

100

The Animal Research Institute

Celebrating 100 years

The

ANIMAL
RESEARCH
INSTITUTE



Contents

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Acknowledgement

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On 26 March 2009, the Department of Primary Industries and Fisheries was amalgamated with other government departments to form the Department of Employment, Economic Development and Innovation.

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Introduction



Mr. ...
 ... grazing and feeding on my property ...
 ... to I was taken on our arrival here - cattle pretty grazing
 ... hills

to 3. cattle becoming aware of the truck and its contents
 ... towards the truck anxious to get at the fermaphos
 ... photos show the cattle pushing around to the
 ... the share of the fermaphos
 ... cattle was definitely improved since they have had
 fermaphos
 if you wish I have the negatives of these photos I shall
 be too happy to post them down to you.
 kindest Regards & thanking you
 your interest -
 Yours faithfully
 per 520 L.B. Rutherford.



The Animal Research Institute, 2009

For the last 100 years, the Animal Research Institute (ARI) at Yeerongpilly on Brisbane's southside has been instrumental in improving livestock and human health.

With a fundamental focus on excellence in diagnosis of livestock disease, ARI has undertaken research to control many livestock pests and diseases, and to understand problems in nutrition and husbandry. World-first discoveries—in collaboration with field officers and regional laboratories—have resulted in radical improvements to the health and productivity of stock throughout Queensland and Australia, and overseas.

A key strength has been the strategic location of many scientific disciplines on one site, resulting in a powerful approach to complex problem-solving. Industries based on pigs and poultry, sheep and wool, beef and dairy cattle, goats and fish have benefited from the application of pathology, biochemistry, biometry, animal husbandry, and information and extension training. Research has also covered both native and feral animals that may transmit diseases to livestock and humans.

This booklet has been produced to celebrate ARI's centenary in 2009. It provides insight into the research, changes, challenges and people that have culminated in a rich and colourful history—it also celebrates a century of success in supporting the rural community.

The early days



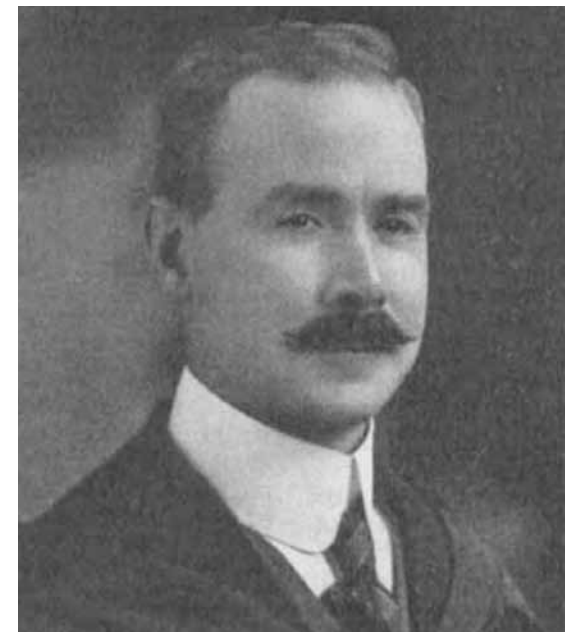
The laboratory (D block) housed a director's room, office and sterilising facility; vaccine, incubating and working rooms; a four-stall stable, fodder and harness room, 12-stall cattle shed and post-mortem room; and sheep and pig pens.

In the 1890s, there were only half a million people settled across Queensland. Livestock played a key part in the state economy, with 7 million cattle, 20 million sheep and half a million horses. However, stock were being ravaged by disease, including lung plague (pleuropneumonia), contagious abortion (brucellosis), tuberculosis and red water fever (tick fever)—a disease with 60 to 70% mortality in cattle. Other serious problems of the time included poultry ticks, intestinal worms, poisonous plants and diseases of unknown causes.

In response, the first Stock Institute was established in 1894 at modest premises in Turbot Street, before moving into a new facility in College Road. However, they lacked facilities for livestock experimentation, later provided when ARI opened as the Stock Experiment Station in 1909 on 18 hectares of land at Yeerongpilly—the first facility in Australia established to deal with and research epizootic diseases in stock.

