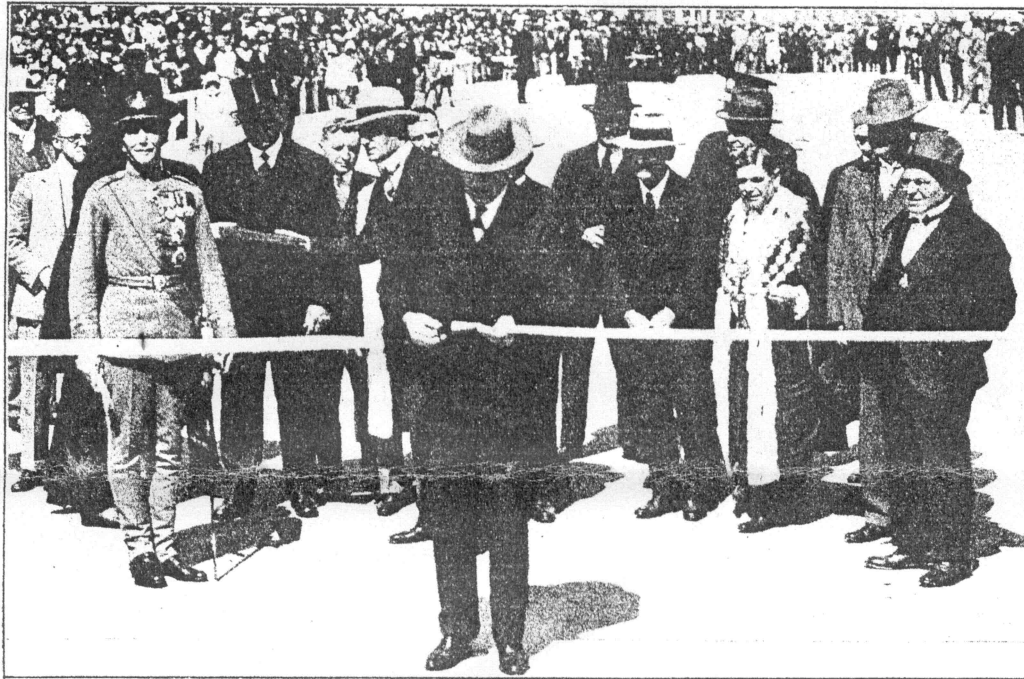
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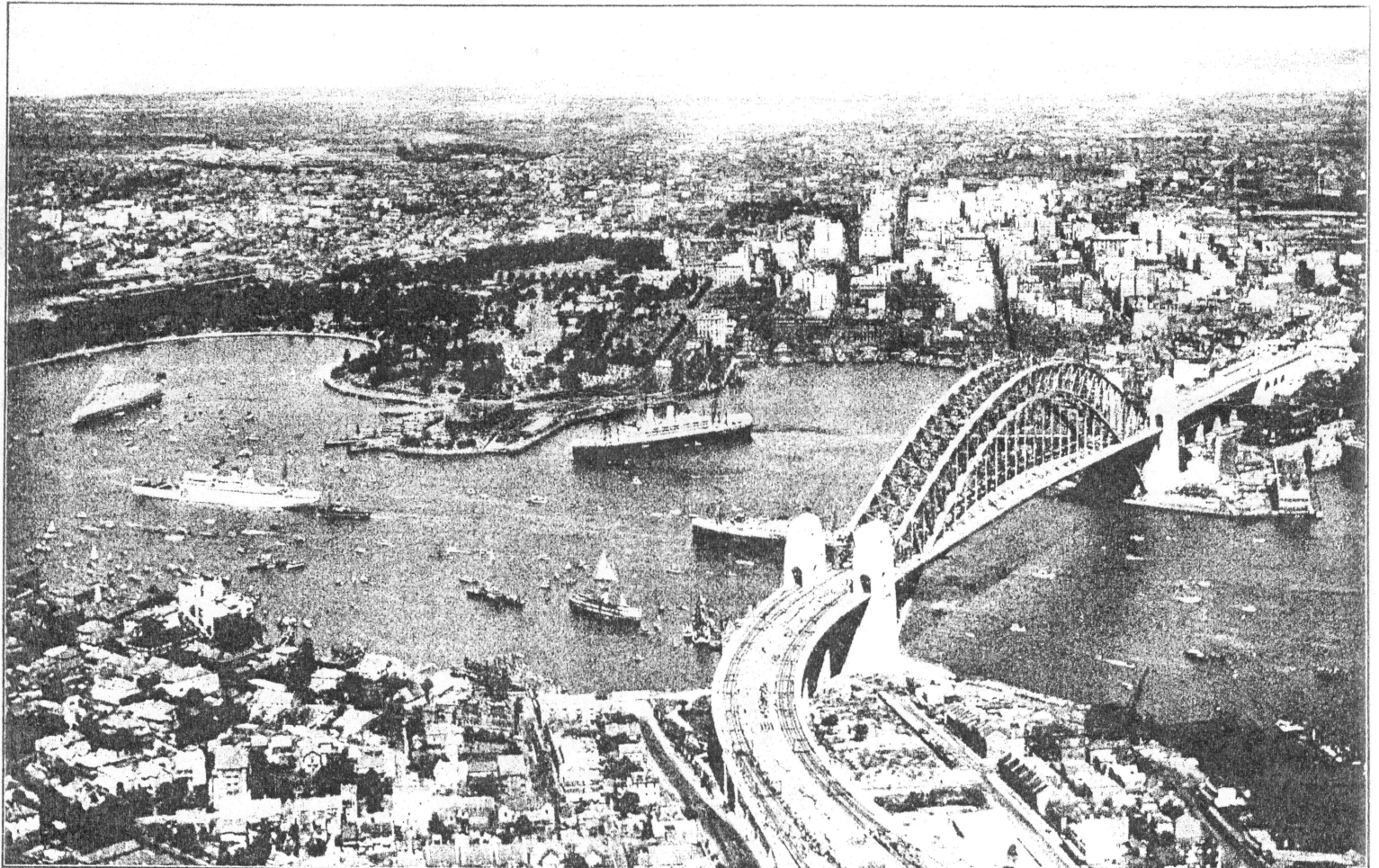
Peter Spearritt *The Sydney Harbour Bridge*, George Allan and Unwin, Sydney, 1982.



The first section of the deck is fixed in position after the arch halves were joined as viewed from Milsons Point.



The Premier cutting the ribbon on the Southern Approach. This operation electrically fired a bomb signal from the top of the arch and severed a yard-wide ribbon stretched across the centre of the Bridge, the halves of the second ribbon, 60 feet in length, falling on either side and floating in the breeze.



[Photo by Hall & Co., Hunter Street.

This aerial view, taken from the north side, shows the "Manunda" after it had passed under the Bridge, with the "Nieuw Zeeland" slightly ahead. The "Orford," which occupied second place in the procession (behind the "Maloja") is shown berthing at Circular Quay. The City stretches into the background.