



## Newsletter of the Australian Society for History of Engineering and Technology

### ASHET annual general meeting Thursday 30 April 2015

ASHET's 2015 annual general meeting will be held at History House, 133 Macquarie Street, Sydney, on **Thursday 30 April 2015** at 6 p.m. Light refreshments will be served at 5.30 p.m. before the meeting.

The meeting, expected to be brief, will be immediately followed by a joint meeting of ASHET and the Royal Australian Historical Society, with a talk by John Gibson.

Each member is entitled to appoint another member as proxy by notice given to ASHET's public officer no later than 24 hours before the time of the meeting. ASHET's Constitution requires that no member may hold more than five proxies. A proxy form may be downloaded from the ASHET website at [www.ASHET.org.au](http://www.ASHET.org.au)

The following business will be conducted at the annual general meeting:

- Confirm the minutes of the last preceding annual general meeting.
- Receive committee report on activities during 2014.
- Receive and consider financial statement for the year 2014.
- Elect office bearers and ordinary committee members.

In accordance with ASHET's Constitution no other business may be conducted at the annual general meeting.

A copy of the committee's report that will be presented to the meeting is included in this issue of *ASHET News*.

### Election of office bearers and committee members

At the close of the ASHET annual general meeting on Thursday 30 April 2015 all the present office bearers and committee members retire. Office bearers and committee members for the coming year will be elected at the annual general meeting. Nominations are called for election to the following positions:

- President,
- Senior vice-president,
- Vice president,
- Secretary,
- Treasurer,
- Three ordinary committee members.

Nominations must be in writing, signed by two members of ASHET and accompanied by the written consent of the candidate. They must reach the secretary seven days before the date of the meeting. The secretary's address is:

11 Heights Crescent  
Middle Cove NSW 2068

A nomination form may be downloaded from the ASHET website at [www.ASHET.org.au](http://www.ASHET.org.au).

### Committee Annual Report 2014

#### ASHET membership

At the end of 2014, ASHET had 46 members. Of these, 39 lived in the Sydney area, 5 elsewhere in NSW, 1 in Victoria and 1 in Queensland.

#### Meetings

ASHET held a series of meetings during 2014 at History House in Sydney jointly with the Royal Australian Historical Society:

Tuesday 25 February, 2014

**Peter Kahn**  
*Sydney's Trams Yesteryear*

Tuesday 25 March 2014

**Talk by Anne Arthur**  
*The meat pie, Australia's own takeaway food*

Tuesday 22 April 2014

**Talk by Philip Rose**  
*Ferries of the Sydney Region*

Thursday 29 May 2014

**Talk by Michael Keats**  
*The Wolgan Valley Railway and the Glen Davis Pipeline*

Thursday 26 June 2014

**Talk by Tony Griffiths**  
*Portraits of Two Artists from Lithgow's Small Arms Factory*

Thursday 31 July 2014

**Talk by Rick Mitchell**  
*Hammerhead crane, Garden Island Naval Dockyard, Sydney*

Thursday 21 August 2014

**Talk by Rob Renew**  
*Brilliant ideas – inventing and adapting machines for opal mining at Lightning Ridge*

Thursday 4 September 2014

**Talk by Tony Griffiths**  
*An Industrial Invasion – Australian civilian volunteers in British factories, 1816 – 1920*

Thursday 30 October 2014

**Talk by Harry Irwin**  
*Discovering Richard Dawson, Pioneer Iron-Founder and Engineer*

Thursday 27 November 2014

**Talk by Kerry Dougherty**  
*Australian-built Sounding Rockets at Woomera*



## Next ASHET events

**Thursday 30 April, 2015**

**Talk by John Gibson**

*The remains of hydraulic power in Sydney*

The world's first public system for networking hydraulic power was installed in Hull (UK) in 1876. It supplied power for cranes, hoist and lifts in buildings and provided a convenient and less polluting alternative to using steam engines for these purposes. At Newcastle (NSW) the Bullock Is. system commenced in 1877 to serve the cranes and windlasses on the wharves. The fifth public system in the world was operating in Sydney by 1891 serving the needs of lifts, cranes (whips), machinery and presses at a pressure of 750 psi. By 1894 the Sydney system had 200 customers, and by 1922 some 80 km of mains. The Sydney system was converted to electricity in 1952. Many other independent systems were in use across the city as well.

