Creating Science – Science is People!

Science is made by people, and people make up the science we use every day. But what does that mean, and how does that help??

#CreatingScienceScienceIsPeople

Suggested Outcomes

(NOTE: This is by no means an exhaustive list of possible outcomes, neither is it intended that ONLY these outcomes can or should be met. Science is a deeply interrelated activity, and you may find cross curriculum links you can and should use.)

Science as a human endeavour:

- Nature and development of science: Science involves testing predictions by gathering data and using evidence to develop explanations of events and phenomena and reflects historical and cultural contributions (ACSHE098)
- Use and influence of science: Scientific knowledge is used to solve problems and inform personal and community decisions (ACSHE100)

Cross curricular outcomes

- History curriculum, history skills. Historical questions and research 7; Identify a range of questions about the past to inform a historical inquiry (ACHHS207)

Science Vocabulary Words

Tier 3

- Paradigm – an example or archetype (that is, a standard).
- Paradigm shift – a phrase coined by Karl Popper to illustrate how sometimes the whole mindset of what science is and how science is done can dramatically change, as in paradigm shift from a heliocentric to a geocentric model of the solar system.

Warning

- No special warnings, but cultural sensitivity is called for.

Preparation

- Prepare a poster or two of some of your favourite scientists. See appendix.

Learning Intent (student friendly)

'We are learning to' (WALT) – appreciate that science is made by people, and each scientist is a reflection of their culture, and adds to their culture.

Success criteria

'What I'm looking for' (WILF) – student who can tell a scientist's story - what they were trying to teach the world, and what they had to go through to succeed.

Student learning goals

Help students make a self-monitored learning goal for this lesson.

Evidence of learning

How will you know when the learning goal is achieved? What EVIDENCE do you have that your students have met or exceeded the learning expectations?

Engage

Perform a prior learning activity as mentioned below.

- ⇨ Note the Learning Intention of this lesson for students.
- ⇨ Make sure all students write down any questions they may have generated during this phase regarding the topic for today.

Engage students with the question: Has anyone from your country ever created some new scientific knowledge?

What did they teach? And how did they convince others it was a good idea?

Explore

Every scientist is the result of their cultural upbringing, and every scientist adds to what their culture knows and believes.

From the pictures in Dr Joe's book "Creating Science", what did the following scientists want to change? What oppositions did they have to that change?

- Barry Marshal
- Ruby Payne-Scott
- John Cade

Explain

Each scientist changed the way science is done, and how we think about the world.

- Ruby Payne-Scott – aside from being a skilled radio astronomer, had to actively challenge expectations of her based on her gender.
- Barry Marshal – took a great, and potentially irreversible, risk to convince the establishment regarding his theory of the cause of stomach ulcers.

- John Cade – challenged assumptions about the way the mind thought, and ways that were necessary to help it think differently.

Change is not always so challenging. But some change is. Many, many other scientists have had to face great difficulty in changing science.

Elaborate

The claim could be made that some great science ideas have had to wait years, if not centuries, for acceptance. Not because there wasn't enough evidence, or logic, but because the idea was not 'popular'. What do you think?

Check out some of the other great debates in science, and explore the protagonists, their lives and their cultures.

- Louis Pascal vs the Spontaneous Generation theory of life on earth.
- Alfred Wegener and tectonic plate theory
- Charles Darwin and early Evolutionary theory.
- Copernicus and the heliocentric model of the universe.[1]

Some great science ideas have had to wait years, if not centuries, for acceptance. Not because there' wasn't enough evidence, or logic, but because the idea was not… 'popular'.

Paradigm shift

Thomas Kuhn, another philosopher, historian and scientist, who invented the idea that sometimes science goes though 'revolutions', where much of what is believed to be known is reviewed in the light of a new scientific theory. The rest of the time, science just chugs along at a normal pace.

Some examples included Copernicus's sun-centred revolution, or Newton's laws which united heavenly movement and earthly movement, or the invention and acceptance of germ theory.

