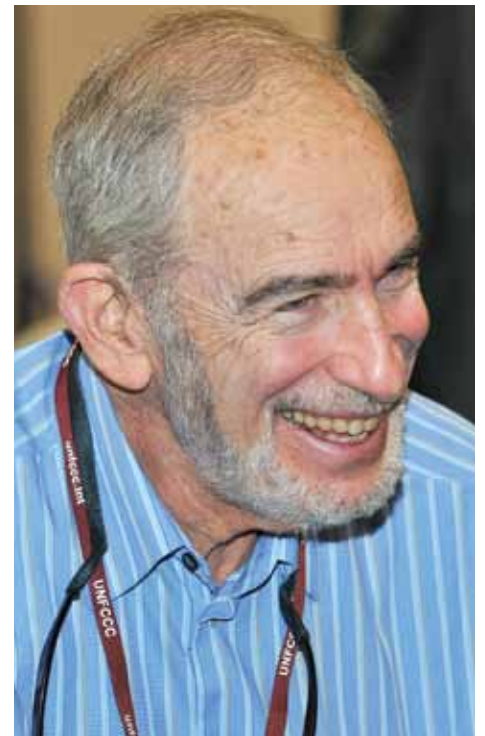


THE POPULATION BOMB

Paul Ehrlich, Bing Professor of Population Studies at Stanford University, will be presenting a public lecture 'Avoiding Global Collapse' in six cities throughout New Zealand in late October and early November. His research interests include long-term studies of the structure, dynamics, and genetics of natural butterfly populations, and he is well-known internationally for his work investigating and raising public awareness of the potential consequences of rapid growth in global human populations.



*The global population has risen sharply in recent times, with total numbers now estimated at about 7.1 billion, double that of 1968, when **The Population Bomb** was first published.*

Paul is the author of many books and articles, but is perhaps best known for *The Population Bomb*, published in 1968. Written for a general audience, in its first chapter, it outlined the problem: too many people, too little food, and a dying planet. To fix the problems the Earth was facing due to increased numbers, Paul argued that food production needed to be greatly increased, and the population growth rate reduced; firstly to zero, and then eventually even further to bring numbers down to an acceptable level. After describing means by which researchers and policy-makers could work to bring

about these changes in the population growth rate and food production, Paul outlined ways for readers to become involved: "The question I am most frequently asked after giving talks about the population explosion is, 'What can I do to help?' The obvious first answer is, Set an example - don't have more than two children". (p159, Revised edition 1971).

Paul, with co-founders Richard Bowers, and Charles Remington, established the nonprofit organisation, Zero Population Growth Incorporated, to provide a focus for the many readers of *The Population Bomb* who wanted to take further action to avert the bleak futuristic scenarios caused by population growth that were described in the book. The group was dedicated to bringing the population size under control, and still exists, now known as Population Connection. Its website states that it concentrates its efforts on education programs within US schools about unsustainable population growth, and on informing family planning policy and funding at the government level.

The Population Bomb was hugely successful, running to 22 printings before a revised edition was released in 1971. Its popular impact in the US is reflected in the many appearances Paul was invited to make on Johnny Carson's Tonight Show. The book even inspired a British film called Z.P.G., released in 1972,

INSIDE THIS ISSUE

OUTREACH

The Population Bomb	1
Steve Jones: Nature, Nurture or Neither?	3

RESEARCH

The two faces of Robert Fitzroy	4
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NEWS

Ngai Tāmanuhiri links up with Allan Wilson Centre	5
Huson Team wins million dollar prize	6
Shelley and the Little Spotted Kiwi	7
Craig Stanford's visit to a future primatologist	8

