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# Investigating Life and Ideas in 1901, and Thereabouts

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Are you looking for ways of building mathematics investigations around the 1901 Federation of colonies? Check the examples provided in the yellow-pages insert in *Common Denominator* (MAV Newsletter No. 174, May 2001). It is also helpful to look more widely. Here are some suggestions for stimulus topics, first focussing on Australian matters, and then casting a glance at the larger world. Globalisation, in the age of the steamship and telegraph was as much an issue then, as now. Mathematics? Consider timelines, units, costs, and anything else that needs to be quantified, measured, plotted, mapped, diagrammed, and so on.

## Australia, 1901 - Federation, History and Mathematics?

- In 1901 the Commonwealth of Australia was formed from the federation of six former British colonies and one former British colonial territory, uniting the continental mainland of Australia with the island of Tasmania, and other smaller islands included in other colony/state/territory regions. Where's the mathematics in that?

This was, apart from anything else, the mathematical beginning of the new Twentieth century. Why? Wasn't 1900 the start of the new century? If it was, where did we start counting? Where was the zero, or 0 A.D.?

Consider some of the following Australian facts from 1901.

- On 30 January, following the lead of New South Wales, Victoria began to pay a State government age-pension of 1 shilling (10 cents) per day, to Victorians aged 65 or older who had been resident in Victoria for 20 years or more. On the first day of this new pension, in Melbourne, 119 men and 77 women queued at the Melbourne City Court to register for the pension.
- In March 1901 Henry Lawson published a new collection of short stories about bush people, *Joe*

*Wilson and His Mates*. The American short story writer O. Henry had barely begun his career, and du Maupassant, in France, had died. A.B. 'Banjo' Paterson had published 'Clancy of the Overflow' in December 1889, 'Waltzing Matilda' in April 1895, and his book including 'The Man From Snowy River' appeared in October 1895. Lawson's first poems, as a seventeen year-old, had appeared in *The Bulletin* (which itself first appeared in February 1880, Australia's first centenary year!) in December 1887, with his first short story appearing in December 1888, with his first book of stories and verse appearing in 1894, when Australia was first established with three time-zones.

- At about the same time as this Australian literary blossoming, the 'Heidelberg' school of Australian Impressionists first camped in the bush near Melbourne, at Eaglemont, and Heidelberg, in 1888: Charles Condor, Arthur Streeton, and Frederic McCubbin.
- In September 1901 Miles Franklin, a 22-year-old woman, published her first novel *My Brilliant Career*, concealing her identity behind the male pen-name. Henry Lawson encouraged the publishers to accept the book, and suspected the author was a woman.
- The Australian publishing firm Angus and Robertson published its first book in 1888, the same year that mechanical shears were first used for sheep shearing.
- The Australian Federation was proclaimed at Sydney's Centennial Park on 1 January 1901, but the first sitting of the Commonwealth government occurred on 10 May 1901, in Melbourne, in the Exhibition Building. Princess Victoria, wife of the Duke of Cornwall and York who opened the national parliament, was still dressed in mourning for Queen Victoria who had died earlier in the year.
- On 12 June 1901, near Wilmansrust, a camp of the Victorian Mounted Rifles was attacked by a Boer

force, during the Second Boer War in South Africa. (Harry 'Breaker' Morant, a member of a counter-guerrilla semi-regular Australian force of volunteers, was executed for alleged atrocities in 1902).

- The separate Presbyterian churches of the former colonies joined into a national church on 25 July 1901. The Methodist churches followed suit shortly after.
- A competition to design a new flag for Australia was jointly won, on 4 September, by five designers, with ideas from all the winners being incorporated into the final single design we have today: a navy-blue (or crimson) jack, quartered, with the Union Jack of Great Britain in the top-left quarter, the Southern Cross, and the Commonwealth Star with six points for the six new states, and former colonies. Altogether 32 823 entries were submitted, and exhibited at the Exhibition Building in Melbourne. Prize money was contributed by the Havelock Tobacco Company (50 pounds), the Commonwealth government (75 pounds) and the *Review of Reviews* newspaper (75 pounds).
- Federal parliament in November 1901 debated the ramifications of a bill to pass control of British New Guinea to Australia. (The north-eastern part of New Guinea, and nearby islands were part of German New Guinea, while the west of the island was part of the Dutch East Indies.) This was to be an 'appendage territory, overseen by the Department of Foreign Affairs' and not a full territory in its own right, and would not become a state of the commonwealth.
- William Farrer, on the last day of 1901, named a new strain of rust-proof wheat 'Federation', to commemorate the new nation.
- A fair-ground silent-movie machine, the Kinetoscope, was introduced to Australia, allowing one person to view a moving picture on a film-loop. However Australia's first feature film, and one of the world's first films with a story, had been shown in Melbourne in September 1900. The Salvation Army made the film on a tennis court in Melbourne, using painted backdrops for scenery. The film, 'Soldiers of the Cross', was about early Christians martyred by Romans. It included thirteen (silent) moving-film sections as well as 200 lantern slides, and a lecture from Salvation Army Commandant Herbert Booth.
- Extensive parliamentary debate considered a 'White Australia Bill', to prevent the immigration of Asians and other non-'whites' from Australia.