Science is not yet done. What great revolutions do you think science may face in the future? The discovery of science that reveals the human soul, perhaps?

Oppression

Like any human endeavour, science does not always face oppression. But when it does, just like any human endeavour, it can be brutal. Can you think of times when science was oppressed? Again, Copernicus is one example, spending most of his days under arrest.

Science, inevitably, is also driven by what questions scientists are allowed to ask, which brings us to the next point.

[1] So 'world shattering' was Copernicus' idea, that some still call a great change in scientific thinking a 'Copernican revolution'.

Science Taboo

Sometimes, perhaps, has science gone too far? Have scientists asked and experimented on questions that should have been left alone? And what do we do with knowledge gained through immoral means?

- Nazi scientists are notorious for purportedly immoral experiments, such as exploring hypothermia by freezing people to death.
- Even otherwise exemplarily nations have supported, if rumours are to be believed, deliberately infecting patients in order to track the spread of disease and effectiveness of immunisations.
- An NZ hospital knew about a doctor assigning patients, without their permission, to a control and experiment group for a new treatment of drug in the 'cervical cancer scandal'.
- Facebook admitted to 'experimenting' with participants' emotional states without their consent, and using that knowledge to influence the American elections.

The list here is brief, and purposely unreferenced so that students are forced to research the issues themselves. Is there any substance to these science rumours? And if so, what is to be done with the 'science that should not have happened'?

Taking the name of Science in vain

Do advertising companies, politicians, and everyday people sometimes use science 'facts' to make their opinions seem true and undeniable?

Once, a scientist was paid to invent a scientific experiment that 'proved' chocolate made you lose weight[2]. Dr John Bohannon used several science tricks to get away with it;

- He had a very small sample size (especially for a medical study) which almost guaranteed he could find results simply by chance.
- Taking many measurements of many, many variables. There's always a chance he'd find a correlation somewhere! [3]
- He paid a 'science journal' to publish his article, and they did not check it properly.
- The journal also did no peer reviewing – which means they likely did not send the article to any other scientists or doctors to see if the results were questionable.

Overall this was a very clever fake that few could pick up on even if they loved science! Just goes to show we all need to look a little closer to tell fake science from genuine.

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[2] From https://io9.gizmodo.com/i-fooled-millions-into-thinking-chocolate-helps-weight-1707251800 on 10 may 2018

[3] And I quote: "Here's a dirty little science secret: If you measure a large number of things about a small number of people, you are almost guaranteed to get a "statistically significant" result. Our study included 18 different measurements—weight, cholesterol, sodium, blood protein levels, sleep quality, well-being, etc.—from 15 people. (One subject was dropped.) That study design is a recipe for false positives."

So what does genuine science look like?

- Replicable – other people can do the experiments and expect similar results.
- Multiple trials – it has as many participants as it needs to make a valid conclusion.
- Focused – it has one or two variables it focuses on, not as many as it can till it finds a correlation by pure random chance.
- Measurable – it actually talks about measurable things and measures them carefully, not arbitrary quantities any observer can disagree on.
- Peer review – it submits itself to scrutiny by experts in the community, and isn't published in the first newspaper they can find.
- And many more. Can you name a few qualities of good science?

Evaluate

⇨ Review with students what they felt they learnt from this lesson. Did they have any questions at the start that they feel were answered?

Success criteria

⇨ Review the Learning Intentions of this lesson with students. Was it met?

At the end of each class, review the learning objective and see how we did. Ask:

- Did you achieve your learning goal?
- (If needed) where can you go for extra help or information?

Assessment

Prior learning:

Ask:

- What role does culture play in science?
- Does it matter what country someone is from when they do science?
- Who invented science?

Be sure to watch out for the following common alternative conceptions:

- Scientists are white men in white lab coats.
- Science is always welcomed by society.
- No one ever tries to use science to lie. If a claim says it is 'scientific', it must be true.

Formative:

As students are learning, help them self-monitor their own learning and achievements.

Summative:

Help students consider ways they can communicate their new understanding to others, just as scientists need to do.

