Newsletter of the Australian Society of Engineering and Technology

ASHET annual general meeting Tuesday 16 April 2013

ASHET's 2013 annual general meeting will be held at History House, 133 Macquarie Street, Sydney, on Tuesday 16 April 2013 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 Ron Ringer. 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. 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 2012.

Receive and consider financial statement for the year 2012.

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

Committee Annual Report 2012

ASHET membership

At the end of 2011, ASHET had 66 members. Of the members at the end of 2012, 52 lived in the Sydney area, 7 elsewhere in NSW, 4 in Victoria and 3 in Queensland.

Meetings

ASHET held a series of meetings during 2012 at History House in Sydney jointly with the Royal Australian Historical Society:

Tuesday 21 February, 2012
Anita Yousif
Residential Development of Archaeological Sites in NSW

Thursday 29 March, 2012
Tony Griffiths
Lithgow's Small Arms Factory Centenary; a century of service

Tuesday 24 April 2012
ASHET annual general meeting
Phillip Hammond
Aerial ropeways in the Blue Mountains

Tuesday 22 May, 2012
Robert Croft
Sydney to Penrith milestones

Tuesday, 26 June, 2012
Michael Waterhouse
The New Guinea goldfields between the wars

Tuesday, 24 July, 2012
Bob McKillop
The Garbage Question

Tuesday, 21 August, 2012
Bill Phippen
The Hawkesbury River Railway Bridge

Thursday, 13 September, 2012 (History Week
Chris Miley
Technology in Wool and How We Fell Off the Sheep's Back

Tuesday, 30 October, 2012
Adam Godijn & Virginia Hollister
Restoring a historic mural at Rylstone

Guided tours

ASHET organized two guided tours to places of historic interest during 2012:

Thursday 1 November 2012
Guided tour of Fairfax Printers at Chullora

Tuesday 4 December, 2012
Guided tour of the Parramatta River by ferry with lunch at Parramatta

Projects

The following projects were undertaken during 2012. Their status at the end of 2012 is shown:

Queanbeyan Printing Museum. Complete. Includes oral history interviews with four of the museum's volunteer workers. Joint project with Engineers Australia, Canberra Division.

Timber truss bridges of New South Wales. In progress. Includes oral history interview with two retired Chief Bridge Engineers with the Roads and Traffic Authority of NSW.

History of mining machinery at Lightning Ridge. In progres. Includes oral history interviews with inventors and builders of machines, and visual display of the history at Lightning Ridge. *History of Unilever at Balmain*, In progress. Includes scanning and indexing of a collection of historic documents held by RAHS and a visual display of the history

ASHET committee

At the annual general meeting on Tuesday 24 April, 2012 a new committee was elected to take officeat the end of the meeting, and to serve until the end of he annual general meeting in 2013. The following office bearers and committee members were elected:

President:	David Craddock
Senior Vice President	Rob Renew
Vice President	Mari Metzke
Secretary	Ian Arthur
Treasurer	Eric Metzke
Committee Member	Ian Jack
Committee Member	Beverley Johnson
Committee Member	Neil McDonald

Next ASHET events

Tuesday 16 April 2013
Talk by Ron Ringer
The Snowy Scheme: overseas aid, engineers and Australian ingenuity

Ron Ringer will talk about his new book, *The Spirit of SMEC: Snowy Mountains Engineering Corporation*.

This history explores the life and times of two distinct yet inter-related organisations, the Snowy Mountains Hydro-electric Authority (SMHEA) and the Snowy Mountains Engineering Corporation (SMEC). Work on the Snowy Scheme commenced in 1949, heralding a period of mass migration to Australia. The Snowy project would never have succeeded without the expertise of German engineers, Czech surveyors and the multitude of highly skilled nationals who fled from the devastation of Europe. SMEC, established in 1970 as a public sector organisation, was corporatised in 1985 and finally sold to the staff in 1993. Today, the spirit of those who worked on the Snowy Scheme continues through a company that provides consulting services for many of the challenging engineering projects in Australia.