The growth in the use of electrical power in the period 1900 to 1930 saw the demand for hydraulic power decrease, with its final closure in Sydney in 1975, just under 100 years. Most of the hydraulic equipment has now been removed. In this talk John Gibson will mention the well known remains of hydraulic power systems in Sydney, and bring to light a number of examples that remain hidden in the depths of the city.

John graduated from UNSW with a Science/Education degree in 1966 and became a lecturer at Sydney Teachers College and later with the Faculty of Education at Sydney University, where he taught engineering studies and materials science to prospective technology teachers. In 1989 he graduated with a Masters Degree in historical archaeology from Sydney University.

This is a joint meeting of ASHET and the Royal Australian Historical Society. This meeting will immediately follow ASHET's Annual General Meeting, which is expected to be brief. Non-members are welcome to attend the Annual General Meeting, but may not vote.

**Venue:** History House, 133 Macquarie Street, Sydney

**Time:** 5.30 for 6 pm.

**Cost:** Includes light refreshments on arrival; RAHS and ASHET members \$10, others \$12

**Bookings:** phone RAHS on (02) 9247 8001 or email [history@rahs.org.au](mailto:history@rahs.org.au)

**Tuesday 12 May, 2015**

**Talk by Peter Hobbins**

*Turning circles: why did Frank Cotton's anti-gravity flying suit fail?*

Incorporating newsreels, artefacts, images and diagrams, this presentation will trace the failure of an Australian innovation from inception to historical footnote.

Arguably one of the first 'cyborg' technologies developed in Australia, the anti-blackout flying suit promised a decisive edge for Allied combat pilots during World War II. Developed in parallel with Canadian and American designs, the 'Cotton Aerodynamic Anti-G' (CAAG) Suit was proposed in 1940 by Sydney University physiologist, Frank Cotton. Yet after four years and tens of thousands of pounds in development, including front-line evaluation in Darwin, the CAAG Suit was abandoned by the Royal Australian Air Force (RAAF) in November 1944.

Rather than diminishing the earnest efforts of Cotton's team, this presentation takes a systems approach across the archives. Although World War II has been characterised as a 'war of experts', it was often the details, rather than the ideas, that won out. In explaining the ultimate failure of Cotton's suit, industrial aspects ranged from elevator experts and latex technicians to zippers and valve tolerances. Operational issues proved just as important, including partying pilots, chocolate vans, lacklustre buzzers and bent Spitfires. Political manoeuvres, as ever, were equally vital, whether in the laboratory, across the RAAF, between the Allies or around the globe.

Peter Hobbins is a historian of science, technology and medicine at the University of Sydney. His previous research has spanned snake-bite, smallpox and the South African War. A lifelong aviation fan, his research for this talk recently took him into the back seat of a World War II trainer to experience high-G manoeuvres. He is also planning to build a working scale model of Frank Cotton's centrifuge, once housed in the University's Medical School.

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**Tuesday 9 June, 2015**

**Talk by Jim Nash**

*The history of Unilever at Balmain*

In 2014 ASHET completed a project to produce a graphic display that tells the history of Unilever at Balmain in a set of nine panels of text and images. The display will be on show at History House to accompany this talk by Jim Nash.

The story begins with a visit to Australia by the British soap manufacturer William Lever in 1892, during which he bought land at Balmain to build an oil mill. His plan was to import to Australia copra from Pacific Islands, extract the coconut oil and ship it to Britain for making soap. The oil mill opened in 1898, and was soon followed by a soap works that commenced operation in 1900, making Sunlight and Lifebuoy soaps. Over the years the works and the range of products expanded, and by the 1960s it was producing a vast range of soaps, detergents, toilet products, margarine and other food products. From the 1960s Unilever gradually transferred its manufacturing to more modern company facilities elsewhere, and the works were finally closed in 1987.

Jim Nash trained as an industrial chemist, graduating from the University of New South Wales. He joined Unilever at Balmain in 1951 and was there until the works closed in 1987, after which he worked with the company elsewhere. While at Balmain he specialised in the management of the extensive packaging facilities. Jim has taken a special interest in the history of the company's activities at Balmain and was a major contributor to the research for ASHET's graphic display. He also has an impressive collection of memorabilia associated with Unilever at Balmain.