- Do up a poster of 'science fakes' – explaining a known LIE that was once passed off as science.
- Explore a scientific revolution – what was once believed as true, who changed it and how, and now how those ideas have grown. Present it as a slideshow.
- Try to convince someone of an outdated scientific theory, such as spontaneous generation or the caloric theory of heat. Can they think of a way to prove you wrong?
- Present a speech about your favourite scientist. What was their cultural upbringing? What question motivated them in their discovery? What resistance did they face?

So what?

People make science, so it can be as thrilling, and dishonest, as any human endeavour.

Creating science

Science as a Human Endeavour:

As we learnt that different scientists from different backgrounds face different challenges to get their ideas accepted, we saw that;

- Nature and development of science: Science involves testing predictions by gathering data and using evidence to develop explanations of events and phenomena and reflects historical and cultural contributions (ACSHE098)

As we learnt that science is used to inform community and personal decisions.

- Use and influence of science: Scientific knowledge is used to solve problems and inform personal and community decisions (ACSHE100)

Cross curricular outcomes

As we asked questions about the great Australian scientists, past and present, investigating their research and the world around them that motivated their questions and research, we had the chance to;

- History curriculum, history skills. Historical questions and research 7; Identify a range of questions about the past to inform a historical inquiry (ACHHS207)

Appendix: Ruby Payne-Scott/Hall

Taken 18 April 2017 from http://engagingwomen.com.au/stories/dr-tamara-davis-astrophysicist/
Ruby was a pioneer in Radio Astronomy, and one of Australia's best and first female scientists, she is credited with the discovery of type 1 and type 3 radio bursts. She helped use radio waves to detect enemy planes in WWII, and researched the effect of magnetism on the human body.

Engaging Women

Unlocking life tips from inspiring minds

The astrophysicist

Image: Ruby Payne-Scott

Interview with Dr Tamara Davis Astrophysicist regarding Ruby Payne-Scott.

"I feel like my life has been blessed because I've almost never encountered any situation in which I've had limited options because of my gender." - Dr Tamara Davis.

Can you imagine being forced to lie about your marriage and living with the threat of being sacked if your bosses found out? Well that's what life was like for women working in Australia's Public Service until the amendment of the Public Service Act in 1966. Married women either accepted temporary positions with poor career prospects and no entitlements, or they lied – even if they were super smart, bright lights like Ruby Payne-Scott.

Ruby Scott was a pioneer radio physicist, mother, teacher and spoke up for what she believed in. World War two offered her a lucky break, the manpower shortage meant she was put on the payroll at the Radiophysics Lab of the then Council for Scientific and Industrial Research at Sydney University, where she had studied.

Her work, classified 'top-secret', was instrumental in forcing the Japanese out of the Pacific. Ruby and her colleagues had fashioned radars out of "coathangers and sticky tape" to protect the coastline.

She also developed a means of measuring radio emissions from the Sun and stars, a breakthrough which would in turn lead to the construction of sophisticated radio telescopes. The groundbreaking work was called: 'radio astronomy'. (source: www.naa.gov.au/)
When her six-year secret marriage was finally exposed in 1950, Ruby didn't go down without a fight, telling the CSIRO:

Personally I feel no legal or moral obligation to have taken any other action than I have in making my marriage known… the present procedure with regard to married women… seems to go far beyond the simple statement in the Act … [it] is ridiculous and can lead to ridiculous results.
Miss Payne-Scott is no longer with us, so I asked a modern-day astrophysicist Dr Tamara Davis (one of the most cited astrophysicists in the world) to put this legacy into context.