Ron Ringer graduated from Nottingham University in 1974 with an honours degree in social and economic history. In 1979 he moved to Australia and continued his teaching career until 1988 when he established himself as a business writer and documentation specialist in the financial services industry. In 1991 he established the communications consultancy, Syntax. As a business and technical writer Ron has completed over 400 projects for major financial, retail, educational, and public sector organisations in Australia.

> **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

Thursday 23 May 2013
Talk by David Carment

Technology on the Australian frontier: a history of Northern Territory mining

Various forms of mining occurred in Australia's Northern Territory from the early stages of its history as a separate entity. Mining is one of the very few types of European economic enterprise that proved viable there but even it had a chequered record. Often initially exciting discoveries of minerals did not prove worthwhile in the long term. Miners' hopes were dashed and the consequences were sometimes tragic. The Territory's mines were usually isolated, their environments were harsh and there were disputes between the different racial groups involved in mining. Yet in the end the industry was a success. As was the case in many other frontier areas, this was largely due the use in the Territory from the nineteenth century

onwards of the most advanced forms of technology. The Territory attracted miners and mining companies from many parts of the world. It witnessed a substantial expenditure on surface plant and infrastructure. Mining in the Territory is an illuminating case study of how the international Industrial Revolution, with its insatiable demand for raw materials, spread to the most sparsely populated, climatically difficult and remote areas.

David Carment is Emeritus Professor of History at Charles Darwin University, where he was also Dean of the Faculty of Law, Business and Arts. He is the author of many publications on Northern Territory history. He also has a long record of active involvement in heritage and history organisations. In 2003, he was made a Member of the Order of Australia (AM).

> **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

Tuesday 25 June 2013
Talk by Frank Heimans
Oral history interviews tell the story of NSW timber truss bridges

In this talk Frank Heimans will describe how he used an oral history interview with two retired Chief Bridge Engineers with the NSW Roads and Traffic Authority (RTA), Brian Pearson and Ray Wedgwood, to tell the story of timber truss bridges in New South Wales. There were at one time over 400 of these bridges, built between 1861 and 1936. Of these 63 remain, and a strategy has been agreed between RTA, now part of the Roads and Maritime Service, and the NSW Heritage Council for the conservation of a representative sample of 25 bridges.

Brian Pearson and Ray Wedgwood have been directly involved in the maintenance and conservation of these bridges over a long period of years and are uniquely qualified to record their history. Frank will describe in his talk how he helped in an interview with them to tell it in an interesting and concise way.

Frank Heimans through his company Cinetel Productions, incorporated in 1975, has specialised in the production of television and video documentaries and in oral history. He has won many awards for his work, including in 2011 the Hazel de Berg Award for Excellence in Oral History. He has recorded 22 interviews for the National Library's *Eminent Australians Oral History Collection* and a large number of interviews for other public and private sector organisations.

> **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

Election of office bearers and committee members

At the close of the ASHET annual general meeting on Tuesday 16 April 2013, 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 fol-

lowing positions: President, Senior vice-president, Vice president, Secretary, Treasurer, and 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 by Monday 8 April, seven days before the date of the meeting which is on 16 April.

Printing the news in country New South Wales

Every weekend, a team of volunteer guides and former operators at the local newspaper *The Queanbeyan Age*, show in action at the museum all the machinery needed for the production of a country newspaper. Also in the museum and in working order, are other exhibits showing the stages in the development of newspaper publishing.

The museum's origins were in 1994, when *The Queanbeyan Age* was acquired by the Rural Press, and production of the newspaper was transferred to Canberra. It broke the heart of Jim Woods the editor and general manager since 1956, to see the machinery destined for the scrap heap, and he decided to preserve it and demonstrate how newspapers were produced before the days of computerisation. The outcome was the Queanbeyan Printing Museum, set up in partnership with the Queanbeyan City Council and opened by the mayor in 2004.

