PEGASUS U3A GEOLOGY/BOTANY GROUP April 2023 Newsletter

Hello Friends,

There's lots to put in this time so I'll keep this short.

I think you'll agree that this month's talk and this month's trip were both excellent. Helen was a witty and informative speaker and we learnt a lot about the science, the scientists and her. Equally good was the trip up the Rangitata to the start of the irrigation diversion with Kees giving us the benefit of his wide knowledge and Terry adding supplementary comments.

We are always on the lookout for good speakers and interesting places to visit, so if you have ideas don't hesitate to tell us. I like to have things planned well ahead as it saves my blood pressure building!

Pat

Recent trip

19th April Rangitata Diversion Race Terry Heiler and Kees Beentjes

As we drove along Kees gave us a commentary about the Rangitata Diversion Race. It was designed in 1938 and dug by hand, providing irrigation water to four companies. It is 67km long and gravity driven. There is a 100m drop from its Rangitata start to Rakaia. It was a huge engineering feat to dig, with a drop of one foot per mile for 42 miles. In 1944 water was provided to farms by blocking the canal at set points and letting it flood over the surrounding land. Each farm in turn got this treatment on a 13-day cycle. Now we use centre pivots, the big rolling irrigators that march across the land guided by a GPS, and they cost about a quarter of a million dollars. For half the year the scheme provides irrigation and in the winter it generates power instead.

Canterbury used to be a dessert but now provides about 8% of our GDP. It is the largest producer of carrot, canola and grass seed in the world. Nitrogen is a problem from cow urine which is washed into the water system and some companies are adding water to the aquifers to dilute it. Researchers are working on foods that will reduce nitrates and methane.

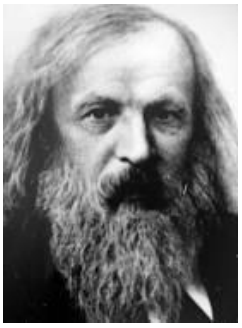
At the inlet we could see where the 5 pipes fed underground to the start of the canal. It is 12ft deep, 12ft wide and the banks slope at 45° Water flows at 30cumecs (cubic metres per second) Most comes from the Rangitata but some from the Ashburton River. Every 5 years they shut down and drain the canal completely for maintenance work. There are 74 bridges along the canal.

Recently they bought a new fish screen at $17,000,000. Water flows through the cylinder but the fish swim up a narrowing channel and are diverted into the river. Our journey back was via Rakaia Gorge. It was a very pleasant and informative day.

Recent talk

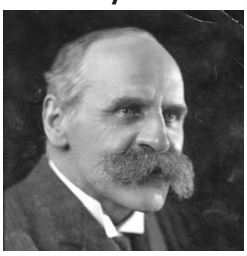
April 3rd **Three Famous Scientists** Helen Peate

The Hairy Russian, Dimitri Mendeleyev. He was born in Siberia in 1834, the youngest of 14 children. His father was a headmaster who went blind and his mother worked in a glass factory. She hitch-hiked with him 4,000 miles to St Petersburg and enrolled him at the Main Pedagogical Institute and later the university, where he was known for his uncontrollable temper and his beard.



At age 21 he was given 2 years to live but managed another 52. At 27 he wrote a 500-page chemistry textbook and at 35 listed all 63 known elements on cards with their properties and sorted them into families according to their atomic weight. He constructed the chart in one day and in 1869 published the Periodic Table. He left gaps for predicted elements, some of which were found by his contemporaries. When Rutherford discovered the structure of the atom, (think of the nucleus as a flea in the middle of Lancaster Park and the electrons flying round well outside the stands,) the elements were arranged according to their atomic number, i.e., the number of protons.
Mendeleyev married twice, had 2 children, was a consultant in fields of agriculture, cheese and oil and had a hobby of making suitcases. He was an eccentric and stormed out of lectures on radiation. He died at age 73.
Helen showed us her posters of the periodic table, as well as a tea towel and T shirt.

The Crazy Scotsman, John Scott Haldane. Another eccentric born in 1860, who studied medicine at Edinburgh and was professor of physiology at Oxford. He specialised in respiratory problems like silicosis and his work reduced fatalities in diving and mining. He developed staged decompression for preventing the bends and used mice and canaries to warn of carbon monoxide in mines. (These were only replaced in 1986.) He invented the Black Veil Respirator for use against gas in the First World War and used oxygen therapy for gas poisoning and to prevent irreparable lung damage. He went on a mountaineering expedition to Colorado to examine the effect of low air pressure on breathing and he experimented on himself and his family. In one procedure his wife had a fit for 13 minutes, but when she came round, he just sent her home to cook the dinner. In another experiment he was left with no feeling in his buttocks and lower spine for 6 years. He died in 1936 aged 76.



