

THE CHENRY CHRONICLE

By Christopher and Heather Henry

We were gone for two weeks and drove over 3000 km. We enjoyed seeing the country side and had a great time. We drove inland on our way down to Canberra and back up the coast on our way home from Sydney.

Cotton Farm

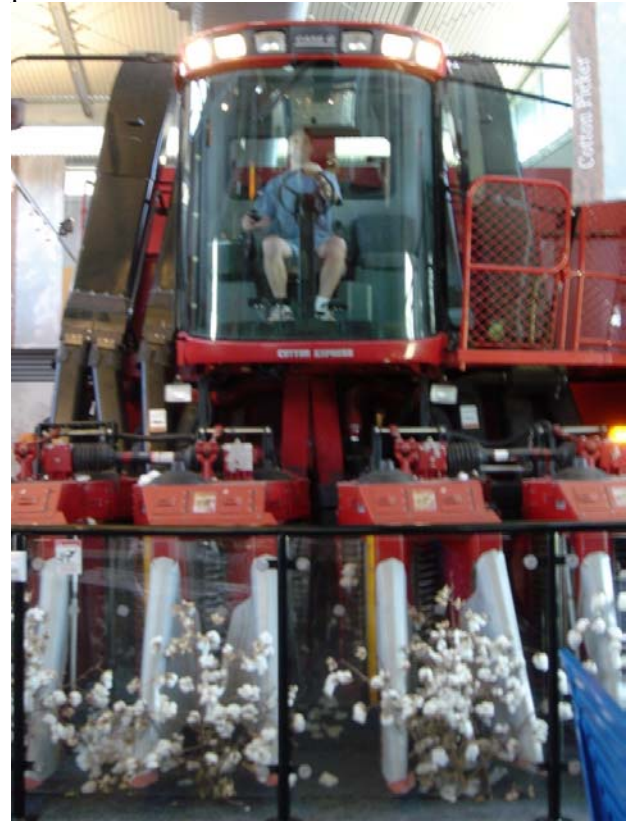
In my research about Australian agriculture, we made arrangements to visit a California immigrant, who has lived the last half of their lives as Australians. We stopped to visit Bill and Carolyn Findley and family. They moved to Australia in 1964 at which time land was selling for \$50 an acre. We saw the irrigation systems and ring tanks, which are large earthen storages. On the tour we also saw their equipment, including a grain cart which was made in Lexington, Nebraska. In fact I spotted several implements, made and imported from the US. Australia irrigated agriculture is primarily gravity and they use siphon tubes to irrigate every other row. They grow Bt cotton (a small amount of milo) which is planted in October and harvested in April. The use of Bt cotton, genetically modified for those that don't know what Bt means, has dramatically decreased the use of pesticides in this region. See the technical corner to learn more about Chris's farm visits.



Ring tank – irrigation water storage structure

Cotton Center

While in Narrabri we went to the Cotton Center and learned about planting and harvesting cotton. It was a very nice museum. There was a cotton harvester that we were able to take our photo in.



Chris is ready to start harvesting cotton now.

They had a farming simulator, similar to a "Sim City" game, which simulated a growing season, the participant had to make farming decisions, when to spray, when to fertilize, and the cost associated, etc. By doing different things along the growth of the cotton, it would tell you what the decisions you made had on the yield. Chris finally figured out the game and had a crop that produced 7 bales of cotton. If you had 6 or more bales, you could win a coupon to get a free ice cream from

McDonalds. Chris is ready now to move to Australia and start his own cotton growing enterprise.

Dubbo Western Plains Zoo

We toured the westerns Plains Zoo, a zoo set up to tour by car. What a novel idea! You are able to tour the zoo by foot, push bike, and car. Your zoo pass is good for two days so if you get tired you can come back the next day. We drove our car around to look at the animals and then got out at each stop to walk up to see the animals. This zoo was created in 1976 and the animals are the overflow animals from the Taronga Zoo in



Feeding time for the Black Rhinos . They like trees.

