

PROKHOROV CENTENARY

Atherton tops in science

HOW someone born here on the Atherton Tablelands can grow up to have such a profound influence on the world today is an inspiration.

That's how Mayor Joe Paronella felt about the centenary of the birth of renowned physicist Aleksandr Prokhorov.

"His family lived on the Tablelands after fleeing Tsarist Russia," Councillor Paronella said.

"In fact, his home stands to this day on Gadaloff Rd in what is now Butchers Creek.

"Prokhorov's work ethics and achievements are a reminder of what anyone can achieve from humble beginnings."

Another example was the renowned musician Ron Grainer who was born in Atherton in 1922.

"He is best known for the theme for the television series, Doctor Who," Cr Paronella said.

"I wonder if there is a connection there — science... science fiction — perhaps not."

Lasers in use everywhere

WHEN lasers were first discovered no one could think of any use for them.

Questacon science-theatre leader Patrick Helean asked the audience at the laser show in Atherton: "What do you think was the first thing people thought they could do with it."

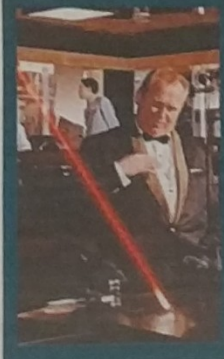
In reply, an audience member said: "Weapons."

Mr Helean agreed and then showed a clip from the laser beam scene from the James Bond film, *Goldfinger* (pictured), which was originally released in 1964, the year Prokhorov was awarded the Nobel Prize.

In fact, lasers were famously described as a "solution looking for a problem." For many decades before that, scientists doubted they could be built.

Today, lasers are everywhere — DVDs, CDs, barcode scanners, 3D printers, manufacturing, surgery, telecommunications and measuring gravitational waves.

It's hard to believe today that when lasers were first discovered no one could think of any use for them.



Scientist honoured in laser spectacle

ATHERTON | David Anthony

THE centenary of the birth of Queensland's first Nobel Prize-winner Aleksandr Prokhorov is proving to be an opportunity to embrace the renowned scientist as one of the Tablelands' favourite sons.

Renowned as the "Father of the Laser", Prokhorov's humble origins were at Butchers Creek where he was born and first went to school.

The Australian Institute of Physics and the Australian Optical Society brought a laser show to the Tablelands recently to honour the eminent scientist.

The Butchers Creek State School community enjoyed a special presentation while the general community had the opportunity to attend the public event held in Atherton State High School's community hall.

The laser show was spectacular and informative thanks to the entertaining presenters, physicist Hans Bachor of Australian National University and Questacon science-theatre leader Patrick Helean.

Australian Institute of Physics president Warrick Couch and Optical Society president Stephen Collins said Aleksandr Prokhorov deserved to be remembered for his groundbreaking pioneering work in lasers.

"As it is 100 years since his birth, we felt we needed to do more to focus on our Nobel Prize winner from North Queensland," Professor Couch said.



The grave of Prokhorov's sister Klavdiya (Clara) in Herberton cemetery. The inscription reads "In loving memory of Clara, beloved daughter of M & M Prochoroff, died at Herberton, 31st July 1921, aged 15 years."

“We felt we needed to do more to focus on our Nobel Prize winner from North Queensland.

Warrick Couch, Australian Institute of Physics president

The work Prokhorov and his fellow 1964 Nobel Laureates Nicolay Basov (USSR) and Charles Hard Townes (USA), developed the technologies that made the laser possible.

While renowned in Russia where he was acclaimed as a national hero, Prokhorov's North Queensland origins were largely forgotten.

Australian physicists, through the laser shows are working to change that.

Science minister in the Hawke Government, Barry Jones, unveiled a memorial plaque to Prokhorov at the Atherton CSIRO in 1987.

Dr Jones had actually met Prokhorov before his death in 2002.

Prokhorov's contributions to physics have changed our lives.

His fellow Nobel Laureates Basov and Charles Townes, Aleksandr Prokhorov developed the technologies that have applications around the world today.

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Atherton CSIRO site leader Cameron Fletcher with the Prokhorov plaque unveiled by then federal science minister Barry Jones in 1987. The plaque reads: "Aleksandr M. Prokhorov (inset), Soviet scientist, co-inventor of the maser, forerunner of the laser, Nobel Laureate in Physics, 1964, was born in Atherton, 11 July 1916." Picture: David Anthony

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The kid from Butchers Creek

David Anthony

ALEKSANDR Prokhorov (July 11, 1916-January 2002) was born in his family home in what is today known as Gadaloff Rd, Butchers Creek.

Various sources cite Atherton or Pearamon as his place of birth.

"No doubt these were references to the region," said Professor Stephen Collins of Victoria University and president of the Australian Optical Society.

His birth certificate cites Russell Rd, Pearamon, in the district of Herberton, then a farm.

The area was known as Little Siberia at the time because

of the number of Russian refugees who lived there.

While the scientist is renowned under his Russian name, Aleksandr Mikhailovich Prokhorov, his birth certificate names him Alexander Michael Pochoroff.

The anglicising of foreign names was common at the time.