Meanwhile Australia's nett immigration for 1901 was 2857 people.

- Women in New South Wales were allowed to vote in 1902, several years after the pioneering electoral rights gained by South Australian women in 1894. This followed the 23 April 1902 Commonwealth Franchise Bill giving women voting rights in federal elections.
- In the preceding leap year, 1900, pre-federation Australians had competed at the Olympic Games in Paris, winning a total of six medals for swimming (in the River Seine), archery and athletics, including the 200 metres obstacle race which involved alternatively climbing over and swimming under boats in the river. Eighteen other countries competed at the games.
- Prior to the formal act of federation, elections in the colonies had paved the way, by approving the joining together of independent colonies into one federated nation. Queensland voted in favour of federation in September 1899, after the third Federal Convention finally approved a national constitution in March 1898. Western Australia was the last colony to agree to join, after holding a referendum, in September 1900. In the same month Queen Victoria royally assented to the decision to federate.
- The decision to place the proposed federal capital city inside NSW, at least 100 miles from Sydney, was made in February 1899, although the final decision to make the permanent capital at Canberra, and to use the existing location's name 'Canberra', was not made until early in March 1913. Alternative names proposed included Shakespeare, Sydmeiadl-perbrisho, Pacifica, Austral, Myola, Thirstyville, Coo-ee, and Jumbuck City.
- Telephones, phonographs, electric light, gas stoves, telegrams, electric trams and other modern technology had been established considerably before 1901.
- The problem of 'engaged' phone lines was discussed by the Postal Department in Sydney in September 1899, and the Post-Master General proposed timed telephone calls, with a three-minute limit to prevent people 'carrying on frivolous conversations'.
- Natural gas was discovered at Roma, in Queensland, while prospectors were drilling for water. Engineers proposed effective ways of removing the gas and rendering the water fit for human consumption.

- The first steam car drove from Bathurst, in NSW, to Melbourne, in May 1900. Melbourne's system of sewers was established in February 1898, shortly after the goldrush to Kalgoorlie, in Western Australia.
- Daisy Bates was investigating reports of human rights abuses against Aborigines in northern Western Australia in September 1899.
- In January 1900 bubonic plague struck the wharves district of Sydney.
- As Australian soldiers were returning South Africa, in August 1900, sailors on HMS Protector, a South Australian naval vessel, were leaving to join European forces fighting against the Boxer Rebellion in China, including a force from HMS Walleroo, a NSW navy ship.

### ... and in the wider world

What happened in 1901? It is easy to list mere trivia. But important events deserve to be recalled, and located meaningfully in their correct historical setting. I have checked Bernard Grun *The Timetables of History* [based on Werner Stein *Kulturfahrplan* 1946] Simon and Schuster, New York, 1975; third edition 1991. Apart from Australia's entry, under the heading of History and Politics, which mentions Edmund Barton as the first prime minister of the new Commonwealth of Australia, you may be interested in some of the following events.

- Queen Victoria dies, and is succeeded by Edward VII - hence Australia began in the Edwardian period.
- The Second Boer War continues, with the Boers starting a guerrilla campaign. (Incidentally, Mafeking had been relieved in 1900, leaping Baden-Powell into international prominence, which later evolved into the Scouting Movement. Harry 'Breaker' Morant was executed by the British Army in 1902.) This Boer war led to the invention of terms such as 'commando' and 'concentration camp'.
- Henri Dunant, Swiss founder of the International Red Cross, receives the Nobel Peace Prize, shared with Frenchman Frederic Passy.
- A Treaty is signed authorising the building of the Panama Canal, under USA supervision.
- The Boxer uprisings in China end with the Peace of Peking.
- Rachmaninoff writes his Piano Concerto No. 2
- Henri Toulouse-Lautrec dies.