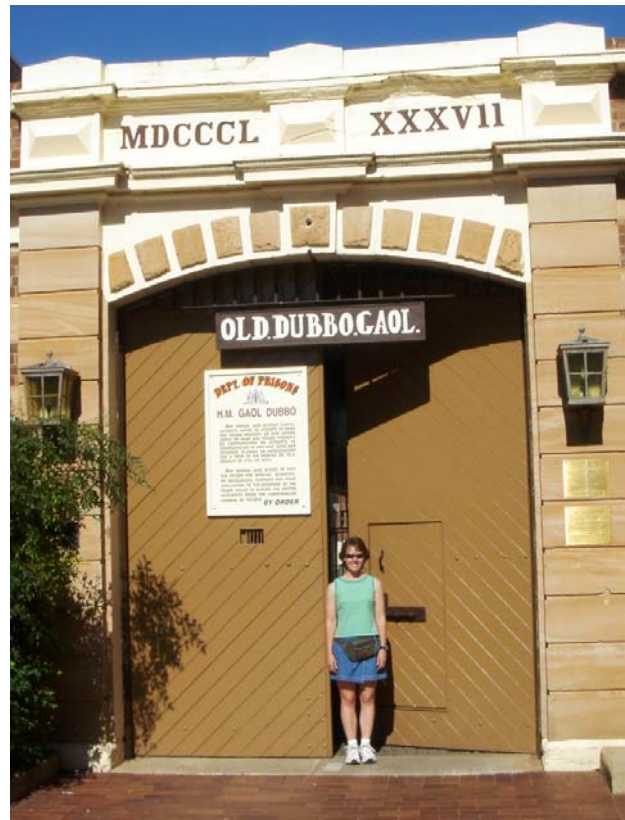
Sydney. We saw black rhinos and white rhinos. This zoo is one of the only successful zoo's to breed black rhinos in the world. The African elephants like to eat snacks, apples, the whole apple and two at a time. African elephants have bigger ears than Asian elephants, since they use them as fans to keep themselves cool.

The hippos are territorial and spray their dung all over the fence. Chris has decided that this is the perfect natural manure spreader, and may very well be the solution to the nutrient distribution problems in Nebraska. He is working on a design for stock cows, see attached video for a demonstration of the hippo spreader.



The meekrat stands watch for his mates.

The Old Dubbo Gaol



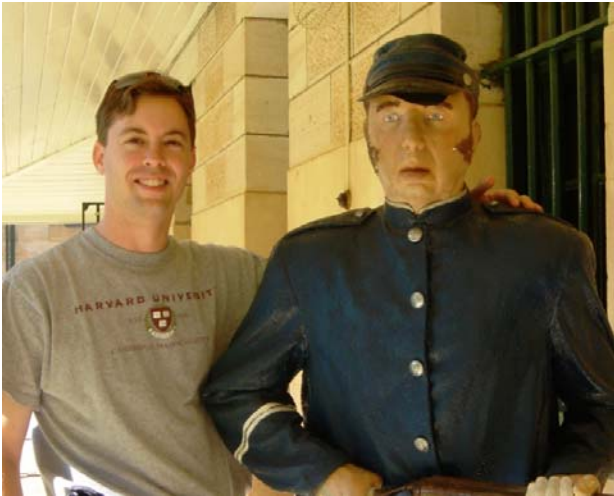
Heather in front of the Old Dubbo Gaol. Note fanny pack that was purchased at garage sale for \$0.50.

We visited the Dubbo Gaol (jail) which was in use from 1900-1960. The jail is now a museum giving tribute to the early days when Australia was being settled. In the day the gaol was self sufficient raising vegetables in the gardens located within the walls. It would have been a hard life to be in prison, but some were there because it was easier than life outside.

The prison was not used for convicts from England, it was used for those that committed crimes in Dubbo.



Help Chris! How do I get out of the pillory?



Chris becomes good friends with the guardsman to get Heather out of the pillory.

The Dubbo Observatory

We went to the observatory in the evening to see the stars and parts of the solar system. A scientist has started a business to teach ordinary people about the stars and light years. We watched a thirty minute DVD. There were about 12 people in the class. He has several high powered telescopes that we were able to see the Southern Cross stars. We viewed Saturn and all the rings, the moon, globular cluster, and centauri stars. You don't see the big dipper here in Australia just like North America cannot see the Southern Cross.