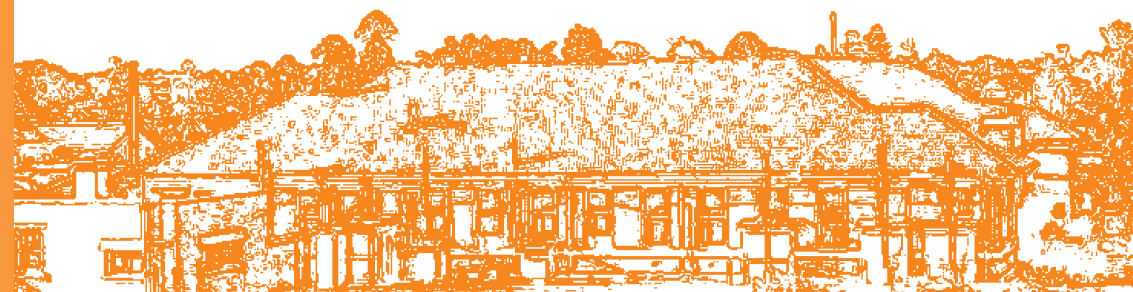
Principal Veterinary Surgeon and bacteriologist, Dr Sydney Dodd, selected the site at Yeerongpilly and was in charge when the station opened. When Dodd began he had two assistants in the laboratory and two farmhands. He commented on the site when the staff moved in:

'The buildings are roomy and well constructed but without any waste in too elaborate design or useless ornamentation.'



Dr Sydney Dodd saw his role as studying disease, preparing vaccines and serums, and providing preventative remedies for different diseases

After substantial progress, Dodd resigned on 30 April 1910, and had an eminent career at the universities of Melbourne and Sydney. Bacteriologist Charles J Pound then took charge and remained director until 1932. Both men spent considerable time addressing farmer groups all over the state to explain the cause of red water fever and other diseases, and the role of vaccination, which was not fully understood or accepted at the time. The success of the vaccination programs established the value of the scientific approach to disease control and laid the foundation for a century of achievement.



Major achievements



Under Pound's leadership, over half a million cattle across Queensland were inoculated.

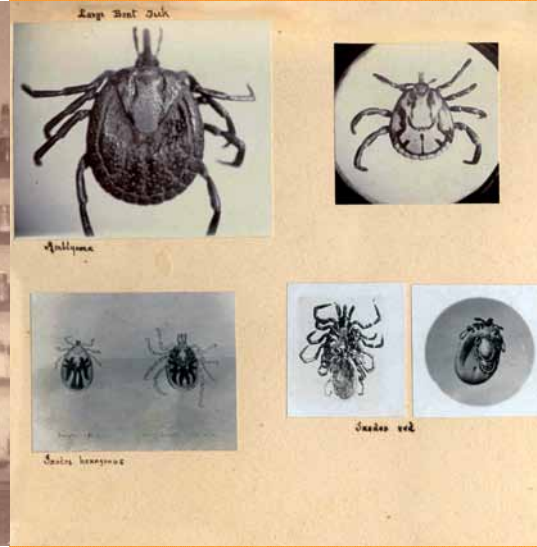
ARI has made many contributions to animal industries, but four stand out because of the billion-dollar savings for the Australian economy—control of tick fever, bovine pleuropneumonia, bovine brucellosis and bovine tuberculosis.

Tick fever

Red water fever (tick fever) research was conducted at ARI since its opening. Dodd discovered in 1909 that tick fever was caused by more than one parasite that lived in cattle ticks, and that cattle vaccinated against one parasite could remain susceptible to the others. Tick fever immunisation remained the top priority under Pound's directorship. Experiments with vaccinations were conducted at Indooroopilly and Mundoolan Station on the Logan River.



Blood from infected cattle held at Yeerongpilly was used to produce infection in 'bleeder cattle', which were then dispatched by rail to distant properties so that their blood could be used to protect exposed herds. Later, the Queensland Government introduced a program to control the spread of ticks through arsenic cattle dips.



Significant improvements were made in the tick vaccines in the 1930s, after it was found that three parasites caused tick fever.