MH: Dr Davis, what has the work of Ruby Payne-Scott and her contemporaries meant for your own career?
Dr D: Thanks to the trail-blazing efforts of Ruby and her contemporaries, I've never felt anything but warmly welcome in my choice of physics and astrophysics as a career. There was never any question about whether it was appropriate for me to take physics, and I have always been strongly supported by all my colleagues, male and female. No doubt there are still subtle biases in the system, and women are still out-numbered by men in my field about 5-1, but I find it a fantastic and enjoyable field to work in, and one in which I feel very well-respected, irrespective of my gender. So I have very much to thank them for.
MH: In the 1940's when she received her 'lucky break', there were few opportunities for women. Can you shed some light on how frustrating that must have been to a woman who obviously loved the field she was in?
Dr D: I find it incredibly difficult to imagine being put in that situation. It's hard to believe that just a few short generations ago attitudes were so different. I feel like my life has been blessed because I've almost never encountered any situation in which I've had limited options because of my gender.
I'm pretty sure I would not have had the determination Ruby Payne-Scott displayed – partly because I find so many different things also interesting, and so would probably have taken the easy way out and tried to excel at something I was 'expected' to excel at.

MH: Can you explain for us how important her work was?
Dr D: The most remarkable thing about her work was realising that astrophysics could be done in a completely different way. Not with telescopes with shiny mirrors, but with telescopes made of wire mesh. Pioneering the techniques and discoveries in such a new field meant a huge display of ingenuity, inspiration, and long-term dedication. Now radio astronomy is a massive field. Eventually Australian radio-astronomers at Parkes Radio Telescope would invent wifi, while trying to detect black holes. So you could argue that being able to use the internet on your phone is one of her legacies.
MH: Incredibly she was forced to quit her job because she got married. How does that make you react as a contemporary scientist and woman?
Dr D: Shock and outrage! Such a requirement might have been enough to force me to be celibate (but that's not really displaying good work-life balance, is it!)
MH: No it sure isn't so why is so important that we share her story?
DR D: Despite the fact that women are now welcome in the sciences, it is still hard to find good female role-models. I certainly didn't really know of many (any?) while doing my degree, and there does remain strong unconscious bias in gender roles. Celebrating female role models is a good way to change that.
MH: Is there any thing more you would like us to know?
Dr D: As I said, I've never felt discriminated against during my career But I do know women who have.
Meanwhile, I've noticed a very strong positive shift in the last five years or so, towards more and more men in the field concerned about the female representation and discussing seriously how to improve it. Men also realise that changing attitudes so that all of our best talent has the opportunity to shine, benefits everyone involved.

Finally, I'd just note that to support all of the best talent means supporting not only the involvement of women, but also more racial diversity in the field. The issue of race is at least as significant as that of gender. Dr Tamara Davis – astrophysicist

About Martine Harte

Martine Harte is founder of Engaging Women, a platform for social good. She is dedicated voice in the advancement of women & girls. Contact: info@engagingwomen.com.au to learn more about mentorship or the Ambassadors program.

Appendix: Barry Marshall

In 1984 Barry Marshal and a handful of colleagues believed the somewhat 'heretical' notion that stomach ulcers were caused by microbes, and not stress and bad diet. He proved it (DO NOT try this at home) by drinking a Petri dish of disease, quickly developing symptoms, and 2 weeks later eradicating them with antibiotics. Their work overturned many opinions.

Barry Marshall

From Wikipedia, the free encyclopedia

Barry James Marshall, AC,[1] FRACP, FRS,[3] FAA (born 30 September 1951) is an Australian physician, Nobel Prize laureate in Physiology or Medicine, and Professor of Clinical Microbiology at the University of Western Australia. Marshall and Robin Warren showed that the bacterium *Helicobacter pylori* (*H. pylori*) is the cause of most peptic ulcers, reversing decades of medical doctrine holding that ulcers were caused by stress, spicy foods, and too much acid. This discovery has allowed for a breakthrough in understanding a causative link between *Helicobacter pylori* infection and stomach cancer.[4][5][6]

Education and early life[edit]

Marshall was born in Kalgoorlie, Western Australia and lived in Kalgoorlie and Carnarvon until moving to Perth at the age of eight. His father held various jobs, and his mother was a nurse. He is the eldest of four siblings. He attended Newman College and the University of Western Australia, where he received a Bachelor of Medicine, Bachelor of Surgery (MBBS) in 1974.[1] He married his wife Adrienne in 1972 and has four children.[7][8][9]