Laser show presenter Patrick Helean said the midwife's name was Alexandra Illin, a Russian neighbour, so it was presumed Prokhorov was named after her.

Prokhorov's father Mikhail is listed as Michael Jant Prochoroff on the birth certificate, a selector, aged 35, born in Mariupol, Ekaterinoslaw, Russia.

Prokhorov senior was a revolutionary in Lenin's party, the Russian Social Democratic Labor Party.

After a couple of arrests for his political activities, he was exiled to Siberia.

He and his girlfriend Mariya Ivanovna married and fled the country in 1911 and made their way to Australia.

They initially sought refuge in a Russian émigré community in Brisbane before making their way to the Atherton Tablelands.

Mariya is named on their only son's birth certificate as Mary (nee Michayloff), born in Grenbourg, Russia.

Prokhorov's older siblings are listed on the birth certi-

cate as Claudia, aged 9, Valentina, 4, and Eugenia, 2.

Claudia's Russian name was Klavdiya and she was later known as Clara. Sadly, she died of pneumonia in Herberton Hospital in 1921, aged 15.

Her grave in Herberton cemetery remembers her as Clara Prochoroff. She was the only one of the Prokhorov children to have been born in Russia and the only one never to return when the family left for Russia in 1922, five years after the Revolution, and arriving in 1924.

Clara's grave remains as a poignant memorial to a family that produced one of the world's most influential physicists.



President of the Australian Institute of Physics, Warrick Couch, presented a plaque to the head of school at Atherton State High School's School of Astronomy and Astrophysics, David Platz, at the Prokhorov laser presentation.



Patrick Helean of Questacon, Canberra, received a helping hand from St Joseph's Parish School year six student Dara Hill, 11, during a demonstration of what lasers sounded like.

Science behind the laser

A LASER emits intense light of a particular wavelength in a very narrow band.

Einstein established the quantum theory behind the laser in 1917, showing that a photon of a particular energy could knock an electron to a lower energy level, releasing its energy as another photon.

In theory, the result—within a substance held in a particular excited state—would be a constant flow of photons of the same energy.

Named "stimulated emission", the theoretical process was one of many revolutionary predictions of the new field of quantum mechanics.

However, at that point most scientists said such a device could never be built.

At the Soviet Institute of Atomic Energy, Aleksandr Prokhorov and Nicolay Basov developed methods to produce and maintain that necessary constant, excited state.

Then, by introducing mirrors at either end of a cylinder of excited material, they bounced the emitted photons back and forth to stimulate emission of even more photons.

By precisely controlling the distance between the two mirrors, the scientists could establish a standing wave, so that only radiation of a particular wavelength was amplified.

From one end of the device a partially-silvered mirror allowed some photons to escape, creating a beam of intense light at a single wavelength.

The laser was born. Prokhorov and Basov worked with longer-wavelength "microwave" radiation, so the first device built was a maser (microwave amplification by stimulated emission of radiation).

Subsequent research extended the technology to visible wavelengths—the "laser" (light amplification by stimulated emission of radiation).

Masers continue to be used today in atomic clocks such as those at the heart of GPS.

What's in a name?

LASER is a word based on the acronym, "light amplification by stimulated emission of radiation". Laser show presenters Hans Bachor and Patrick Helean taught us the original term to describe the invention was the more accurate "light oscillation by stimulated emission of radiation". But the acronym, LOSER, did not catch on.

Tablelands recalled with 'light and pleasure'

David Anthony

ALEKSANDR Prokhorov remembered his childhood on the Atherton Tablelands as one of "light and pleasure".

A video recording of his reminiscences was screened at the National Science Week laser show at Atherton State High School recently.

After an education at Butchers Creek, Prokhorov continued his schooling in Leningrad.

He enrolled in physics at Leningrad State University, graduating in 1939.

Prokhorov continued his studies at the PN Lebedev Institute in Moscow (later the Russian Academy of Sciences)

where he received the equivalent of a master's degree.

He had a break in his studies to serve in the Russian infantry during World War II where he was twice wounded.

His father was killed in the siege at Leningrad (1941).

Upon his return to Lebedev, he was awarded a PhD in 1951 for his thesis, *Coherent radi-*

ation of electrons in the synchrotron accelerator. His career continued at Lebedev Institute where he eventually took up senior positions.

From 1969, Prokhorov was chief editor of *The Great Soviet Encyclopedia*.

Prokhorov founded the General Physics Institute (GPI) at the Russian Academy

of Sciences in 1982 and he was appointed its first director.

In 2002, the year of his death, the institute was named after the Tablelander.

This fact is noted in Eacham Historical Society's plaque at Prokhorov's first place of learning—little Butchers Creek State School on the Atherton Tablelands.



President of the Australian Institute of Physics, Warrick Couch, was pictured with Wendy and Tablelands Regional Mayor Joe Paronella at the Prokhorov display at the laser presentation held at Atherton State High School's community hall on August 20.

Pictures: David Anthony



Peter Brkic of Eacham Historical Society and Victoria University professor and Australian Optical Society president Stephen Collins at the laser presentation held as part of National Science Week.