This is a joint meeting of ASHET and the Royal Australian Historical Society. ▶▶

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**Tuesday 14 July, 2015**

**Talk by Michael Adams**

**Lawrence Hargrave: Australian Father of Flight; the Centenary of his death**

Lawrence Hargrave is generally considered one of the main contributors to eventual human flight. His inventions included the radial rotary engine and stable wing surfaces, as well as wing shapes of optimum lift. His meticulous scientific method paved the way for the Wright brothers and the first European aviators of the 20th century. Had he a suitable engine he probably would have flown, but he was ahead of that time. 2015 marks the centenary of his death. The new Sydney airport is expected to be named this year, and Hargrave is a front-runner, giving more poignancy to the presentation.

Michael Adams, founder of the Lawrence Hargrave Centre (LHC), will deliver his PowerPoint presentation on the evening of the actual Centenary of Hargrave's death, July 14 1915 and illustrate it with models commissioned by LHC.

LHC has erected a heritage display in Stanwell Park where Hargrave lived from 1893 and where he carried out his pioneering experiments with box kites and wing surfaces. LHC has commissioned several models of Hargrave's most significant contributions to aviation, and hopes these will eventually be housed for public display and easy access at Stanwell Park.

This is a joint meeting of ASHET, the Royal Australian Historical Society and the Lawrence Hargrave Centre.

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## ASHET Annual Report 2014 continued from page 1

### Guided tours

ASHET organized one weekend tour during 2014:  
 Friday 7 November to Sunday 9 November 2014  
**Guided tour of central Newcastle**

### Projects

The following projects were undertaken during 2014. Their status at the end of 2014 is shown:

**History of Unilever at Balmain,** Complete. Includes scanning and indexing of a collection of historic documents held by RAHS and a visual display of the history. During 2014 the display was presented at the Leichhardt Library and at the Watch House, Balmain.

**The meat pie: Australia's own fast food.** In progress. Includes research on the meat pie and the pie-making industry and provides a graphic display of the history of meat pies.

### ASHET committee

At the annual general meeting on Tuesday 22 April, 2014 a new committee was elected to take office at the end of the meeting, and to serve until the end of the annual general meeting in 2015. The following office bearers and committee members were elected:

|                       |                |
|-----------------------|----------------|
| President:            | Rob Renew      |
| Senior Vice President | David Craddock |
| Vice President        | Mari Metzke    |
| Secretary             | Malcolm Brady  |
| Treasurer             | Eric Metzke    |
| Committee Member      | Ian Arthur     |
| Committee Member      | Neil McDonald  |
| Committee Member      | John Roberts   |

### About ASHET

ASHET is an association incorporated in NSW. It carries public liability insurance in the amount of \$2 million which is renewed annually. ■

## Pies project display launched at History House

ASHET has now completed its project of producing a graphic display of the history of the meat pie in Australia with a formal launch by the President of the Royal Australian Historical Society (RAHS), Carol Liston. There were short talks by Anne Arthur on the history of the meat pie and by Tom Lindsay of Lindsay PieMaking Machines. A group of singers from the Lane Cove Choristers sang a Pie Song written for the occasion.

The display consists of nine stand alone panels that are designed to be easily portable and simple to set up. ASHET is now lending the panels to local public libraries and other organisations that can display them to the public for a period of up to one month. If you know an organisations that might like to present the display, contact the project manager Ian Arthur on (02) 9958 8397 or email [ianarthur@ozemail.com.au](mailto:ianarthur@ozemail.com.au).

The origin of this display was a detailed report on the Sydney pie making industry as it was in 1963. It was prepared for Unilever, which was at the time considering the possibility of entering the pie making business on a large scale. The company decided against manufacturing pies, but as a major manufacturer of margarine, it maintained close ties with the industry. We found a copy of the report in the RAHS archives, and realised it contained a mine of information on the pie making industry. We formed a team to re-

search the history of pie making in Australia, and with assistance from an Australian Government grant, were able to engage a professional graphic designer, Judith Denby of SiteSpecific, to produce the display, and Alison Stevens, our webmaster, to produce a webversion which is now on the ASHET website at <http://ashet.org.au/the-meat-pie/>.



## 1915: an important year for BHP, Newcastle, and Australia

In 1915, the same year that Australian troops landed at Gallipoli, there was an event at Newcastle, NSW, that was also a landmark in Australia's history, the opening of the BHP steelworks.

BHP's blast furnace at Newcastle produced its first cast of iron on 9 April 1915. The steelworks were opened by the Governor General on 2 June that year and within four months had produced 36,214 tons of pig-iron, 17,134 tons of steel blooms and 11,574 tons of steel rails, a remarkable achievement.