Career and research[edit]

In 1979, Marshall was appointed as a Registrar in Medicine at the Royal Perth Hospital. He met Robin Warren, a pathologist interested in gastritis, during internal medicine fellowship training at Royal Perth Hospital in 1981. Together, the pair studied the presence of spiral bacteria in association with gastritis. In 1982, they performed the initial culture of *H. pylori* and developed their hypothesis related to the bacterial cause of peptic ulcer and gastric cancer.[7] It has been claimed that the *H. pylori* theory was ridiculed by the establishment scientists and doctors, who did not believe that any bacteria could live in the acidic environment of the stomach. Marshall has been quoted as saying in 1998 that "(e)veryone was against me, but I knew I was right."[10] On the other hand, it has also been argued that medical researchers showed a proper degree of scientific scepticism until the *H. pylori* hypothesis could be supported by evidence.[11]

After failed attempts to infect piglets in 1984, Marshall, after having a baseline endoscopy done, drank a Petri dish containing cultured *H. pylori*, expecting to develop, perhaps years later, an ulcer. He was surprised when, only three days later, he developed vague nausea and halitosis (due to the achlorhydria, there was no acid to kill bacteria in the stomach, and their waste products manifested as bad breath), noticed only by his mother. On days 5–8, he developed achlorydric (no acid) vomiting. On day eight, he had a repeat endoscopy, which showed massive inflammation (gastritis), and a biopsy from which *H. pylori* was cultured, showing it had colonised his stomach. On the fourteenth day after ingestion, a third endoscopy was done, and Marshall began to take antibiotics.[12] Interestingly, Marshall did not develop antibodies to *H. pylori*, suggesting that innate immunity can sometimes eradicate acute *H. pylori* infection. Marshall's illness and recovery, based on a culture of organisms extracted from a patient, fulfilled Koch's postulates for *H. pylori* and gastritis, but not for peptic ulcer. This experiment was published in 1985 in the *Medical Journal of Australia*[13] and is among the most cited articles from the journal.[14]

After his work at Fremantle Hospital, Marshall did research at Royal Perth Hospital (1985–86) and at the University of Virginia, USA (1986–Present), before returning to Australia while remaining on the faculty of the University of Virginia.[2] He held a Burnet Fellowship at the University of Western Australia (UWA) from 1998–2003.[15] Marshall continues research related to *H. pylori* and runs the *H. pylori* Research Laboratory at UWA.[16]

In 2007, Marshall accepted a part-time appointment at the Pennsylvania State University.[17]

Awards and honours[edit]

In 2005, the Karolinska Institute in Stockholm awarded the Nobel Prize in Physiology or Medicine to Marshall and Robin Warren, his long-time collaborator, "for their discovery of the bacterium *Helicobacter pylori* and its role in gastritis and peptic ulcer disease".[18]

Marshall also received the Warren Alpert Prize in 1994; the Australian Medical Association Award and the Albert Lasker Award for Clinical Medical Research in 1995; the Gairdner Foundation International Award in 1996; the Paul Ehrlich and Ludwig Darmstaedter Prize in 1997; the Dr A.H. Heineken Prize for Medicine, the Florey Medal, and the Buchanan Medal of the Royal Society in 1998.

He was elected a Fellow of the Royal Society (FRS) in 1999. His certificate of election to the Royal Society reads:[3]

Barry Marshall, together with Robin Warren, discovered spiral bacteria in the stomachs of almost all patients with active chronic gastritis, or duodenal or gastric ulcers, and proposed that the bacteria were an important factor in the aetiology of these diseases. In 1985, Marshall showed by self administration that this bacterium, now called Helicobacter pylori, causes acute gastritis and suggested that chronic colonisation directly leads to peptic ulceration. These resuslts [sic] were a major challenge to the prevailing view that gastric disorders had a physiological basis, rather than being infectious diseases. Marshall showed that antibiotic and bismuth salt regimens that killed H. pylori resulted in the cure of duodenal ulcers. The view that gastric disorders are infectious diseases is now firmly established and there is increasing evidence for a role of H. pylori infection in gastric cancers. The work of Marshall has produced one of the most radical and important changes in medical perception in the last 50 years. Barry Marshall was awarded the Albert Lasker Award for Clinical Science in 1995 and the Buchanan Medal in 1998.

