



*Len boarding a USAAF C17 at Pegasus Airfield on his homeward journey to Christchurch, New Zealand.
Photo by Len Doel*

Teaching Fellowship Provides Opportunity of a Lifetime

With a passion for science and technology, Len Doel applied for a New Zealand Science, Mathematics and Technology Teacher Fellowship for 2008. The topic for his proposed project was “The technology that scientists use to collect data in extreme conditions and environments.” The Teacher Fellowship fund is organised by the Royal Society of New Zealand and gives classroom teachers an opportunity to study a topic of interest, for up to one year, fully funded and with the right to return to their job after completion.

Len was successful with his application, which allowed him to spend his year focussing on four key elements of his project: 1) studying the data collection devices used in flooding and tsunami detection; 2) investigating open and deep ocean research in the Chatham Rise area; 3) participating in the release of an upper atmospheric research instrument package; and 4) in the summer of 2008/09, two different projects in Antarctica. After returning from nine weeks in the McMurdo Sound area, Len writes this piece for *Antarctic* about his experience while completing the Antarctic component of his project.

The first Antarctic project was with Phil Lyver’s Landcare Research

event K122, studying Adelie penguin population responses mediated by climate change, during November and December 2008. Len assisted with collecting field data at Cape Bird and Beaufort Island. The majority of the work was done around the three Cape Bird colonies of approximately 40,000 pairs of penguins and involved searching for and recording band numbers of known age Adelie penguins. When a banded bird was spotted, its band number was written in a book and its breeding status noted. If the bird was sitting on eggs, the nest was marked with a tag and the geographic location was recorded in a Global Positioning System (GPS) unit. All of this information was entered into

a computer database for researchers to analyse at a later date.

Most of the technology used in this field work was “low tech” but reliable. For example, the use of binoculars for reading band numbers and a notebook and pencil for records because ball point pens often freeze in this environment. This did not mean there was no “high tech” equipment in use. Len’s US co-workers had a Wireless Access Point (WAP) installed at Cape Bird Hut which gave access to the internet and also a telephone. In this way it was possible to call Cape Royds and McMurdo direct to get updates on environmental conditions and project planning. The team also had a satellite phone and Len was able

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to contact his family in New Zealand on Christmas Day. Scott Base provided excellent extreme weather clothing and the training to keep Len safe in Antarctica.

Scott Base staff were a friendly helpful group who had a number of roles. Their primary goal was the health and safety of all visitors to the base, and for reducing human impact on the environment. They also made it their business to give visitors an enjoyable, informative stay.

During his stay at Scott Base between and after events, Len was able to take advantage of activities organised by Scott Base staff. On one occasion he accompanied a group exploring an area of crevasses close to the Base. He was introduced to a number of alpine techniques used to lower and lift people in and out of a crevasse, as well as becoming better acquainted with his instructors and other personnel. There was time to visit McMurdo for their weekly “Sunday Brunch” then check out Scott’s Discovery Hut close by. That was quite a time warp, eating an excellent omelette in the comfort of McMurdo, then seeing at first hand the seal blubber stove and cramped, smoke blackened quarters that the early Polar explorers used. The comparison made one very grateful for modern conveniences.

Len was next flown into the Miers Valley with Craig Cary’s University of Waikato K020 event, collecting data to predict bio-complexity in Dry Valley ecosystems. Craig is leading a multinational, multidisciplinary team working from several tent camps in and north of the Miers Valley. The camp was palatial compared to Discovery Hut. For one thing, chemical tests were carried out in the Polar Haven tent which had a diesel heater to keep chemical reagents from freezing. Polar sleeping kits were modern, warm and comfortable, a far cry from the animal hide sleeping bags used in the early 20th century.

But in the field, collecting soil samples, again it was the reliable “low tech” equipment that was used, such as measuring tape and trowel, hand-lens and direct observation, pencil, data sheets and clipboard. Len was shown how to look for mosses and lichens beneath marble and quartz stones, growing about a centimetre below the soil surface.

The marble and quartz transmit light to an ecosystem that is less harsh than above ground where wind speeds may reach 200 kph (125 mph) and temperatures dip to -40°C (-40°F), especially during winter. Len was also asked to look for springtails (*Gomphiocephalus hodgsoni*). At about 2 mm (0.08 in) in length, this species of springtail is the largest animal that permanently survives on the Antarctic continent. He was on the lookout for a mite that grows to about 1 mm (0.04 in), as well.

As at Cape Bird, there were also “high tech” solutions to safely sampling in remote, hostile environments including regular, daily radio schedules with Scott Base and the use of satellite phones for keeping field teams up to date with sampling regimes and weather conditions in other Valleys being sampled. When there was a snow dump, the ground could not be seen so sampling was stopped, particularly on higher ground.

A project of personal interest to Len was the assembly and testing of a time lapse camera system that is being used to record snow cover during the 2009 winter. This was set up in an area of the Miers Valley that K020 has had temperature sensing “iButtons” deployed at 100 m (328 ft) altitude intervals. The photos produced will be used to augment satellite images when cloud obscures a view of the ground from space.

Len brings home with him memories of being insignificant, dwarfed by the size of Antarctica’s landscape. He felt the mood of the



places he visited was determined by sunshine. In the Miers Valley, sunlight gave the hills a honey coloured warmth that seemed to turn to grey on overcast days. And to the classroom Len brings back tales of life underground, both plant and animal. Of penguins nesting in colonies for thousands of years, on the bones and guano of tens of thousands of predecessors. Of the delicate balance of the environment in polar regions, and how small changes in these high latitude locations may affect the whole world. Of “low-tech” pencil, paper and legible handwriting, of observation and thinking about questions to answer about our planet and its ecosystems. Although the tools of technology are important, it is the science questions and analysis that allows us some understanding of what is happening on our planet.

Finally Len would like to acknowledge the help and support from the New Zealand Science, Mathematics and Technology Teacher Fellowship, the Royal Society of New Zealand staff, Phil Lyver and colleagues, Landcare Research, Lincoln, Craig Cary and his team, University of Waikato and last but not least his family support network, particularly his partner Alina. ❧



◀ Mark Stevens (left), Craig Cary (middle) and Len (right) setting up a time lapse camera in the Miers Valley. Photo by Craig Cary



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Len accompanied by Emperor penguins on the sea ice near Beaufort Island, Ross Sea. Photo by Melissa Friess