Wellington Caves

We drove 48 km to the Wellington Caves from Dubbo. While we were there we took a tour of a phosphate mine. Phosphate is million year old bat poo (manure) that has been compressed by geologic activity over time to form rock

phosphate. Funny how producers pay big bucks for million year old bat poo, but won't pay a dime for fresh stuff.

There were two mining companies in the early 1900's. They developed the mine after a geologist reported that there was a 100 years of phosphate in the mine. Turned out that they got most of the phosphate out in about six months. After this it turned into a show to attract investors so that the original investors could get their money back. It was operated as a fiasco for several years later, as people tried to make a go of it, but alas it turned into a money sink.

The local shire has again tried to turn it into a profitable venture, only this time the visitors aren't investors they are tourists. Money well spent though.

The Dish

In the 1960, man landed on the moon, and a radio telescope in a sheep paddock near Parkes, NSW was collecting the transmission from the moon and relaying it to the US. Almost didn't happen, in fact it is such a story that they made a movie out of it, called "The Dish". We took a short detour to see this Australian icon, and go through the information center.



This Dish collected the TV signals from Apollo 11, providing the world with man's first walk on the moon.

You can look at the telescope from a distance, but it is a working telescope so entry into the observatory is not permitted. Interesting note,

that NASA seems to fund a good portion of their work, as it is the most sought after high end telescope in the southern hemisphere. We rented "The Dish" from the video store after we arrived back to Toowoomba to see what the fuss was about. It is a good Australian movie, a flick we recommend.

Canberra (pronounced CAN bra)

The Australians decided to develop a new city for the capital with its own territory between Sydney and Melbourne. The Capital city has many huge two way roundabouts within roundabouts which made driving interesting. Thanks to the maps and arrows we were able to navigate and get out of the circles.

The Australian War Memorial

We spent the day at the Australian War Memorial. The 90 minute guided tour touched just the surface of the museum itself. Part of the memorial includes a Wall of Heroes which lists every soldier's name who died in conflict.



The Australian War Memorial

We rode in a simulator plane on a bomb run and watched the reenactment of the Japanese Sydney Harbour attack. The museum is not about war, it is about Australia's role in the world and how their participation has shaped their culture. The comrade ray and unity that is so common to see here has its roots in the trenches of the First World War. In fact so much of Australia's identity is a result of the First World War, that even though the Japanese were on their doorsteps in 1942, the first conflict is the most important to this country. The mobilization for the first World War, the first battle on the beaches of Turkey, is when

Australia became a country, it is similar to our 4th of July. There are individual memorials all along Anzac Parade commemorating all of the conflicts Australia has participated in which leads up to the war memorial.

The "New" Parliament House

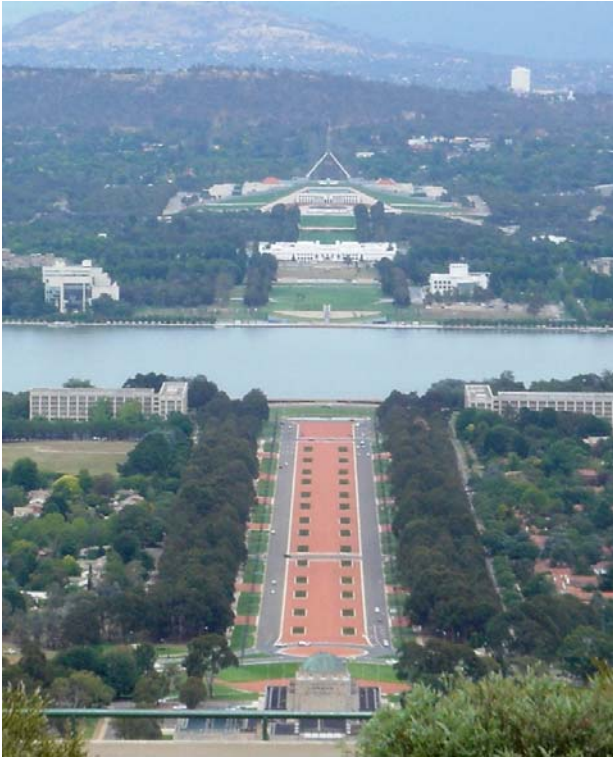


The front of the New Parliament House.