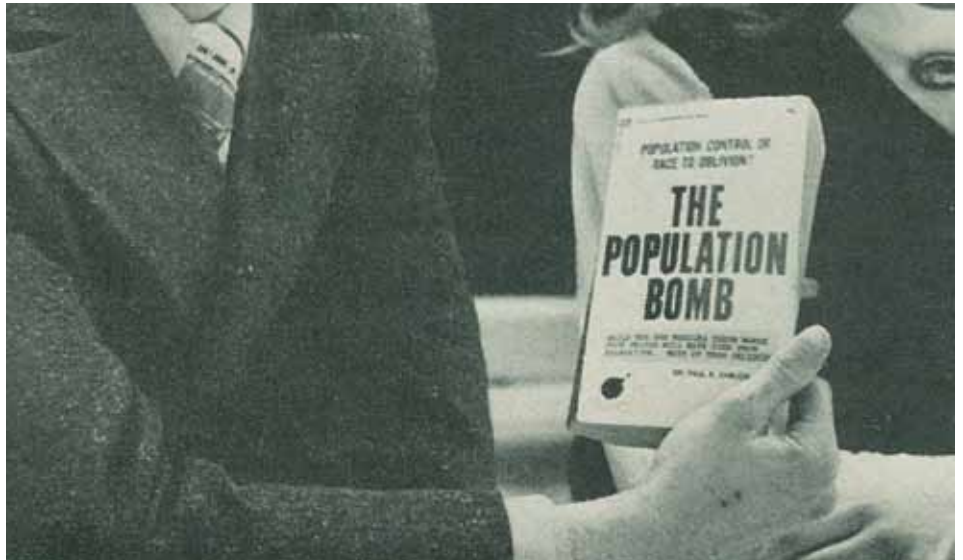


Paul & Anne Ehrlich. Picture courtesy of L.A. Cicero

which starred Oliver Reed and Geraldine Chaplin. It was set in an overpopulated, heavily polluted future world, whose global government had set down a 30-year ban on having children. Couples were supplied with robotic life-sized babies if they desired; those who had real children were sentenced to death.

Paul's work on population growth issues and human ecology continued in the following decades, and included several further books for professional and general audiences, many co-authored with his wife, Anne. He has received many international honours over the course of his career, including the Gold Medal Award of the World Wildlife Fund International, a MacArthur Prize Fellowship, and the Crafoord Prize. Last year Paul was elected to the fellowship of the United Kingdom's Royal Society, and in an invited perspective article for the Royal Society's journal, co-authored with Anne, and published early this year, he describes the environmental problems facing the world today. These include severe climate disruption, growing numbers of extinctions of animal and plant populations worldwide, and depletion of key resources. The Ehrlichs argue that these problems, and others, are likely to continue to build up until they cause a collapse of global civilisation in the near future, unless major international social and political changes occur to address the sources of the problems.

In the article, overpopulation, and overconsumption, of natural resources are identified as the main drivers of environmental problems. The global



The Population Bomb, published in 1968. Picture courtesy of 'Mother: Caring for 7 Billion'

According to the most recent United Nations estimates, the human population of the world is expected to reach 8 billion people in the spring of 2024.

Note: 'The Population Clock' is consistent with 2010 Census data and the most recent national population estimates. Sourced from <http://www.census.gov/popclock>

population has risen sharply in recent times, with total numbers now estimated at about 7.1 billion, double that of 1968, when *The Population Bomb* was first published. A population of eight billion is expected in about 14 years time, and a total of nine billion before 2050 (global projections from the United States Census Bureau, U.S. Department of Commerce). Paul and Anne predict ongoing and increasing problems with the global food supply as the population continues to increase, exacerbated by the impacts on the environment of continued

fossil fuel use. Another predicted serious threat to societies could result from a growing susceptibility to epidemics, as rapid population growth brings with it closer living conditions and greater contact with potential animal reservoirs.

The title of the article asks 'Can a collapse of global civilisation be avoided?' and in their conclusions Paul and Anne answer this positively, writing that they believe a collapse in this century can be avoided. However, 'the odds of avoiding collapse seem small because the risks are clearly not obvious to most people and the classic signs of impending collapse, especially diminishing returns to complexity, are everywhere'. They argue that key steps towards avoiding collapse include significant cultural changes, in the wealthier nations of the world, away from the current popular trend of overconsumption, and political changes to direct more resources and research to address environmental problems. Most critically, they write: 'To our minds, the fundamental cure, reducing the scale of the human enterprise (including the size of the population) to keep its aggregate consumption within the carrying capacity of Earth, is obvious but too much neglected or denied'. Forty-five years - after the publication of *The Population Bomb*, the message remains the same.