Pound directed the station until his retirement on 31 July 1932. The station's name was changed to Animal Health Station in 1932. James Arthur Rudd, a government veterinary surgeon, was appointed as director in 1933. He established a collaborative research arrangement with CSIRO studying tick fever and 'three days sickness'.

John Legg (Director of Oonoonba Stock Experiment Station from 1921) is credited with introducing the third tick fever organism *Anaplasma centralli* (after a study trip to South Africa), which was included in the vaccination. He succeeded Rudd as director in 1941.

Scientific improvements continued to be made in the 1950s. By the 1960s the tick fever vaccines had become 99% effective in controlling outbreaks. Production of the vaccine was moved to the Tick Fever Research Centre at Wacol in 1965, but research support continued from ARI. Over the next four years, vaccine use rose from 122 000 to 1.3 million doses.

The work was held in very high regard by farmers. The Queensland Agricultural Journal (February 1934) quoted *The Courier-Mail* (29 December 1933) where 'an old timer' wrote:

I lift my hat, figuratively, to the veterinary surgeons who have captured and banished many of the dreadful stock diseases against which breeders had to fight. Science has made wonderful strides in fighting the battle of the man on the land; it may have a long way to go, and there might be a very vast field for it to clear up, but those whose memories can go back to the nineties and early nineteen hundred will agree that a wonderful lot has been accomplished. Here's the best to the Animal Health Station at Yeerongpilly and all connected with it.



Tick fever was one of the main vaccines developed at the institute, which, in the last century, saved the lives of millions of Australian cattle.

Pleuropneumonia

Bovine pleuropneumonia (pleuro or lung plague) is a highly contagious bacterial lung infection characterised by laboured breathing and sudden death. It was eradicated in the United States and Britain in the late 19th century, but persisted in Australia. The department developed a vaccine and Pound prepared over 100 000 doses per year in the 1890s. This work continued until 1936 when a cultured vaccine became available. There were subsequent outbreaks and compulsory vaccination was instituted for cattle before transport. The state was declared free of pleuropneumonia in 1972.



Brucellosis testing in the 1970s

Brucellosis

Bovine brucellosis is a major bacterial disease that can cause up to 100% of heifers to abort or to produce dead calves. The infection can pass from cattle (and pigs) to humans, where it causes undulating fever (chronic fever, headaches, joint pains, etc). Development of an effective vaccine based on a weakened strain of *Brucella abortus* allowed the gradual eradication of brucellosis from Australian cattle herds.

Brucellosis testing was conducted at ARI in the 1970s and 1980s, and Australia was declared free of bovine brucellosis in 1992.



Tuberculosis testing in the 1980's

Tuberculosis

The cause of tuberculosis was identified in 1882 in Germany by Robert Koch. At that time, both humans and cattle were commonly afflicted with the disease. Although the organism causing tuberculosis in cattle (*Mycobacterium bovis*) was later found to differ from that in humans (*M. tuberculosis*), the former still caused serious disease in humans—in 1930, milk from infected cows was considered the cause of up to 30% of tuberculosis cases in children. To curb this, compulsory milk pasteurisation was introduced in Australia after World War II. A national eradication program, involving testing and slaughter of infected cattle, was conducted in Queensland throughout the 1970s.

Tuberculosis research was undertaken at Yeerongpilly, Rockhampton and Townsville, and mobile blood-testing facilities were used at centres such as Roma and Charleville. Australia was declared free of bovine tuberculosis in 1997.

Fifty years of progress: 1959 to 2009

Parasites and pestilence

Control of ticks was always a priority for the cattle industry—even Pound wished to eradicate them—but this has never been achieved. As the ticks developed immunity, arsenic dips and chlorinated hydrocarbons were gradually replaced by organophosphorous and carbonate acaricides. Each new chemical required specific analytical procedures to monitor dip strengths for farmers. The next frontier of research was aimed at understanding the ticks' resistance to sprays and vaccines, and new statistical research using computer models was undertaken to determine effective control methods. Tick-free zones are maintained through stock movement restrictions and effective clearing dips.

Research into various pest flies has also been conducted at ARI, preventing screwworm fly entering Australia, and leading to production of highly selective and effective traps for sheep blowfly and better buffalo fly traps.