We were able to tour the Parliament House, an endeavor that set the country back two billion dollars to build. They actually billed each individual to pay for it; I think the amount was \$100-\$200. We had a tour guide that took us around the house and we had tickets to view the House of Representatives in session during "question time." The opposition can ask the Prime Minister questions during 2-3pm each day. Their political system is a hybrid of the American and British systems, but is a system all its own. It was very interesting to observe. It is similar to the British parliament, they voice their opinion, sometimes very loudly, while the speaker is talking. So it can get very noisy in the house. The House of Representatives is green in color and the Senate is Red, modeled after the British, House of Commons and House of Lords.



An aerial view of the Parliament house.



Starting from the bottom of the picture, the Australian War Memorial, Anzac Parade (the street) the first white building is the Old Parliament House, the top building is the New Parliament House. The view is from Mount Ainslie lookout.

The Old Parliament House

An American architect designed the layout of the capitol city Canberra and the Parliament House. When it came down to it the country decided they couldn't afford to build the building he designed so they built a temporary



The Old Parliament House

building that was planned to be used for 40 years. It actually used for 63 years. The architect from Chicago, Illinois didn't understand why a country would want to build a temporary building. The Australians are very conscious about acquiring debt. We toured the old Parliament house with a tour guide who took us through the House in an hour.

Fulbright Scholars



The 13 Fulbright scholars with the US Ambassador, Bill Stanton.

We met 11 other student Fulbrighters and 2 professional Fulbrighters from across the US. Out of 150 applications that are reviewed from the Australian Fulbright Commission only 13 are selected. What an honor to be chosen! I felt overwhelmed by being in a room with so many intelligent people who are so highly educated. Many of the Fulbrighters were from prominent East and West coast schools, UCLA, MIT, Duke, and Cambridge to name a few. Chris was the first and only Fulbrighter to ever be stationed in Toowoomba and the only Fulbrighter doing work in the agricultural industry. Most of the other Fulbrighters were doing work related to aquatic biology/ecology, international relations/political science, or medicine. Most were studying in the larger metro areas such as Sydney, Melbourne, or Canberra. We had a great time visiting with everyone and meeting the United States Ambassador, Bill Stanton. We were invited to his house for cocktails one evening. The bus drove us to his house and the security guard came on the bus and checked everyone's ID and invitation. Each Scholar was presented with a certificate and a Fulbright pin.

Later that evening we went to dinner and met Australian Fulbright Alumni who had studied in the US. We had a great time visiting with the alumni about their experiences. We sat next to a gentleman who came to the US over 30 years ago. He told us about his many trips to the US and small towns we had never heard of. What an interesting person to get to know!

He has even eaten dinner with Queen Elizabeth.



Congratulations! Chris with Bill Stanton receiving his certificate, wearing very proudly, his University of Nebraska name badge.



Dr. Heather F. Henry a Fulbright scholar from Kentucky with Mrs. Heather D. Henry from Nebraska.

One of the Fulbright events we did together was to visit the Australia National Museum. It was huge, but we had a tour guide who took us around to all the different exhibits; aboriginal history, animals, etc. We didn't get to see everything on the tour so we went back later that afternoon to view the Australian exhibits. There was one exhibit on Kraft Vegemite. Vegemite is actually the leftover yeast from the beer vat. Vegemite is full of vitamin B. It is mainly spread on toast and eaten for breakfast. It is a staple food here, and how they managed to shove this stuff down the throats of Australian consumers is quite a good example of the power of marketing.

We ate lunch with three of the museum curators. The museum has only been open to the public for five years but they have been collecting things for decades. There are 34 curators on staff at the museum.



National Museum exhibit representing the Australian continent.

Botanical Gardens



Chris and Heather with the kangaroo paws flower in the background.

The botanical gardens are laid out like the Australian territories. The bottom part is Victoria and the top is Queensland where the rainforests are located. There is a rare tree called the Wallemi pine that was discovered outside of Sydney in 1994. It is a pre-historic tree from the fossil record thought to be extinct, and only recently rediscovered. There is a small hidden forest of these pines in the Blue Mountains near Sydney. The tree will be available commercially to buy in a few years. To protect this tree it has a cage around it but that didn't stop someone from stealing it so they added more protection with smaller wire so you cannot put your hand through it.