Marshall was awarded the Benjamin Franklin Medal for Life Sciences in 1999; the Keio Medical Science Prize in 2002; and the Australian Centenary Medal and Macfarlane Burnet Medal and Lecture in 2003.[19] [20]

Marshall was appointed a Companion of the Order of Australia in 2007.[21] He was awarded an honorary Doctor of Science degree by the University of Oxford in 2009.[22]

See also[edit]

- Timeline of peptic ulcer disease and Helicobacter pylori

Appendix: John Cade

While Lithium is rarely used to treat mental disorders today, to suggest such things could be used at all was a novel and daring approach. But, at the time, the alternatives were MUCH worse!

John Cade

From Wikipedia, the free encyclopedia

Dr **John Frederick Joseph Cade** AO[1] [2] [3] (18 January 1912 – 16 November 1980) was an Australian psychiatrist credited with discovering (in 1948) the effects of lithium carbonate as a mood stabilizer in the treatment of bipolar disorder (then known as manic depression). In an age where the standard treatments for psychosis were electroconvulsive therapy and lobotomy, lithium had the distinction of being the first effective medication available to treat a mental illness.

Early life[edit]

John Cade was born in Murtoa,[nb 1] in the Wimmera region of Victoria, Australia. John's father David was Murtoa's general practitioner. Ellen, John's mother, and younger brothers David and Frank completed the family. When John was a small boy, his father left for World War I and served in Gallipoli and France. On return from the war, his father suffered from 'war-weariness' and had difficulty in continuing in general practice. Therefore, his father sold the practice and accepted a position with the Mental Hygiene Department. Over the next 25 years, Dr Cade Sr became medical superintendent at several Victorian mental hospitals, namely Sunbury, Beechworth and Mont Park. John and his brothers spent many of their younger years living within the grounds of these institutions, which had a great bearing on John's later deep understanding of the needs of the mentally ill.[4] John was educated at Scotch College, Melbourne, matriculating in 1928. He then studied medicine at the University of Melbourne, graduating at the age of 21 years with honours in all subjects. He became a House Officer at St Vincent's Hospital and then Royal Children's Hospital before becoming severely ill with bilateral pneumococcal pneumonia. While he was convalescing, John fell in love with one of his nurses, Jean. They married in 1937.[4]

World War II[edit]

Like his father before him, Cade left his young family to fight for Australia in the Armed Forces in World War II. Cade was appointed captain, Australian Army Medical Corps, A.I.F., on 1 July 1940 and posted to the 2nd/9th Field Ambulance.[5] Although trained as a psychiatrist, Dr. Cade served as a surgeon and departed for Singapore in 1941 on RMS Queen Mary. He was promoted to major in September 1941. After the Fall of Singapore to Japan, he became a prisoner of war at Changi Prison from February 1942 to September 1945.[4] During his imprisonment, he reportedly would observe some fellow inmates having strange, vacillating behaviour. He thought perhaps a toxin was affecting their brains and when it was eliminated through their urine, they lost their symptoms.

Discovery of the effect of lithium on mania[edit]

After the war, Cade recuperated very briefly in Heidelberg Hospital, then took up a position at Bundoora Repatriation Mental Hospital in Melbourne. It was at an unused kitchen in Bundoora where he conducted crude experiments which led to the discovery of lithium as a treatment of bipolar disorder. Since he had no sophisticated analytical equipment these experiments mostly consisted of injecting urine from mentally ill patients into the abdomen of guinea pigs. His early experiments suggested to him that the urine from manic patients was more toxic. There are 2 toxic substances in urine: urea and uric acid. He found urea was the same in both ill and healthy people. He started to work on uric acid. In order to do that, he made artificial solutions of uric acid. To make up different strengths of uric acid he needed to convert it unto a substance that he could more easily manipulate. On its own uric acid would not dissolve in water. Then, in an effort to increase the water solubility of uric acid, lithium was added to make a solution of lithium urate. Cade found that in the guinea pigs injected with lithium carbonate solution, as a control solution, the guinea pigs were more restful.[6] His use of careful controls in his experiments