The steelworks at Newcastle were the first venture into iron and steel making by the Broken Hill Proprietary Company Limited (BHP) and the base on which it developed into Australia's largest company..

### The early years of BHP

The Broken Hill Proprietary Company Limited was incorporated in Melbourne in 1885 by a group of business men to develop a vast and rich mineral deposit recently discovered at Broken Hill in the far west of New South Wales. The company engaged internationally proven mine managers and from the 1890s was operating very profitably, producing silver and lead from oxide ores close to the surface at Broken Hill. BHP's leases covered only a minor part of the valuable mineral deposits and other companies were soon also mining at Broken Hill. The oxide ore had virtually run out before 1900 and the sulphide ore that lay beneath it was much more difficult to treat. BHP made an early decision to move its silver and lead smelting operation from Broken Hill to Port Pirie on the South Australian coast and to feed it with silver-lead concentrates produced at Broken Hill. The other mining companies operating at Broken Hill were at the time exporting their concentrates for treatment overseas. BHP had looked at various locations for their smelter including Port Waratah, adjacent to Newcastle, and had purchased in 1895 a lease on land there that would be suitable for a smelter.

The smelting process required ironstone as a flux, and large quantities had been discovered at Iron Monarch, close to Port Pirie; this was an important factor in selecting Port Pirie as the site for its smelter, once it had acquired mining leases at Iron Monarch from the South Australian government. BHP experienced some difficulty in gaining title to more than a small part of the ironstone resource and was paying a high price to others for part of its requirements, but eventually had acquired the leases not only for Iron Monarch, but other rich deposits nearby at Iron Baron and Iron Knob that altogether far exceeded the needs of the smelter. It then built a private railway from the iron deposits to Port Pirie.

From the early 1990s the BHP board had become worried about the future of Broken Hill. The oxide ores were rapidly depleting and the sulphide ores could not be treated satisfactorily with the existing technology. Also the price of silver had declined from around 50 pence per ounce in 1885 to less than 30 pence per ounce in 1897, and the trend was still downwards. The Board sought an overseas expert to help solve their problems, and after enquiries made the offer of a three year contract as as-



Guillaume Delprat

sistant manager to a Dutch engineer and metallurgist Guillaume Delprat, who had achieved distinction working in Europe and America. Delprat declined the offer. Alexander Stewart, BHP's manager then announced his intention to resign and become general manager of the Chillagoe Company. He recommended that the BHP board negotiate directly with Delprat and ask his terms. Delprat responded that he would accept a three year contract at an annual salary of £2,000 and free passage for his wife and seven children. He was appointed on 12 May 1899 and remained with BHP until he retired in 1921.

Guillaume Delprat was born in 1856 in Delft, Holland. He served an engineering apprenticeship on the ill-fated Tay Bridge in Scotland from 1873 to 1877, taking classes in science and physics, learning calculus by post from his father, and adding Italian to his knowledge of languages that included French and German. He began a mining career in Spain and also took on consulting work, making a reputation in Norway, North America and Mexico.

On joining BHP he led the work on developing methods of treating the difficult sulphide ore. This resulted in what became known as the Potter-Delprat flotation process, that was capable of treating the ore to produce separate lead-silver and zinc concentrates that could be satisfactorily smelted. Delprat and Potter received patents for their process, which revolutionised the treatment of Broken Hill ores and with various refinements is still in use. Some of the early process improvements were made by a BHP engineer, Leslie Bradford, working under Delprat's direction and he



John Darling

also was granted important patents. This work made possible the economic treatment of not only the sulphide ore then being mined but also vast quantities of tailings at Broken Hill. This was very profitable for BHP.

On Delprat's recommendation, zinc smelting was added at Port Pirie and the works were expanded in 1908. Delprat estimated that there was 38 years of work with the material on hand. The smelter treated concentrates from other Broken Hill miners as well as BHP and eventually became owned by a consortium named Broken Hill Associated Smelters.

### A change of direction for BHP

By 1908 BHP had ceased to be the dominant miner at Broken Hill, and Delprat warned the Board that BHP's income from its remaining reserves would steadily decline. BHP's reserves of ore finally ran out in 1939, ending the company's involvement with Broken Hill.