Professor Paul Ehrlich will be touring New Zealand as a guest of the Allan Wilson Centre for Molecular Ecology and Evolution

Hamilton	Palmerston North	Auckland	Wellington	Christchurch	Dunedin
Wednesday 23 October, 6.30pm, Hamilton Playhouse Theatre, Gallagher Academy of Performing Arts, University of Waikato	Thursday 24 October, 6.30pm, Central Library, 4 The Square	Tuesday 29 October, 6.15pm, Auckland Museum Events Centre, \$15 for General Public \$10 for Auckland Museum Institute members, Auckland Writers & Readers Festival Patrons and Friends or students with ID	Wednesday 30 October, 6.00pm, Te Papa Soundings Theatre	Thursday 31 October, 6.30pm, Middleton Grange School Auditorium, 50 Acacia Ave, Upper Riccarton	Friday 1 November, 6.30pm, St David's Lecture Theatre, University of Otago

BOOKINGS: Bookings: Seats may be reserved, and tickets purchased (for Auckland) online at: <http://www.allanwilsoncentre.ac.nz>. Click 'Register Online' under 'News and Events'.

STEVE JONES: NATURE, NURTURE OR NEITHER?

COMING SOON
NOV 18th – 26th

Picture courtesy of Michal Mañas



The Allan Wilson Centre's 2013 Lecture Series concludes this November with 'Nature, Nurture or Neither?' by Steve Jones, Emeritus Professor of Human Genetics at University College London. Steve is a talented communicator of science, well-known internationally for his accessible and entertaining books about biology.

Steve is an evolutionary biologist, and has spent many years studying the ecological genetics of land snails and fruit flies. Snails have many attributes (such as being simple to handle, living in a range of different habitats and having shells that display patterns of underlying genetic variation) that make them particularly useful for exploring evolutionary questions. In an interview for the BBC's *The Life Scientific* series last year, Steve tells of how he has developed a great affection for snails having worked with them since the late 1960s, and has amassed a large collection of more than 1500 snail-related artworks and ornaments. He also describes how in the late 1980s he became interested in describing the exciting developments in evolutionary genetics of the time to the general public. In 1991 he gave a series of radio talks (the Reith Lectures) called *The Language of the Genes*. These were published as a book in 1993 and won the Rhône-Poulenc Prize for the year's best general science writing.

The follow-up to the popular success of *The Language of the Genes* was a six-part TV documentary series called *In the Blood: God, Genes and Destiny* written and presented by Steve, which aired in the UK in 1996. A book of the series was produced, and published in 1997, and since then Steve has written five more well-received books examining and explaining aspects of biology for a general audience.

"I sometimes think that most science is a specialised branch of the entertainment industry. I'm a scientific stand-up in that sense ... and I think being a public scientist is actually very important, and I think what people not in the world of science don't realise is that the entire structure of the scientific enterprise depends on communication"

Steve Jones, interviewed by Jim Al-Khalili in BBC's *The Life Scientific* series (2012, <http://www.bbc.co.uk/programmes/b01lhf55>)

Two of these books provide readers with an accessible, and entertaining, overview of Charles Darwin's work and influence on contemporary evolutionary biology. In *Almost Like a Whale*, published in 1999, Steve takes Charles Darwin's 1859 *The Origin of Species*, and updates it by presenting modern scientific examples to illustrate Darwin's original arguments. The structure of the original is retained, and parts of Darwin's text used alongside and within Steve's own writing. In *Darwin's Island: The Galapagos in the Garden of England*, published in 2009, Steve examines other books and work by Darwin, demonstrating how he found enough inspiration and evidence for his evolutionary theory in the great diversity of genetic forms present in his own home environment.

Steve is a familiar commentator on science in the UK media, and writes a regular column on a wide range of topics for *The Telegraph*. His most recent book *The Serpent's Promise: The Bible Retold as Science* examines the bible from the point of view of a scientist. As Steve puts it 'in an attenuated version of its original, it tries to imitate the Testaments by weaving what might seem a series of unrelated facts into a coherent whole'. His upcoming public lectures in New Zealand focus on how our current knowledge of evolution fits our own species today - is it nature, nurture, or neither that determines who we are?