revealed that the lithium ion had a calming effect by itself, but even this finding may have been caused by the toxic effects of an excessive dose of Lithium. After ingesting lithium himself to ensure its safety in humans,[4] Cade began a small-scale trial of lithium citrate and/or lithium carbonate on some of his patients diagnosed with mania, dementia præcox or melancholia, with outstanding results. The calming effect was so robust that Cade speculated that mania was caused by a deficiency in lithium.[6]

While Cade's results appeared highly promising, side-effects of lithium in some cases led to non-compliance. Toxicity of lithium led to several deaths of patients undergoing lithium treatment. The problem of toxicity was greatly reduced when suitable tests were developed to measure the lithium level in the blood. Moreover, as a naturally occurring chemical, lithium salt could not be patented, meaning that its manufacturing and sales were not considered commercially viable. These factors prevented its widespread adoption in psychiatry for some years, particularly in the United States, where its use was banned until 1970.

Royal Park and RANZCP[edit]

John Cade acute unit at Royal Park Hospital circa 2003

In 1952 Cade was appointed Superintendent and Dean of the clinical school at Royal Park Hospital. Two years later, at the request of the Mental Hygiene Authority which was planning to remodel Royal Park, he visited Britain for six months to inspect psychiatric institutions. On his return, he introduced modern facilities and replaced the rather authoritarian approach to patient care with a lot more personal and informal style that included group therapy. Concerned at the number of alcohol-related cases, he supported voluntary admission to aid early detection and later proposed the use of large doses of thiamine in the treatment of alcoholism.[5] Cade served as the Superintendent at Royal Park until his retirement in 1977.[4]

He served as the federal president of the Royal Australian and New Zealand College of Psychiatrists in 1969–70, and also as the president for its Victoria branch from 1963 until his death in 1980. In the end, Dr. Cade's discovery did receive widespread acknowledgements and praise. For his contribution to psychiatry, he was awarded a Kittay International Award in 1974 (with Mogens Schou from Denmark), and he was invited to be a Distinguished Fellow of the American College of Psychiatrists.[7] In 1976, Cade was one of the first to be made an Officer of the Order of Australia.[8] Dr. Cade remained humble about his chance discovery, describing himself as merely a gold prospector who happened to find a nugget. Finally, in July 2004, the Medical Journal of Australia reported that Cade's 1949 article, "Lithium salts in the treatment of psychotic excitement", was the number one most cited MJA article.[9]

Legacy[edit]

John Cade died of oesophageal cancer[4] at Fitzroy on 16 November 1980, and is buried at Yan Yean Cemetery in Whittlesea.[5] Recognition of Cade's pioneering work continued after his death. The Adult Acute unit at Royal Park Hospital was named the "John Cade Unit" in recognition of Cade's long service to the hospital. After Royal Park's closure, the newly opened Adult Acute Psychiatric Unit at Royal Melbourne Hospital was named "John Cade Adult Acute Inpatient Unit".[10] In 1980 the first John Cade memorial lecture was delivered by Mogens Schou at the congress in Jerusalem of the Collegian International Psychopharmacologium.[5]In 2013 the National Health and Medical Research Council (NHMRC) offered two $750 000 per annum fellowships for mental health research, entitled the

"NHMRC John Cade Fellowship in Mental Health Research".[7] The Fellowship recipients were Professor Helen Christensen of the University of New South Wales and Professor John McGrath of The University of Queensland.[11] The RANZCP awards The John Cade Memorial Medal to a final year Victorian medical student following a special clinical examination at Monash University or the University of Melbourne each year.[12] The Faculty of Medicine at University of Melbourne also awards the John Cade Memorial Prize.[5]