In 1911 John Darling, chairman of the BHP board and Delprat agreed that the time had come for major change and recommended to the board that BHP should shift its focus to making steel, exploiting the extensive and very high quality iron ore deposits it held in South Australia. The Board was divided, but agreed to grant Delprat six months leave to travel overseas and report on the prospects for steel making. Delprat came back with a recommendation that BHP should make an immediate decision to build a steel works and that it should engage an American, David Baker, to manage the project. The BHP Board, strongly urged by Darling, accepted the recommendation. Baker accepted BHP's offer of employment and arrived in Australia on 12 May 1912.

Baker was born in 1861. He was a graduate of the Massachusetts Institute of Technology, had worked as a blast furnace superintendent with the Pennsylvania Steel Company and oversaw the establishment of a new steelworks at Sparrow Point. In 1898 he moved to the Illinois Steel Company and from 1901 to 1904 he was general superintendent at Dominion Steel in Nova Scotia. He then became a consultant in partnership with James P. Ladd. He held several patents related to blast furnaces.

Baker's reports to the board, in a series of letters, were all optimistic. He wrote that BHP 'had a rare opportunity to establish a very profitable industry', that 'now is the psychological moment to start a modern steelworks in this country' and that 'the Company would be able to produce steel at a lower cost than the United States Steel Corporation'.

Baker found that Australia's needs for steel were enough to ensure the profitability of a moderate sized steelworks in Australia, provided the cost of materials was low. In 1913 less than 20,000 tons per year of ingot steel were being produced at the Hoskins Brothers Lithgow steel works, the only ones in Australia, and 750,000 tons per year of steel were imported. Baker was convinced that BHP had access to raw materials that would meet the requirements for low cost steel production. Baker noted

that in 1910 about 150,000 tons of steel rails were imported and that BHP could make that quantity almost immediately. The demand for steel rails would soon increase with the building of the Trans Continental Railway and would increase further over time. The Board was convinced.

### The BHP steelworks



David Baker

Delprat believed the steelworks should be built at Port Pirie. Baker disagreed and explained to the Board, using steel rails as an example, that producing a ton of steel required 1.74 tons of ore and 2.44 tons of coal to produce one ton of rails. To minimise transport costs, the steelworks should be close to coking coal reserves. Newcastle and Port Kembla would be suitable sites, with a preference for Newcastle, which had better port facilities.

Delprat accepted Baker's advice and then recommended that the board engage Baker on a five year contract as superintendent, based in Newcastle, for the new

steelworks. With Darling's enthusiastic support and Baker's acceptance of the five year contract the project moved ahead. Delprat gave Baker a free hand to import American experts and methods. German suppliers offered lower prices than the Americans for the major steel works items, but fortunately American technology, was adopted, and Newcastle acquired an integrated steelworks with the world's best labour saving technology. Delprat himself negotiated with the NSW government to ensure that the land, port facilities and railway connections would be available on time and would be fully able to meet the company's needs.

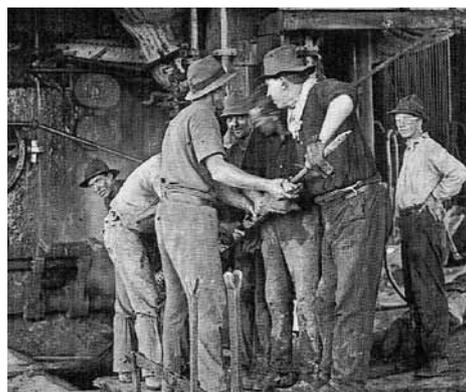
John Darling died suddenly in March 1914, but by this time BHP was fully committed to leaving Broken Hill behind and concentrating on its new role as Australia's leading steel maker. Outbreak of war in August 1914 became an opportunity rather than a setback as the government's support was enlisted to have the steelworks in operation as soon as possible.

The team's efforts were rewarded and the steel works were opened on time and within the budget of £1.5 million. BHP was probably the only company in Australia with the resources needed to achieve such a result.

### Managing the steelworks

Essington Lewis, son of an influential member of the South Australian Legislative Council, was encouraged by his father to undertake a diploma course in mining at the Adelaide School of Mines. On completing his course in 1904 he joined BHP at the lowest level of its workforce, with the intention of making a career as a mining engineer. At the same time his father was chairing the parliamentary committee investigating BHP's proposed acquisition of Iron Monarch and Iron Knob. Essington became a protégé of Delprat, who recognised his talents, and he rose steadily through the ranks to become assistant manager at Port Pirie in 1913. He also had an important role in managing the expansion of iron ore mining at Iron Knob and opened a limestone quarry at Melrose in Tasmania.