Technical Corner -USQ Ag Industry Study Trip

Chris was able to join a study tour of Queensland agriculture just before the trip to Canberra. The first stop was a tour of a meat processing plant. The meat processing plant is owned by an American and Japanese joint venture, and processes beef animals for export to Japan. Pictures were not allowed, and I have never stepped onto the killing floor before; it is an experience I will never forget.



At the meat processing plant, the only place I have seen the American flag.

The next stop was to a cotton gin in the Darling Downs, known as the most productive farmland in Queensland. The plant only operates about six months out of the year, and when we were there, they were refitting and working on the gin. Moisture content and fiber length are the most important factors in the ginning of cotton. Cotton is harvested with a picker, placed in a module builder, which packs and ties the cotton into a large bale, or module. Special equipment called moonbuggies are used to load modules onto trucks and into the gin. See a picture of a

moonbuggy (limited visibility of this machine, makes work around the gin very hazardous).



Moon buggy

Cotton is then loaded into a large device used to unconsolidated the cotton so that it can be processed by the gin. The gin is a device that has changed very little since it was first developed. Basically the cotton is blown through a very complex series of tubes to extract the seed and debris, and comb the cotton so that is clean and packed into bales for export. Every bulb of cotton is exported from Australia; there is no market for cotton in Australia.

Moisture content of cotton is crucial and proper operation of the dryers is needed to ensure quality and minimize fires later in the ginning process. In the photo below, the manager is pointing to the moisture meter (manual indicator, now controlled by computer), moisture content is best between 3-6 percent.



Cotton Gin General Manager showing how the control room controls the ginning process.

The next stop was to the Dalby Agricultural College, what I would explain to people in Nebraska would be similar to the Beatrice Southeast Community College. DAC was established in 1978 and owns and operates over 25,000 acres. It trains students for return to broad acre (crop farms) crop and grain production, irrigated and dry-land cotton production, intensive livestock production, rural business management, and agricultural engineering. Here I got a close look at the irrigation farming practices deployed. It was like taking a trip back in time. Ground water and surface water, when there is enough to impound, is pumped into extremely large “ring tanks” or irrigation ponds. From these ring tanks, water is gravity supplied to open ditches, where it is flood irrigated using siphons. For those not familiar with irrigation efficiency and best management practices, this is a very inefficient way to manage irrigation water. Tremendous losses are incurred from evaporation and seepage in these unlined impoundments, in a country where water is becoming very scarce. I found it strange that

the farm manager told us that seepage losses were minimal and that all the loss was due to evaporation. Soil clay contents range between 20% and 40%. Sprinkler irrigation, (very few around) is slowly gaining acceptance.

An interesting observation about the impact that genetically modified organisms can have on plant health and pesticide usage can be seen below. The plant on the top is a non-GMO cotton variety planted next to a GMO variety of cotton. They were planted on the same day and received the same herbicide treatments. The leaves of the plant below, greener and untouched by insects are very apparent. The presence of brown spots on the GMO variety is non-existent. Still amazes me how far the arms of Monsanto can reach into the pockets of farmers.



Non-GMO



GMO Cotton

The irrigation pumps are massive for this ring tank, and the true magnitude of these structures cannot be conveyed by picture alone. Some

statistics from DAC, \$1,800-\$2,000 AU/acre for prime irrigation ground in Australian dollars, yields of 5 bales per acre, typical price between \$300 and \$600/ bale. \$150/ ML for treated wastewater from Brisbane used for irrigation water, a practice that is getting to be very common in Queensland. A common annual application rate is 5 ML/ha of irrigation water per year in an area with an annual rain fall similar to western Nebraska (North Platte/ Kearney). Pasture stocking rates in QLD vary between 1 pair for 4 acres to 1 pair per 100 acres. Generally yields are quoted in metric tones per acre, a mix of metric and English units, yet irrigation is always in ML. Currently the price of corn is \$3.17 USD/bushel; it took me a while to get that one converted.