Coccidiosis is one of the more economically important disease problems in Australia's intensive poultry industries. In 1999 to 2002, ARI successfully developed Australia's first low-virulence lines of several *Eimeria* species, allowing development of a commercial vaccine.

Intestinal worms plague livestock in some areas, and manure testing at ARI allows drenching programs to be developed that provide effective control for livestock producers.



International surveillance programs and improved trapping has helped stop the highly destructive flesh-eating screwworm flies reaching mainland Australia.

Research into intestinal worms is examining more natural agents to control parasites.

Bacterial diseases and beneficial bacteria

Several major bacterial diseases were controlled in the early years of the Stock Institute, and bovine pleuropneumonia, tuberculosis and brucellosis have all been eradicated from Australian herds.

Botulism still causes stock losses every few years. In the 1980s, ARI staff identified botulism as the cause of over 4000 feedlot cattle mortalities. A vaccine has been produced at ARI since the 1960s, and was particularly in demand after very expensive losses of race horses at the Sydney Royal Show.



Research into cattle feed and its digestion could hold the key to reducing methane emissions.

Currently, ARI leads the nation in research on the impact of food-borne pathogens such as *Salmonella* and *Campylobacter* in intensive pig and poultry production systems, covering environmental spread, potential health impacts and molecular typing to identify host associations.

ARI has established national and international leadership in bacterial respiratory pathogens—identifying new pathogens, providing specialised typing and now curating the global centre for the typing of the major pathogen *Pasteurella multocida*.

Bacteria and other microbes in the rumen of livestock are essential to convert forage into nutrients that can be absorbed by the animal. Tackling climate change is a new focus for ARI, with research into cattle nutrition and digestion examining ways of reducing methane emissions.

Viruses

In the 1960s, the existence of enzootic bovine leucosis was proven in Queensland cattle. After isolation in the late 1970s, a serological test was developed that allowed testing for frequency and severity of the disease, so it could be monitored and exports managed—millions of dollars in exports have been protected by this means. ARI also developed the first live Australian vaccine for infectious bovine rhinotracheitis, a major disease of feedlot cattle.

In 1967, ARI acclaimed microbiologist Geoff Simmons isolated the V₄ strain of the virus that causes Newcastle disease in poultry. This research has been the basis of all vaccines and a newer version is used in villages throughout Asia and Africa.

More modern-day viruses like Hendra have been studied by ARI, which identified the epidemiology of the virus and that it was hosted by flying foxes. Given recent deaths from Hendra, work is still continuing. The rabies-like lyssavirus (also carried by flying foxes) has also been investigated.



ARI researchers studying flying foxes in the field

Poisonous plants

Research into poisonous plants affecting cattle, sheep and horses has been continually addressed since the 1930s. There have been many successes in identifying the toxins involved, and finding preventative measures and antidotes for poisoned stock. ARI research has contributed to knowledge about a host of poisonous plants affecting Queensland livestock and food quality, including St George disease caused by *Pimelea* plants, fluoroacetate poisoning from Georgina gidgee, heart failure from *Bryophyllum* plants, and 'big head disease' of horses caused by oxalate in tropical grasses.



Des Connole and Geoff Simmons being interviewed by R Logan (ABC)

Moulds and mycotoxins

The study of diseases caused by fungal infections began at ARI in the 1950s, and greatly expanded once it became clear that the mycotoxins can be poisonous to animals and contaminate crops and feedstuffs. ARI has demonstrated that aflatoxins, ochratoxins, fumonisins, ergot alkaloids, zearalenone and trichothecenes cause disease in livestock.



Current research has identified various types of fungi to control cattle ticks, sheep lice and the small hive beetle. This parallels early attempts by Pound to use fungi to control locusts and mice.