By this time BHP business was heavily involved with building its steelworks at Newcastle and its activity at Broken Hill was being in decline, while the



First tapping of pig iron from blast furnace, Newcastle, 1915

other major miners at Broken Hill were becoming rich. BHP was prepared to accept a minor role at Port Pirie and it was agreed to form a new company, Broken Hill Associated Smelters, to take over the works. It appeared that Lewis might become the manager, but the directors of the new company apparently agreed that Delprat had Lewis in his sights as second in command at Newcastle, and he was not offered the job. The transfer of ownership of the Port Pirie works was completed in June 1915. Lewis remained with BHP, where he was involved in various activities and particularly those relating to BHP's entry into steel making at Newcastle. In 1916 Lewis volunteered to enlist in the armed services; on learning of this Delprat used his influence to have the Department of Defence block the enlistment. In 1919 Lewis was appointed BHP's assistant general manager under Delprat. Lewis was allowed to sit but not vote at meetings of the board while Delprat was overseas in 1919. He quickly gained a rapport with the youngest member of the board, John Darling's son Harold, and made a trip overseas with him in 1920 to view overseas steel works.

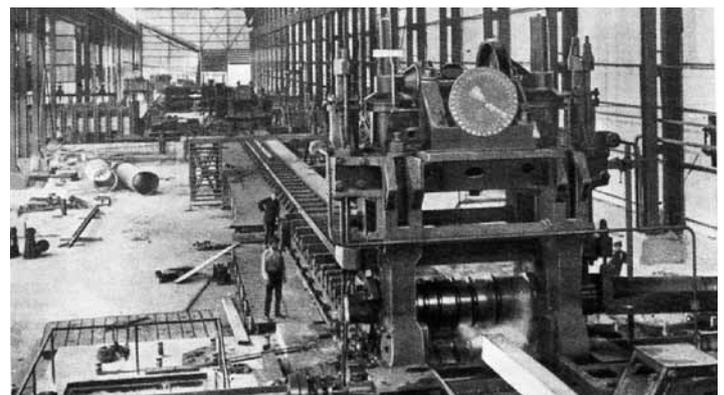
### Conflict and resolution



Harold Darling

Delprat at this time was 63 and close to retirement. He was still deeply involved in planning for the expansion of the Newcastle steel works. He and Baker were proposing to increase the steel making capacity at Newcastle by adopting an American concept known as the Duplex process which some American steel makers had employed during the war to stretch the capacity of their open hearth steel making furnaces. In essence it involved interposing a Bessemer converter to remove some impurities from the molten iron before it was further refined in an open hearth furnace. Lewis toured Duplex plants in America and concluded that the process was not suitable for adoption at Newcastle. By this time Delprat had taken the proposal to the board and gained its approval to proceed with it. Lewis cabled Delprat discussing the proposal in detail and recommending strongly that the decision be suspended at least until his return. Delprat refused to put Lewis' advice to the board. Darling, who agreed with Lewis, cabled the board advising that 'from information received consider cost prohibitory. Adoption likely to prove fatal to Broken Hill Pty Co'. The board responded that the installation would proceed as planned. Lewis was incensed. When he and Darling reached Britain their discussions there confirmed his view that the plan should not proceed and he sent urgent telegrams endorsed by Darling. The board relented and agreed to suspend work until the travellers returned. On the journey home, Lewis wrote a report not only damning the Duplex process but also Delprat's choice of new coke ovens.

When the board next met, Delprat did not receive his customary invitation to attend. Darling led the debate that led to the board deciding to abandon the Duplex process. They would also have reversed the coke



Rolling mill, Newcastle steelworks, 1915

oven decision but work was too far advanced. After the meeting Delprat offered his immediate resignation and then addressed the next meeting of the board and recommended Lewis as his successor. On 18 February 1921 the board announced that Lewis would take over immediately. Delprat would be retained as 'consulting engineer' at his old salary for the next 18 months. Delprat continued to speak publicly in support of his protégé and of BHP.

### A setback for the steelworks



Essington Lewis

Lewis immediately faced a crisis. The boom that Delprat had anticipated would follow the end of the war had not occurred and a world-wide surplus of steel production was depressing prices and eroding BHP's share of the Australian steel market. British steelmakers were claiming tariff preference under the trade agreement; American steel makers were exploiting their advantages of scale; shipping costs were declining. BHP was losing money and faced bankruptcy.