The Queanbeyan Age

The Age had its 100th anniversary in 1960, four years after Jim Woods came to Queanbeyan. The original proprietor was John Gale, who sold the business to his son-in-law Edward Henry Fallick in 1894. Shortly afterwards the family lost control of the company, but soon regained it and eventually sold it to the Federal Capital Press, publishers of the *Canberra Times*. Arthur Shakespeare, chairman and managing editor of *Canberra Times* then arranged for an equal partnership of his family with the Bradleys and Woods to own *The Age*, and for Jim Woods to move to Queanbeyan and manage the business. At the time of purchase it was near bankrupt, morale was low, the buildings a shambles and the plant fit for the scrap heap. The paper was published twice a week.

One of the conditions of the purchase was that the press that had printed the *The Canberra Times* since its establishment in 1926, an American Battle Creek Duplex, a full rotary press built in 1908, should be completely reconditioned and moved to Queanbeyan. It printed *The Queanbeyan Age* from 1959 until 1970, when it went to Bega as *The Age* installed offset printing, one of the first NSW papers to change to the new type of plant. At Bega the press printed several local newspapers until it in turn was replaced in 1976 by offset equipment. Jim Woods had the idea of preserving the historic press by offering it to the newly formed National Museum. It was accepted and there was a ceremonial handover in Canberra in 1976 when the press was set up to produce a special four page edition of *The Canberra Times*.
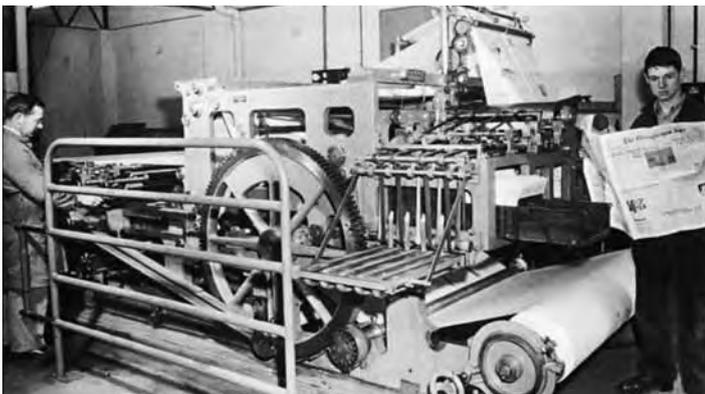
Battle Creek rotary press at the Queanbeyan Age

Over the next few years the Bradley and Woods families acquired interests in a number newspapers in the south of NSW, and *The Queanbeyan Age* provided typesetting and printing for several of them. The interests in these papers were sold off during the 1980s to other newspaper publishers. In the meantime at Queanbeyan the company expanded and went to tri-weekly publication in 1973. The expanding operations required the purchase of modern equipment for typesetting and printing.