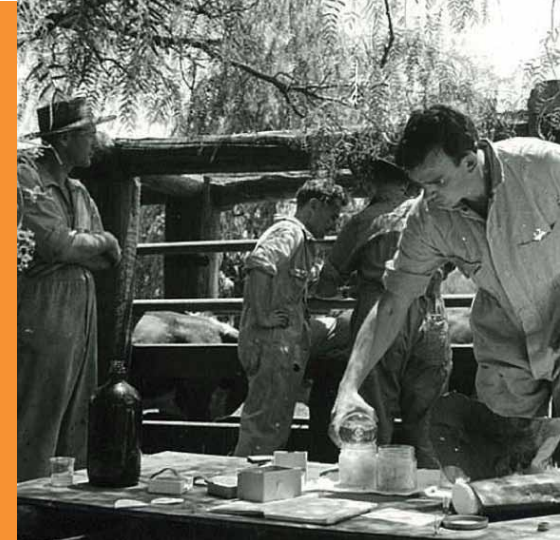
ARI was involved in the rapid response to pesticide contamination, including construction of chemical residue laboratories.

Residue-free foods and market access

Agricultural and veterinary chemicals (pesticides, antibiotics) are essential for controlling pests like ticks and flies, and for treating animal disease. All are registered to maintain safety, but occasional misuse can lead to undesirable residues in meat and agricultural crops, affecting export market access.

In 1987, a major problem resulted from the detection of minute traces of organochlorine acaricides in beef exports, later estimated to have cost the beef industry about \$1 billion. Several more residue crises occurred over the next 20 years, and ARI responded in each instance. This laboratory is widely recognised as one of the best in Australia and the leader in antibiotic residue testing.

Residues of mycotoxins and other natural toxins have also been a key focus area over the past 20 years. Extensive surveys of mycotoxins in Queensland crops were conducted. Widespread plant collection and testing, livestock feeding experiments and behavioral studies have provided the meat industry with detailed assessments of the potential for residues occurring in the meat of livestock exposed to all known toxic plants across the northern Australian rangelands.



Field samples of cattle helped identify deficiencies of phosphorus, copper, sodium and calcium. Poisoning from arsenic, lead, cyanide, nitrate and oxalate were regularly diagnosed.

Nutrients, mineral imbalances, growth and husbandry

In the 1950s to 1970s, the Biochemistry and Husbandry Research branches put in a major effort to identify and cure a range of mineral toxicoses and deficiencies in livestock. Jim Harvey conducted detailed studies of fluorosis in sheep across Queensland from drinking bore water.

Extensive research on maintaining livestock during drought included use of urea, protein meals and bagasse/molasses supplements. Feeds for intensively reared poultry, pigs, cattle and aquaculture species were all optimised for Queensland conditions through research led by ARI.

Genetic diseases and selection for improved production

In the 1960s, ARI led several successful research programs aimed at identification and eradication of genes causing genetic diseases in cattle (Pompes disease), poultry and pigs (porcine stress syndrome).

ARI developed methods for identifying genes that improve the shell quality of eggs in poultry, reduce the cost and improve the quality of pork and beef, and improve the profitability of aquaculture species. Substantial genetic improvements in livestock were achieved through pig progeny testing at Wacol, poultry selection trials and bull proving at Rocklea.

Room mates and renovations



ARI during World War II

In 1932, a substantial northern wing was added to D block (the south wing was added in 1942). With strong support from the Agriculture and Stock Department, The University of Queensland established their veterinary school at the station in 1936. Announcements at the time celebrated the close working relationship between the organisations, and anticipated enhanced support for state animal industries.

The veterinary school occupied a new building (A block), built between 1936 and 1940. It comprised a student's laboratory, research and histology laboratories, a library and offices. The north wing housed the equine operating theatre, lecture and X-ray rooms, and offices. The south wing comprised a common room and preparation and post-mortem rooms. The former stables at the station were substantially altered in 1939 to convert the building to an anatomy school.

The faculty was closed down during World War II and the American military used A block to prepare deceased servicemen for return to the United States.

In 1945, A block was occupied by Animal Health Station staff. University staff and students were housed in wooden buildings transported to Yeerongpilly from Boggo Road, and the university's domain site. The veterinary school moved to the St Lucia campus in 1961.

The Council for Scientific and Industrial Research operated a veterinary parasitology laboratory at Yeerongpilly during the 1940s to 1960s in the southern wing of D Block. Parks and wildlife departmental staff also had offices in D Block in the 1960s.

In 1952, 360 acres were purchased at Rocklea for an animal husbandry farm—it was established the following year following the recall of land from the Yeerongpilly site for construction of the Tennyson Power Station. AK Sutherland was the Chief Husbandry Officer in charge.