Professor Steve Jones will be touring New Zealand as a guest of the Allan Wilson Centre for Molecular Ecology and Evolution

Auckland	Wellington	Palmerston North	Christchurch	Nelson	Dunedin
Monday 18 November, 6.15pm, Auckland Museum Events Centre, \$15 for general public \$10 for Auckland Museum Institute members, Auckland Writers & Readers Festival Patrons and Friends or students with ID	Wednesday 20 November, Embassy Theatre, Courtenay Place, 6pm, \$15 for general public, \$10 Royal Society members and students (with ID)	Thursday 21 November, 6.30pm, Central Library, 4 The Square	Friday 22 November, 6.30pm, Middleton Grange School Auditorium, 50 Acacia Ave, Upper Riccarton	Saturday 23 November, 6.30pm, Old St Johns, 320 Hardy St	Tuesday 26 November, 6.30pm, University of Otago College Auditorium

BOOKINGS: Bookings: Seats may be reserved, and tickets purchased (for Auckland) online at: <http://www.allanwilsoncentre.ac.nz>. Click 'Register Online' under 'News and Events'.

The two faces of Robert Fitzroy

By Rebecca Priestley, Science in Context group, School of Chemical and Physical Sciences, Victoria University of Wellington

Robert FitzRoy (1805–1865), by Maull & Polyblank © National Portrait Gallery, London



Robert Fitzroy is known to many New Zealanders as second governor of New Zealand, a humanitarian and enlightened – for the time – man who was an ardent defender of Maori rights. Evolutionary biologists and Darwin scholars, however, know him as the bad-tempered Captain of HMS Beagle, the survey ship that carried Charles Darwin around the world between 1831 and 1836.

The Captain Fitzroy they know was an ultraconservative political and religious fanatic, an ardent supporter of black slavery who believed in the literal truth of the Bible and denounced Darwin's ideas about the abolition of slavery and the evolution of species.

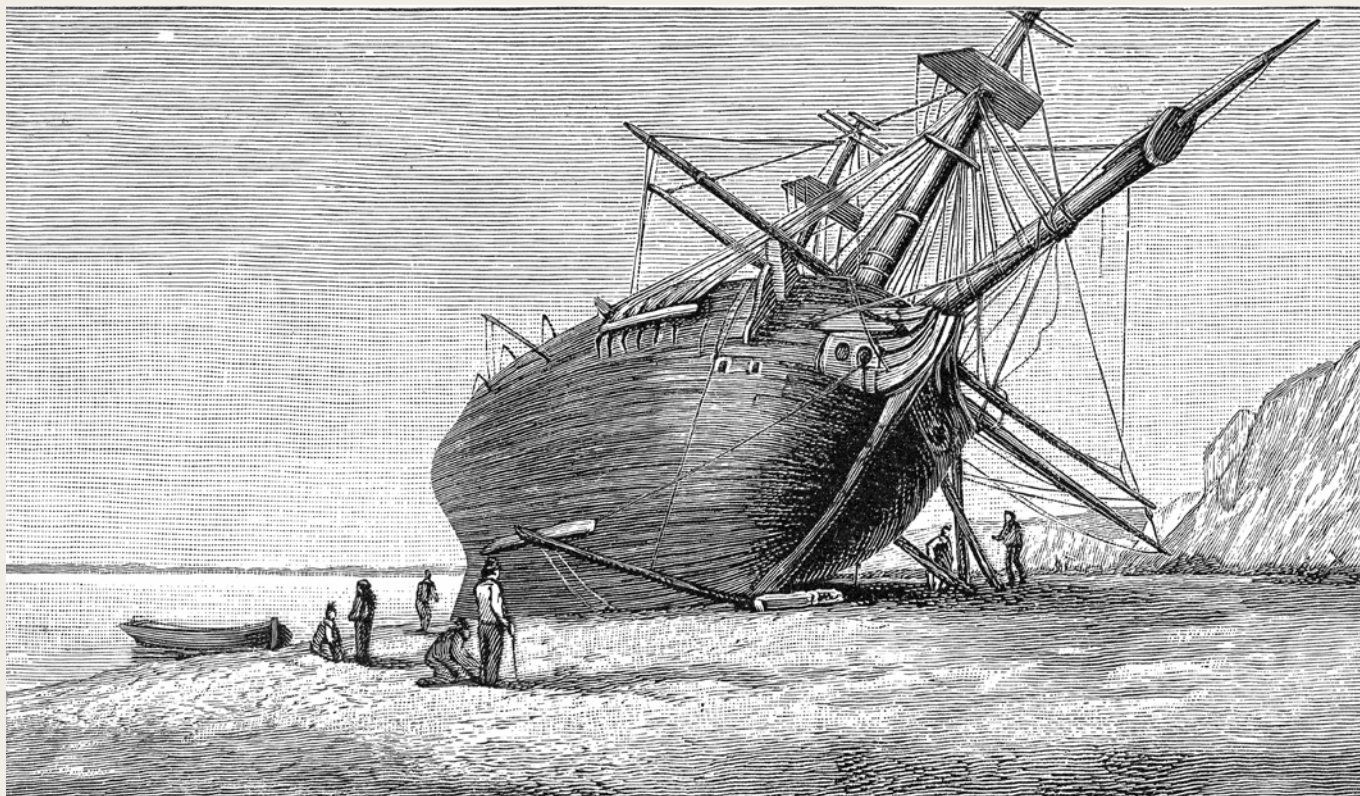
These 'two faces' of Robert Fitzroy are examined in a new paper co-authored by Hamish Spencer, director of the Allan Wilson Centre and professor of zoology at the University of Otago. The paper, co-authored by University of Massachusetts scholar Diane Paul and University of Otago historian John Stenhouse, was