- Picasso is in his 'Blue Period', painting in Paris in great poverty.
- Ragtime jazz develops in USA (led by Black American composer Scott Joplin), replacing the previously popular Cakewalk style of 'jazz'.
- Marconi makes the first trans-Atlantic radio transmission, transmitting from Cornwall to Newfoundland.
- Max Planck publishes 'Laws of Radiation', having proposed his Quantum Theory of energy in 1900.
- Wilhelm Maybach, technical director at Daimler works, constructs the first Mercedes car.
- The first motor driven bicycles are developed.
- Adrenalin is isolated as a biochemical, the first hormone to be processed in this way.
- Wilhelm Roentgen, discoverer of X-rays (in 1895), receives the Nobel Prize for Physics.
- Walter Hermann Nernst (of Germany) postulates the Third Law of Thermodynamics (and this later wins the Nobel Prize for Chemistry in 1920): actually some of the reference books I have looked at are confused about just what the Third Law is, and whether it is something to do with Absolute Zero, discovered or postulated by Lord Kelvin in 1851. Hans Ohanian *Physics* (Norton, New York, 1985, pp 524-525) says that Nernst's Third Law is that the entropy (thermodynamic organisation) of a system at absolute zero is a universal constant (independent of all the macroscopic parameters describing the system), which may be set to zero, that is, at absolute zero the entropy is zero; and in an alternative formulation of the Third Law, the absolute zero of temperature is unattainable. (Incidentally, the Second Law, formulated by Kelvin and Planck, is that there is no such thing as a free lunch, while the First Law is equivalent to the Law of Conservation of Energy.)
- The Trans-Siberian railway reaches Port Arthur on the Pacific Coast, after Russia had occupied this Chinese territory in 1897. (The war between Russia and Japan began in 1904. Japan won!)
- Cuba is made a protectorate of the USA, having been a Spanish colony, but ceded to USA, along with the Philippines, Guam and Puerto Rico after Spain was defeated in the war of 1898.
- Rudyard Kipling writes his Indian novel *Kim*.
- Japan seeks concessions in Korea, but negotiations failed. (The king of Korea had proclaimed himself emperor in 1897.)
- Negotiations for a treaty between Britain and

Germany fail to reach agreement.

- Britain launches its first submarine. (Germany had flown the first zeppelin in 1900.)
- Exploratory drilling for oil begins in Persia (now Iran).

### Pre-metric Measurement and Everyday Mathematics (Numeracy)

[I confess I have been unable to find a suitable Secondary mathematics textbook from around 1901, apart from some upper-level books, such as Charles Smith *An Elementary Treatise on Conic Sections by the Methods of Co-ordinate Geometry*, first published in 1882, or S. Barnard and J.M. Child *A New Algebra*, first published in 1912, and still used when I was doing Year 12 in the mid-1960s, just before the so-called "New Mathematics" swept in. So I have resorted to a copy of *Arithmetic for Grade VIII* [Year 8], the official Victorian mathematics textbook, first published in 1941. It is worth recalling that at that time, and until shortly after World War II, most, if not all "primary" schools had classes from Grade 1 to Grade 8. Most students attended such "central" schools until the students either achieved Passing grades for Grade 8, or reached the school-leaving age of 14 - whichever came first. After Grade 8, for those lucky enough to complete their "primary" schooling, most moved into some form of young-adult employment, possibly including some on-the-job training. A minority attended technical colleges, or undertook trade apprenticeships. A smaller minority went to "secondary" schools, which were either public State schools such as Melbourne High, or private church schools. Very few students completed Year 11 ("Leaving") or Year 12 ("matriculation", that is, the entry-requirement for university). Hence, the following questions represent the most demanding kind of everyday mathematics required of an educated citizen.]

Calculators are NOT permissible, although simple unit-tables may be used, e.g. 12 inches = 1 foot, 3 feet = 1 yard, 12 pennies (d) = 1 shilling (s), 20 shillings = 1 pound (£), etc.

Cumulative Revision - IV (pp 125-126).

1. The population of Australia on 31 December 1937 was estimated to be 6,866,590.
  - (a) Express this in words;
  - (b) Express this rounded to the nearest hundred thousand.
2. Fifty-nine cases of eggs, each containing 30 dozen eggs, were exported. But on arrival 180 eggs were

unfit for sale. How many dozen were fit for sale?

3. Mr Jones and Mr Brown ate at a restaurant. Mr Jones paid the bill of 3s. 10d. Mr Brown's share of the cost was 6d more than Mr Jones's share. How much did Mr Brown have to pay Mr Jones?
4. From a roll containing 10 and  $\frac{3}{4}$  yards, a shop assistant served three customers with 1 and  $\frac{1}{8}$  yards of ribbon, and served five customers with  $\frac{3}{4}$  of a yard each. How much ribbon was left?
5.  $0.1 + 0.1$  of  $0.1 \div 0.1$
6. On a day in June, the temperatures, taken at intervals of 1 and  $\frac{1}{2}$  hours, from 9 a.m., were: 380, 420, 510, 640, and 560. Draw a line graph to illustrate the change in temperature.
7. Mr Watkins placed £50 in a bank at a fixed deposit rate of 2% p.a. for 3 months. At the end of that time he renewed the £50 deposit for a further 6 months, this time at 2.5% p.a. Find his total interest.
8. A farmer bought 20 sheep at 15s. 9d. each. Two sheep died. At what price per head did he sell the remainder if he made a profit of £1 16s. on the deal?
9. If the buying price of an article is £1 19s., the overhead is 4s 6d, and the selling price is £2 10s, express the nett profit as a percentage of the selling price.
10. (a) A paddock has four sides: 20 chain, 15 chain, 29 chain and 12 chain. If the cost of fencing is 7s 6d per chain, what does it cost to fence the paddock?  
(b) The paddock is a right-trapezium (with the 20ch. and 29ch. sides parallel, and the 12ch. side perpendicular to these other two sides): Find the value of the paddock if it is worth £8 10s per acre.

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