ARI STAFF 1959

Back 2 rows (left to right)

Tony Johnston, Colin Ludford, Rolf Gartner, Rom German, Graham Manderson, Tom McEwan, Merv O'Bryan, Everit Payne, Malcolm Levitt, John Twist, Ian Hurwood, Len Tammemagi, Don McGavin, Peter Oelrichs, O. Moranovicz, Ken Daddow, Geoff Simmons, Dan McKeown, Dick Beames, Bill McKeller

Third row (left to right)

Ian Baynes, Pat O'Sullivan, Arnold Robinson, Bill Callow, Alan Lancaster, Ken Moir, Bill Thomas, Sandy Findlay

Second row (left to right)

Gavin Ponting, Erol Lanham, Bill Hornbuckle, Geoff Daly, Josie O'Dwyer, Deirdre Taylor, Moya Charlton, Jean Elder, Joyce Gray, Knight Pepper, Des Connole, Don Griffiths

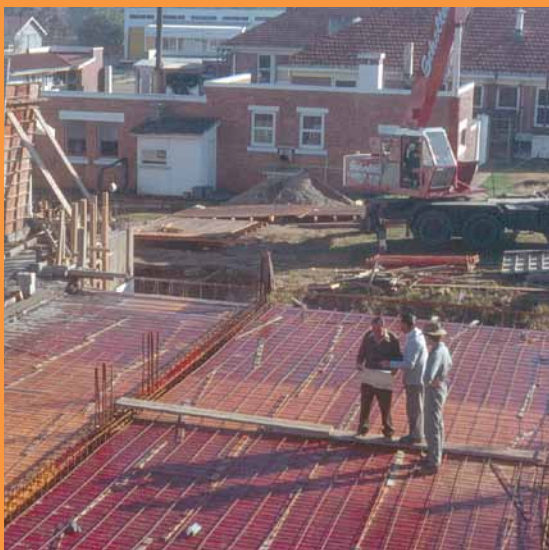
Front row (left to right)

Rita Oxenham, Sheila Mullins, Kath Scheldt, Bill McCray, Les Newton, John Ryley, Jan Leather, Helen Harch, Miss Carroll

From 1951 to 1953, a number of chemists were transferred from the Agricultural Chemists Laboratory in William Street to the Animal Health Station. The name of the facility changed again on 9 December 1954 to the Animal Research Institute.

Jim Harvey (later Director-General of the department) was in charge of the newly formed Biochemistry Branch in 1956, and in 1957, ARI comprised Pathology, Biochemistry and Husbandry Research branches.

Components of the sheep and wool, pigs and poultry, beef cattle husbandry, veterinary services and biometry branches joined ARI in 1967. A facility for radioisotope research and an animal metabolism building (including a unique abattoir facility for carcass composition studies) were also constructed. In the 1980s, the chemical residues laboratories were built to deal with the emerging issue of chemical contaminants of meat as a barrier to meat exports.



There was a major building program in the 1970s. Laboratories for biochemistry, husbandry research and the brucellosis and tuberculosis eradication program were constructed.

Profile: Dr Peter Doherty

Peter Doherty, who worked at ARI from 1963 to 1967, won a Nobel Prize in 1996.

In 1958, Peter Doherty was granted a five-year scholarship in veterinary science. Peter commenced work at the institute in 1963 as a veterinary officer and, in the same year, applied to commence a Masters degree in veterinary science. He also met his future wife, Penny Stephens (a virologist), at ARI.

Doherty left the department in 1967 to study for his PhD at the Moredun Institute in Edinburgh, Scotland.