Irrigation Pump elevating runoff water (tail and storm) into the ring tank, picture taken from top of berm.



Irrigation ditch for cotton paddock, Dalby Ag College

The next stop was to a crop farm, what is referred to here as a “broad acre” farm that was using controlled traffic to limit compaction. The owner farmed about 2,000 acres, owned two tractors, a cotton picker (which he did mostly custom work with), sprayer, planters, and some tillage equipment. He used all the same tire spacing on all his equipment. Typical crops were cotton, grain sorghum, wheat and barley.



Australian made planter toolbar (3-pt), note use of US made John Deere row units.

After the broad acre farm we went to the Bunya Mountains to rest for the next day. The Bunya Mountains are a small mountain range and rainforest in the Darling Downs, it is a special species of pine called the bunya pine that is unique to the area. The bunya pines have a pine cone the size of a volleyball and contains nuts that are edible. The aboriginal people would flock to this area when the pines were in season, and all of the tribes would work together to harvest the pine nuts.

The next stop was to the peanut processing facility, Peanut Company of Australia. It is a large and long standing peanut processor. The plant process about 35,000 tonnes of peanuts per year. There is enough domestic demand for peanuts to consume all that is produced in Australia, in fact it is cheaper for companies to import peanuts from overseas than it is to raise them domestically. Their specialty is the production of hi Oleic peanuts and oil that were

developed by government research groups, (CISRO and DPI&F). Kraft is their largest customer. For raw peanuts, farmers are paid about \$750/tonne and the product (still in shell peanuts) is sold to end use customers at about \$2,000/tonne. The smallest you can buy is 20 kilos (50 lbs) pallets.

After the peanuts, we were off to a cheese factory and a winery. Here the owner, knowing there were engineers in the group insisted on quizzing us on all sorts of pumps. “Now can anyone tell me what kind of pump this is, and what we use it for?” “It was made in Italy.” It was getting kind of old after about the 15th variation of a centrifugal pump. They make their own wine and have a small cheese factory operated by a two person crew. We sampled their cheese and wine, the cheese was good.



Winemaker mixing yeast for fermentation vats.

The last stop I accompanied the group on was to a 3,000 head feedlot. As I mentioned in previous Chronicles, feedlots are constructed and operated differently here.



AU Feedlot. Note Manure storage area in background, absence of feed bunks for self feeder, and absence of mounds. All lots are at 3% slope. All manure is sold and effluent is irrigated on forest ground using gated pipe.

A few statistics I picked up, 12 sq meters/ SCU (head, similar to animal unit), 1/2 Brahman, 1/4 British, 1/4 euro, would be his ideal cross breed. 1.8 kg/day average daily gain, harvest manure every 5 weeks, manure sells for \$4-\$5/ton unscreened, \$10-\$11/ton screened for rocks. Typical finishing diet is 83% grain, 10% cotton hulls, remaining is hay and minerals. Most feedlots steam flake their grain, usually barley, grain sorghum, or wheat, a few still use a dry roll mill. Unlike most feedlots, the beasts were fed from self feeders instead of a bunk line. This requires a different type of machine than we are accustomed to. See custom made feed truck below. Feed costs are much higher in Australia than in the US.



Feed truck

I took this opportunity at the feedlot to give my colleague a quick lesson on field olfactometry. I showed Ian Craig, one of the odor researchers from the National Centre for Engineering in Agriculture, how to use the mask scentometer that Ron Sheffield and I developed.



Chris giving a lesson on using a field olfactometer.

Things are going well and I am enjoying my time here and getting to know my colleagues. I have had to redefine some of my objectives because currently there is little interest in ambient field olfactometry, and little or no opportunity to collaborate with on-going work. I have been able to work myself into some very significant projects and collaborate on modeling projects that will enhance the development of the odor footprint tool (a current effort taking place at UNL).

Note about Videos:

Hippo Dung Spreader: As manure is excreted, manure is distributed by tail. Difficult to see, so look close.

Heather and the Dish: While at the Parkes observatory, Heather and Chris use two identical dishes to demonstrate how radio telescopes work. Even though Heather is 100 feet away she sounds as if she is standing right next to Chris.