Jim Woods
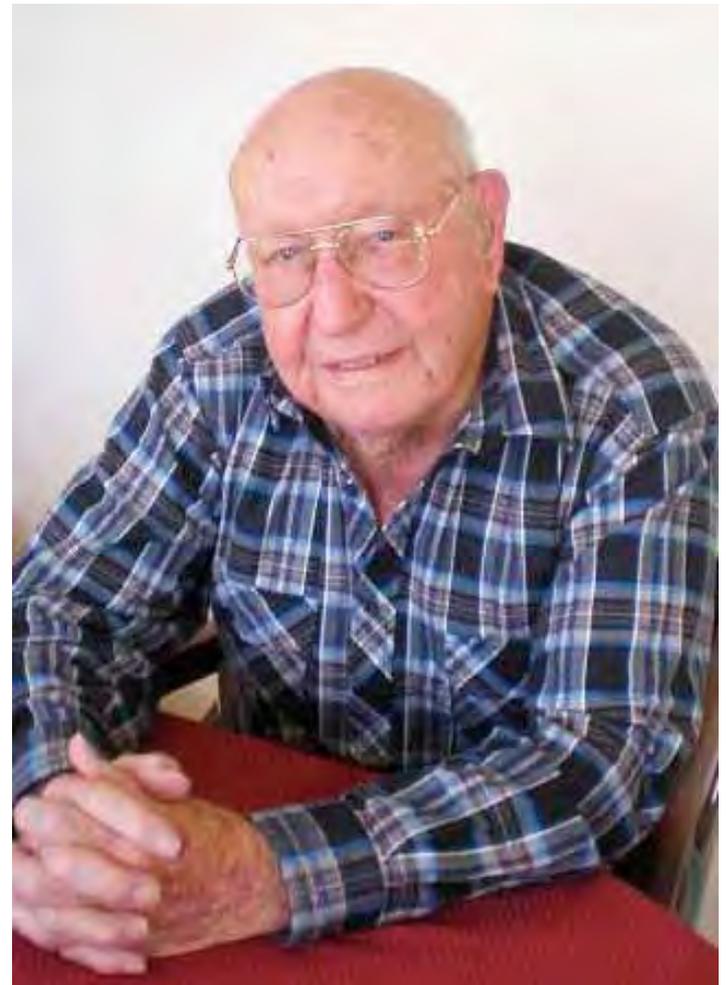
Central to all of these developments was Jim Woods. At the time he retired he had worked in the newspaper publishing industry for 61 years. He was born in Temora in 1913. His first experience with the newspaper industry was as a boy selling copies of the *Temora Star*. At age 15 he started an apprenticeship with the rival newspaper, *The Independent*. When he completed his six year apprenticeship in 1934, there was no chance of full time employment in the industry, but Jim got part time work at *The Independent*. By this time it had installed a linotype machine and when

the only linotype operator, suffering form bad vision, wanted to move to Sydney, Jim had the opportunity to train as a linotype operator. At that time *The Star* and *The Independent* exchanged type, adding a different heading and introduction. Soon after the start of World War II he was the only linotype operator in Temora, and *The independent* was publishing several newspapers in the area, as well as doing commercial work. Jim was married in 1938, and apart form his work was busy running his own dance band and playing in sporting teams.

In 1949 Jim went into partnership with the proprietors of *The Independent*, Jack and Arthur Bradley, to purchase the *Crookwell Gazette* and move to Crookwell to manage and develop the business. He installed new equipment, progressed to a 16 page tabloid format and then from a weekly to a bi-weekly. It won the award for the best weekly newspaper in New South Wales.

While still at Crookwell, Woods, in partnership with Bradley, purchased and later sold the Braidwood *Despatch*. In 1957 he purchased a share in Cooma newspaper *The Express*, at the same time as he was moving to Queanbeyan. At that time *The Express* had a large and growing amount of commercial business with the Snowy Mountains project, and the plant had to be continually upgraded to cope with the work load.

Printing technology on display at the Queanbeyan Printing Museum

When Jim Woods started work at the *The Independent* in 1928, type for the newspaper was set by hand, each character or space individually, using technology that was little changed from that developed by Gutenberg in Mainz, Germany, around 1440. The assembled type was locked into a frame, called a chase. One or more of these would be assembled in a frame to make up the forme that was set horizontally in the printing press, which was originally a simple framework that allowed a platen holding a sheet of paper to be pressed using force applied by a screw against the

Chandler and Price platen press

inked forme. With refinements, such as providing for the forme to be slid out from under the platen to simplify the processes of inking the type and positioning the paper, this simple design of press survived until the early nineteenth century.

By then, wooden presses were starting to be replaced by metal ones, and arrangements of levers and cams were developed to speed up the application of pressure to the platen. This led to mechanisation, including the use of steam power and to mechanical application of ink to the forme using powered rollers. Speeds of over 1,000 impressions per hour were achieved with these steam driven bed and platen machines.

With the growth in demand for commercial printing in the 19th century, a different form of the platen press became popular and is still in wide use today, in a range of sizes. These machines are compact, and include both hand fed and automatic models. The forme carrying the type is mounted vertically and press is arranged so that the gap between the forme and the platen holding the paper opens and closes. The Queanbeyan Museum has three examples of this type of hand fed of platen machine, the largest being a Chandler and Price hand platen. In this machine, the sheets of paper are inserted and removed by hand. Ink rollers move automatically across the type.