Peter recalls his time at ARI:

Graduating as a DPI cadet from the UQ vet school in 1962, I joined the ARI about mid-1963 after a few months with Veterinary Services in Toowoomba. Les Newton needed someone to replace Randy Winks, who'd defected to CSIRO Animal Health and left Les in a hole with an externally funded bovine leptospirosis project. That, together with learning diagnostic pathology, became my job, and I spent a good part of my life driving back and forth across Brisbane to sample cattle on Rockangle Farm, a former dairy property that would soon be flooded by a new dam. I reckon that I transported and examined (by dark field microscopy) the equivalent of a petrol tanker full of bovine urine! I shared an office with Ian Baynes who later left to become a clinical psychologist, though I don't think I drove him to that. Apart from Ian, I got a lot of professional help from



Lionel Laws, Sam Hall, Bill Callow, Don McGavin, Des Connole, Jean Elder, Corrie Granzen, Rolf Gartner, Colin Ludford and, of course, Geoff Simmons. It was only later that I realised how very good these guys were at what they did. That's also where I met Penny Stephens who was working with Geoff on the IBV problem. I've lost most of my records from that time, but Penny still has a wonderful letter telling her that she'd been appointed with the approval of the Governor and would have to join a union within one month of her start date! It was a different era, a world that's gone, and both our lives were to change dramatically, but we still value the experience of those ARI years and the wonderful and dedicated people we met at that time.

Peter Doherty, 30 July 2009

While Peter remains one of ARI's most famous sons, there are many eminent scientists who worked at the institute and helped shape the future of Queensland's agriculture industry.

A fresh approach

Most of the infectious diseases present in Australia a century ago have now been controlled or eradicated, but the need to remain vigilant against a host of other diseases remains—notably foot and mouth disease, avian influenza and screwworm fly. New threats are emerging, some of which can affect humans just as tuberculosis and brucellosis did in the past. These threats demand that our diagnostic and response capacity is maintained at readiness, and our methods need to evolve with opportunities presented by new technology.

In addition, our farmers are faced with problems such as global warming. The Australian food supply and lifestyle can only be maintained if our scientists can continually adapt to meet changing needs. We need to ensure a safe and residue-free food supply, monitor disease in native animal populations, learn from native animals, use alternative low-cost and eco-friendly pest control, and manage feral animals in a way that is consistent with land management and industry profitability.

After 100 years, the face of ARI is changing. The Queensland Primary Industries and Fisheries' fresh approach initiative will provide improved research facilities, increase investment and foster innovative research partnerships.

From 2011, ARI staff will co-locate with CSIRO and The University of Queensland at the \$300 million Ecosciences Precinct at Boggo Road and the \$70 million Health and Food Sciences Precinct at Coopers Plains. Animal-based livestock research will be undertaken at Gatton, with the opening of the \$33 million Centre for Advanced Animal Science (in partnership with The University of Queensland). The Ecosciences Precinct and the Centre for Advance Animal Science will complement other livestock research stations across regional Queensland.



Artist's impression of Boggo Road

These changes will enable our scientists and researchers to develop new ways of helping Queensland producers increase their profitability and productivity, and meet growing worldwide demand and the new challenges ahead.

For 100 years, the institute has been at the forefront of scientific discovery and development, and although the facility will soon be closing, our dedicated staff will continue to use their expertise and ingenuity to advance animal health, nutrition and husbandry research in Queensland.



ARI Staff Photo 2009

Seated row: Jillian Templeton, Anita Gordon, Megan Vance, Sandy Jarrett, Lucia Mascali, (left to right) Rois Reichmann, Julie McNally, Sue Everingham, Wafa Shinwari, Helen Standfast, Kerry Mackellar, Kerryn Henderson, Irene Sheehan, Mo Amigh, Anita Maguire, Denise Goulding, Lisa-Maree Gulino, Damien Finn, Gary Everingham, Catherine Minchin, Ala Lew

Second row: Roseann Waia, Neetha Choorayi, Pat Pepper, Ros Gilbert, Nina Kung, Mindy Laird, (left to right) Nalini Chinivasagam, Thuy Tran, Janet Giles, Christine McCarthy, Diana Leemon, Shirley Mills, Agi Onysk, Thimali Maddumaarachchi, Melissa Hastings, Judy Fox, Laurie Dowling, Rosemary Kopittke, Glenda Loxton, Kerri Dawson

Third row: Jan-Maree Hewitson, Lea Indjein, Natalie Mellick, Jim Kidd, Kathy Delaney, (left to right) Adam Pytko, Reema Singh, Sarah Corcoran, Michael Macbeth, Stuart McLennan, Athol Klieve, Jane Oakey, Cindy Galwey, Luis Cordova, Cameron Kath, Belinda Gahan, Grace-Kellie McDermott, Caroline Pui, Katherine McGlashan