The Scandalous Pole, Marie Curie. She was born in Warsaw, in 1867, the youngest of five. Her parents were teachers but her mother died when she was 11. She lived in poverty but went to the Sorbonne and graduated top of her class. She became the first woman PhD graduate in France and married fellow scientist Pierre Curie when she was 28. They had two daughters Irene and Eve.

After Becquerel's discovery of emission of rays from uranium, the Curies investigated the uranium ore pitchblende and found that it contained an element or elements more radioactive than pure uranium. They bought 10 tons of it and turned their primitive shed into a factory. Marie discovered that the emission of radiation was from within the substances themselves and gave the name radioactivity to this spontaneous emission of rays. They isolated the new elements polonium and radium and after 4 years had one tenth of a gram of pure radium which glowed brightly. Radium became very popular with radium spas, parties, even lipstick and condoms. It wasn't until the 1930s that it was realised it was dangerous and 15 girls who painted radium on the hands of watches died.
In 1903 Marie and Pierre, with Becquerel, were awarded the Nobel Prize for physics for the discovery of radiation, but the Curies were too busy to go to Sweden to collect it. Tragically, in 1906, just a year after their second daughter was born, Pierre was killed in a street accident. Marie was devastated.
Several years later she had an affair with fellow scientist Paul Langevin, which caused a scandal and when she was awarded a second Nobel Prize in 1911 for chemistry for the discovery of polonium and radium, they asked her not to collect it. She insisted the prize was for her scientific work and not her private life, and went.
Marie was very keen on radium being used in medicinal circles and founded the Curie Institute for cancer research. She also saved thousands of lives by sending 200 x-ray units to the war in France. She died in 1934 aged 67 as radiation had destroyed her bone marrow, and later her remains and those of Pierre were moved to the Pantheon. Marie was first woman buried there for her own achievements. A new element, curium, Cm, was named after her. She said that "nothing in life is to be feared, only to be understood."

Jorgen sent us this link. Please try it as this talk sounds very relevant to us, especially after having more recent quakes.

https://af8.org.nz/explore-the-science/af8-roadshow The *AF8 Roadshow: The Science Beneath Our Feet* shares Alpine Fault hazard science with communities likely to be impacted by the next Alpine Fault earthquake. It is designed to enable conversations, activate local knowledge, and support informed decision-making to increase awareness of, and our preparedness for, a future event. While we can't predict when earthquakes will occur, scientific research has shown that the Alpine Fault has a history of generating regular, large earthquakes. The next event is likely to occur within the lifetime of most of us, or our children and young people, for whom this is likely to have major short and long-term impacts.

Join us on Tuesday 2nd May, 7pm at Cowles Stadium or at the TSB Space Tūranga library, on Wednesday 3rd May, 5.30pm for a public talk by leading Alpine Fault scientists about the potential impacts of a large Alpine Fault earthquake in your region

Future events.

Monday 1st May
Terry Thomson will talk to us. He sent this resume.
The accent of this talk is the origin of some ancient vertebrate animals but also some plant origins in New Zealand. All this in the context of plate tectonics and our isolation from Gondwana.

Wednesday 17th May
Colin Heinz has arranged this for us. The trip will take in the historic Hurunui Hotel on the road to Hanmer and from there travel inland to the Waitohi Gorge on the Lake Sumner Road. After lunch we will travel via Hawarden and Mason's Flat returning to the Main Road via the Waipara Gorge Road. Colin Heinz will accompany us and give an interesting commentary on the many historic, and geological features of the trip.
Time: Meet at McCormacks Bay for 9 a.m. departure. Cost: $25. Bring: lunch, chairs etc
You can start booking for this with Heather. Phone 384 2461 or heatherbirch@xtra.co.nz
Pay on line at PegasusU3AGeology/BotanyGroup Account number 03 1369 0274903 00

After our bus trip to the Rangitata Diversion Race, two people found their chairs had been taken by mistake and they were left with someone else's. Please tie a ribbon or attach some other distinctive identification to your chair so we can avoid mix ups.
People who took long green or blue folding chairs please check that you have the right one. If your green one has a red ribbon attached, please contact Joe McCarthy.

Monday 5th June is King's Birthday so no meeting.

For June, July and August we are still fine tuning our trips but have some things being investigated.

Monday 3rd July Prof Ian Shaw will talk, probably "On the Aftermath of Plastics"

Monday 7th August Melissa Huchison will give a talk on Lichens.

That's far enough ahead for you but I can assure you we do have 3 more talks and trips already planned.

You can contact me on 384 3475 or by email on patwandpate@gmail.com