The museum also has a Heidelberg automatic sheet feed machines. The Heidelberg was the first successful automatic platen machine to be seen throughout the world, and built in various sizes from 1924. *The Age* had two Heidelbergs, both sold when it ceased operations in Queanbeyan. The example in the museum was donated by Foster-Tuncurry Printers and was built in 1924.

In 1820 there were only eight steam driven printing machines in London, mainly used for newspapers. It was not for another thirty years that efficient steam engines were readily available. During this time, a new form of the flat bed printing machine had developed for newspaper and general printing in which a roller, rather than a platen, carries the paper sheet and presses it against the forme. The museum has an example of a very popular design for newspaper printing, the Wharfedale, in which the cylinder stops turning after printing each sheet to allow the bed to return to its starting position. There were other designs of cylinder press in which the roller rotated continuously and ones in which the roller accompanies the bed in its forward motion. The one in the museum was in a very worn condition when it was retired from *The Crookwell Gazette* in 1950, and has been restored by museum volunteers. Originally belt driven, it would have been capable of printing up to 1,200 papers per hour.

The museum also has a more modern and compact cylinder machine,
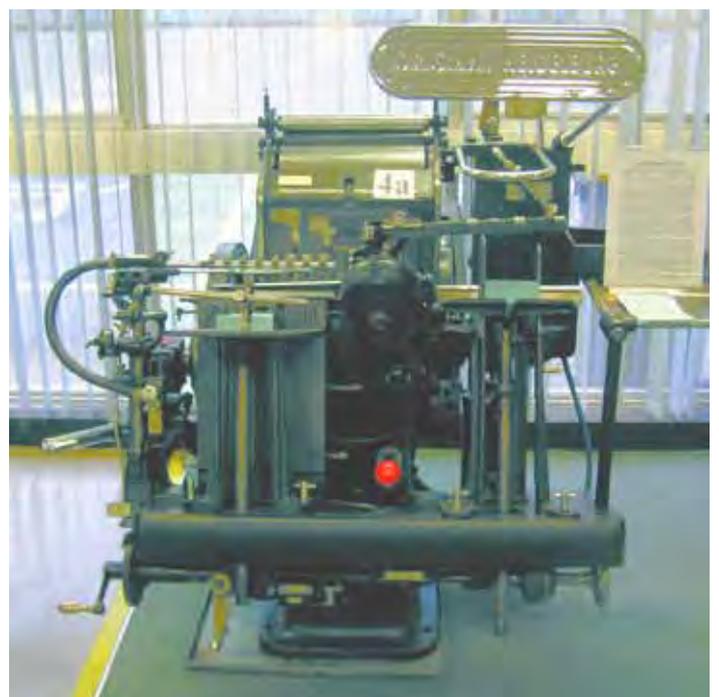
Heidelberg press with automatic sheet feed

Wharfedale printing press at Queanbeyan Printing Museum

Meihle cylinder machine

a British Miehle purchased by *The Age* in 1963. By that time the production of cylinder machines, except for the Miehle, had ceased, but it was very popular and there are many still operating.

The demise of the cylinder was mainly a result of a further development, the full rotary press. To be successful this needed a process for producing the type on a curved surface that could be applied to a roller. Such a process was invented in France around 1830, and a similar one in England a few years later. A flexible mould was made from layers of paper and paste, papier-mâché and pressed or rolled against a forme of type, to make an impression of it. This was then bent around a cylinder, and dried to form a mould for casting a curved plate. Two Frenchmen, Worms and Phillipe patented in 1845 a cylindrical machine for printing from such curved plates on to a roll of paper. In 1850 they demonstrated in Paris a printing machine claimed to print two sides of paper at 15,000 copies per hour, and suited to operation with steam power. By 1870, the London *Times* was being printed on a rotary press, the *Walter,* at 12,000 copies per hour on a rotary machine of this kind, that served until 1895. The individual sheets were cut after printing, and because folders had not yet been invented, were delivered unfolded. Several small makers were

soon building commercial rotary presses in Britain and America, and one of these, Duncan and Wilson of Liverpool had a folding apparatus on their *Victory* machine. America's leading manufacturer of printing machines, Hoe, had a rotary press on the market in 1873.