Lewis responded by visiting every part of the company seeking economies; he confronted the unions with demands for a deal that would stop the disastrous

losses and then closed the steelworks for nine months throwing 5,000 men out of work; he opened talks with politicians and sought government assistance.

Lewis took advantage of the works closure to make improvements that would reduce production costs.

By 1924 trade was improving and all the company's major problems appeared to have solutions. It was clear that further economies would have to come from increased capacity. To this end the Lewis and the board began discussion with British companies Guest Keen and Nettlefold and Co. Ltd and John Lysaght and Co. Ltd, on the possibility of their investing in expanding the steel works expansion and purchasing product for further processing in Australia. Lewis visited Britain and soon concluded that the whole British steel industry was having acute financial problems and was in no state to contemplate major investment in Australia. BHP's plans for immediate expansion had to be put aside.

David Baker, the steelworks manager retired and returned to America in 1924. He was succeeded by Leslie Bradford, who had worked with Delprat at Broken Hill on improvements to the flotation process and later been open hearth superintendent at Newcastle. He had resigned from this position to go to America hoping to benefit from his rights to the flotation process. This did not work out and Bradford returned to Newcastle and with E. J. Kendal established a foundry that still bears his name. He rejoined BHP he was allowed to retain his interest in the foundry, a sign of the high regard in which he was held. Harold Darling became chairman of



Rolling mill operators, Newcastle, 1920

BHP and Lewis was promoted to managing director. The personal friendship and trust between Harold Darling and Lewis lasted until Darling's death in 1950.

### Australian Iron and Steel Limited

At this time, BHP's only competitor in Australia, G. and C. Hoskins Ltd and its successor Hoskins Iron and Steel Company, were facing the need to modernise and relocate its Lithgow steel works. Hoskins had not suffered as badly from the downturn in the early 1920s as BHP because they had less volatile markets for their main products, steel rails and pipes. In 1924 Hoskins purchased land at Port Kembla for a steelworks. The company owned coal deposits and coke ovens close by at Wongawilli and limestone leases at Marulan, sixty miles away. Charles Hoskins successfully negotiated with the NSW government to build a railway between Moss Vale and Port Kembla, that would carry limestone to Port Kembla and product from the proposed steel works Melbourne. BHP, which maintained good relations with its competitor, agreed to supply iron ore from South Australia on a ten year contract at a price yielding a good profit. Two large British steel companies, Dorman Long (which was building the Sydney Harbour Bridge) and Baldwin's, agreed to invest in the project, and the Australian shipowner and collier Howard Smith agreed to provide between them half the capital for a new company, Australian Iron and Steel Limited (AIS), with Hoskins providing the other half with a share issue that was oversubscribed. The company was formed in 1928. The blast furnace at Port Kembla, with an output of 800 tons of iron a day would be one of the largest in the world.

The new steel works were opened at the height of the depression and barely survived. AIS sold only 18,000 tons of steel in 1930-31. Cecil Hoskins finally sought a merger with BHP in 1935. Darling and Lewis were ready, and BHP's acquisition of AIS was quickly and amicably accomplished an exchange of shares. AIS continued as a public company with the Hoskins brothers managing the Port Kembla works until 1949 when the Hoskins brothers Sid and Cecil retired. By 1937 BHP was Australia's largest company, with profits of over £1 million and rising. In 1939 it claimed to be making the cheapest iron and steel in the world.

### The end of steelmaking at Newcastle

BHP closed the Newcastle works in 1999. By this time they were small by world standards, and were no longer profitable even though BHP had made heavy investments in modernising parts of them. By this time iron and steel making was no longer a leading part of BHP's business.

### Sources and further reading

The fascinating history of BHP has attracted many authors. Several of them have written at length about the steel works at Newcastle and provided material for this article. The following are suggested for further reading.

E.M. Johnston-Liik, George Liik, R.G. Ward, *A measure of greatness: the origins of the Australian iron and steel industry*, Carlton, Vic.: Melbourne University Press, 1998

Christopher Jay, *A Future more prosperous: the history of Newcastle Steelworks, 1912-1999*, Newcastle, N.S.W.: Broken Hill Proprietary Company Limited, 1999.

Ian Arthur

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