Fourth row: Tellisa Kearton, Felicity McIntosh, Louise Jackson, Stephen Were, Ximena Tolosa, (left to right) Bing Zhang, Peter James, Keith Reichmann, Paul Whatmore, David Waltisbuhl, Peter Martin, Warwick Turner, Bruce Corney, Ben Schofield, Rob Stewart, Michael Gravel, Judy Gemmell, Alan McManus

Fifth row: Barry Rodwell, John Kopinski, Wayne Ehrlich, Nigel Boyce, John McCarthy, (left to right) Noel Greiner, Jess Morgan, Erin Mawhinney, Anthea Bruyeres, Ryan O'Dell, Bruce Hill, Greg Robbins, Paul Hickey, Brian Burren, Diane Ouwerkerk, Tony Swain

Sixth row: Shirley Turner, Glen Hewitson, Conny Turni, Patrick Seydel, Geoff Brown, Ian Brock, (left to right) Manuel Rodriguez, Valle, Barry Blaney, Peter Johnston, Steven Rice, Michael McKew, Dennis Webber, Lex Turner, Ralph Stutchbury, Aisak Pue

Seventh row: Evan Harris, Binendra Pratap, John Lapworth, Bronwyn Venus, Wayne Jorgensen, (left to right) Brad Pease, John Hoad, Patrick Blackall, Emily Piper, Duncan Ferguson, Mary Fletcher, Roger Chong, Howard Prior, Richard Silcock

Absent: John Allen, Christine Bain, Justin Bartlett, Ben Bassingthwaighe, Sandi Beard, (left to right) Dennis Boothby, David Borland, Norma Brewer, Lisa Bricknell, Lynda Bull, Maree Burgess, Jason Callandar, Chien Cao, Krista Cavallaro, Stephen Cox, Ian Dalgliesh, Stephen Day, Amanda De Jong, Carol De Jong, Jan De Vries, Sharon De Wet, Ibrahim Diallo, Vivienne Doogan, Ian Douglas, Paul Duffy, Moira English, Rosa Farrow, Hume Field, Belinda Fraser, Greg Gates, Fiona Giblin, Cindy Giles, Darren Giles, Karen Harper, Chris Holloway, Christine Horlock, Kim Johnson, Pat Kalinowski, Andrew Kelly, Patrick Kelly, Kerry Lambert, Tina Lambkin, Trevor Lambkin, Maxine Lyndal-Murphy, David Mayer, Gordon BBS McDonald, Peter McKinley, Bradley McLellan, Doug McNaught, Angela Millen, Madeline Modina, Amanda Morrison, Sean Muller, Carol Myles, Selina Ossedryver, Morgan O'Leary, Nikola Pejcinovic, David Peters, Clare Raven, Alan Reed, Warwick Roe, Michele Rogers, Kellie Round, Craig Smith, Daniel Stock, Greg Storie, Sounthi Subaaharan, Alan Teakle, Andrea Turner, Rudolf Urech, Olivia Weiss, Andrew Wilke, Andrew Wilson, Bartosz Wlodek, Donna Worland, Tao Xu, Li-Hua Zhang



1909



1929



1945



1969



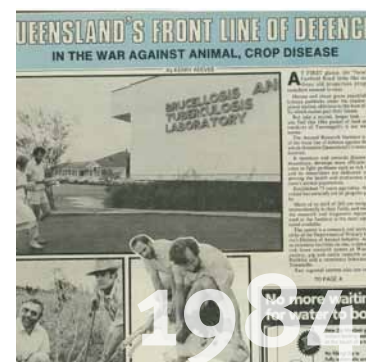
1971



1972



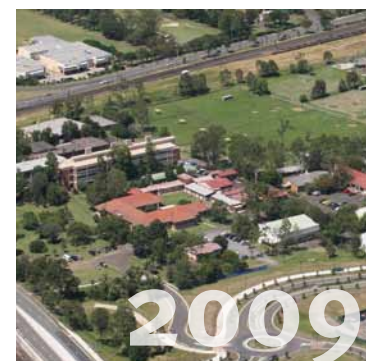
1974



1984



1999



2009

1000