Capital city newspapers in Australia, soon had rotary presses, but the country newspapers, mostly weeklies, could not afford, and did not need high speed printing machinery. *The Queanbeyan Age* was printed on a hand fed Wharfedale flat bed press until 1957 when it acquired from the *Canberra Times* the rotary press mentioned earlier in this article. At *The Age* it initially printed and folded eight broadsheet pages at 4,500 copies per hour. The Queanbeyan museum does not have a rotary press in its collection.

The Linotype machine

Jim Woods was learning to use the newly acquired linotype machine for typesetting during his apprenticeship in Temora, and mechanical typesetting was in common use by New South Wales country newspapers by the 1930s. The linotype was invented by Otto Mergenthaler, a German born American, and first demonstrated publicly in 1886. It had a 90 key typewriter-like keyboard. The operator used this to assemble a set of brass moulds termed 'matrices' representing single letters and other characters, and immediately casting molten metal into them. Each casting represented a line of type, and these were assembled by the machine to form the type for a complete column or article. The machine sorted the brass moulds after casting and returned them ready for re-use. Mergenthaler's machine was almost immediately put into use at the *New York Tribune*. Industrial action ensued as unions saw the threat to their skilled typesetters. At that time the world's largest newspapers were eight pages, but the mechanisation of typesetting, along with the availability of high speed rotary printing presses, removed the major barriers to economically producing much larger publications. Morgenthaler's company was very successful and had a virtual world wide monopoly of typesetting machinery until 1914 when the Intertype, a similar machine, emerged as a competitor. *The Sydney Daily Telegraph* was the first Australian newspaper to operate Linotype machines in 1894.

The Queanbeyan Museum has two Linotype machines on display and in working order plus another in storage. The Model 14 Linotype on display is one of two purchased from America and in use by *The Age* since the mid-1920s. They were retired in 1983 when *The Age* changed to computer type setting.

Linotype machine at Queanbeyan Printing Museum
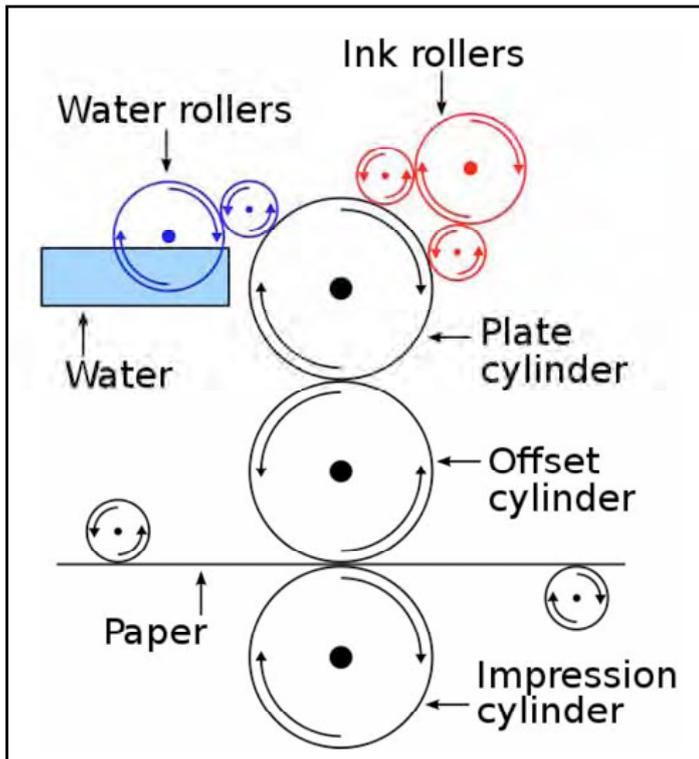
Offset printing press

Offset printing

In 1970 the *Queanbeyan Age* made a major change from letterpress print-ing as described above, to the more efficient offset printing process. *The Age* was one of the first New South Wales country newspapers to make the change, for which it purchased a new News King press. Later three more units were purchased for this machine to enable the printing of more pag-es or colour. With the acquisition of the new press, the paper was changed from broadsheet to tabloid size. Initially it was set, cut and pasted manu-ally, but later became fully computer paginated. Each completed page was photographed on to a negative and then burnt on to an aluminium plate that had a treated surface layer that was chemically removed in the areas that were not be inked. The plate is then fitted to the plate cylinder of a rotary printing press. In the printing process the plate first contacts a roller that applies water which is retained on the surface of the plate where the coating has been removed, but not on the areas where the greasy surface coating has not been removed. The rotating plate attached to the printing roller then contacts the ink roller where a greasy ink is applied. The ink does not adhere to the wet areas of the plate. An image is thus formed on the cylindrical printing plate. The rotating plate then contacts another rotating cylinder, the offset roll, which is coated with rubber, and the ink is transferred to its surface. The rotating offset roll then transfers the ink to the sheet or web of paper which is pressed against the offset cylinder by the impression cylinder, while it passes between them.

The offset process is capable of producing better images than letter-press and is the cheapest method of producing high quality print in com-mercial quantities. It became widely used commercially during the 1950s and has now almost completely superseded letterpress.

The process had a long period of development. It is termed lithog-raphy because the first plates were limestone, which had a flat porous surface that would absorb moisture and readily repel a greasy ink from the parts of its surface that had not been exposed to water. In the nineteenth century it was used for printing on tin cans. A rotary offset lithographic printing press was patented in England by Robert Barclay in 1875.

The offset process was well adapted to photo typesetting, since it did not require the use of hot metal type produced on a Linotype machine. Various systems were developed during the 1960s for phototypesetting, in which a page could be pasted up from items produced on linotype keyboards linked to paper tape machines that would print typed pages that could then be manually cut and pasted. Photos, graphics and material produced on typewriters could also be used in the paste-up, which could

News King offset press at Queanbeyan Age

then be photographed. During the 1970s computers made these processes easier and eventually computer software became available that allowed complete newspaper pages to be conveniently put together from a variety of sources and conveniently edited and proofed on computer screens be-fore the images of the pages were transferred photographically to plates for the printing machine.

At *The Age* the transition from hot metal to fully computerised type-setting proceeded slowly once the change was made to offset printing in 1970. A landmark was reached when the Linotypes were retired in 1983.

A visit to the Queanbeyan Printing Museum

The museum is open every Saturday and Sunday afternoon from 2 to 4 pm. The volunteer guides are all experienced printers able to describe the exhibits and the processes and demonstrate the operation of the newspa-per printing machines. Besides these, the museum has exhibits of all the other equipment used in producing a newspaper in the hot metal type era. This includes the photographic darkroom, machines for cutting, folding and stapling sheets of the printed paper. There are also items of equipment used in commercial printing that was carried out by *The Age* and most other country newspapers in New South Wales. It is a very comprehensive display of small scale newspaper and commercial printing in the part of the 20th century before the era of offset printing and computerisation.

Ian Arthur

Sources and further reading

We acknowledge with thanks the permission of the Queanbeyan Printing Museum to use the coloured images in this article which are the work of its photographer Bob Woods.

The Museum website www.queanbeyanprintingmuseum.com/ has more photos and descriptions of the exhibits in the museum. It also has available for downloading the autobiography of Lial James (Jim) Woods, *Looking Back*, published by the Homestead Press, Queanbeyan NSW in 1995 and updated in 2007.

The ASHET website at www.ashet.org.au has oral history interviews with Jim Woods and three of the volunteer guides from the museum.

James Moran, *Printing presses; history and development from the fifteenth century to modern times,* Faber and Faber, London, 1973, is a comprehensive history of letterpress printing machines from the fifteenth century until around 1949.

Encyclopaedia Britannica has an informative twenty page article on printing including its history and descriptions of the technology.