published in the September 2013 issue of the Quarterly Review of Biology.

Paul, Stenhouse and Spencer argue that it's time to bring together 'the two parallel histories – of Darwinism and New Zealand' into a more nuanced account of Fitzroy's career. Much of what we thought we 'know' about Fitzroy – including his alleged support for slavery – comes from unsubstantiated anecdotes, they say, and contradicts Fitzroy's own writings, in which he criticises slavery.

Fitzroy died, by suicide, in 1865, 'destitute, having expended all of his inherited

wealth on projects intended for public benefit'. Paul, Stenhouse and Spencer urge us to remember Fitzroy not just as a governor and a captain, but as a scientist as well. Following the publication of Darwin's popular account of the voyage of the Beagle, Fitzroy lived under Darwin's shadow. But as well as being a skilled navigator and surveyor, Fitzroy was a scientist in his own right, a Fellow of the Royal Society who pioneered the science of weather forecasting and made important hydrography observations and natural history collections.



'The Beagle Laid Ashore' drawn by Conrad Martens (1834) and engraved by Thomas Landseer (1838). Depicting the ship HMS Beagle, which set sail from Plymouth Sound on 27 December 1831 under the command of Captain Robert FitzRoy, R.N.

NGAI TĀMANUHIRI LINKS UP WITH ALLAN WILSON CENTRE



On a crisp and sunny day in August, with kererū racing ahead of the manuhiri, and many other birds in attendance, Ngai Tāmanuhiri signed a Memorandum of Understanding with the Allan Wilson Centre. The agreement is to exchange scientific information that will help the iwi realise it's bold plan for development of their lands and people and, in turn, help AWC scientists more directly communicate their research findings and put them into action.



Jim McLean and Dr Hope Tupara signing the Memorandum of Understanding

This agreement will allow the Allan Wilson Centre to gain a more practical, personal understanding of how iwi approach ecological restoration and the goal of sustainable land and water management.

The Chairman of the Allan Wilson Centre Governance Board, Jim McLean, Governance Board member Rau Kirikiri, Director Professor Hamish Spencer, Manager Wendy Newport-Smith, and eminent anthropologist Professor Lisa Matisoo-Smith, attended the signing

of the Memorandum of Understanding at Muriwai Marae, south of Gisborne.

Richard Brooking, the Ngai Tāmanuhiri General Manager, said 'Ngai Tāmanuhiri started working with the Allan Wilson Centre when I was approached by Sir Paul Callaghan who was in Gisborne to visit Te Aitanga Hauiti as they developed the Transit of Venus project. Sir Paul believed 'that our future would be enhanced by a focus on scientific discovery and the businesses that flowed from that'.

'One aspect of the Hauiti project related to a biodiversity plan for the Uawa River which Tāmanuhiri was keen to replicate. Initial work with Peter Handford (one of the consultants to AWC working on the Uawanui plan) to map our rohe, and make sense of the topography and best use of the land, has happened during the past year. Specific studies of some of our landblocks have provided high quality information about the land and its use for various management committees.

'We pride ourselves on our relationship with Papatuanuku and the challenge of reconnecting with the Moana and the Whenua is as much a cultural journey as it is a scientific expedition'.

On the eve of the signing, Professor Matisoo-Smith gave a lecture in Gisborne on the great human migration out of Africa, which began 65,000 years ago, and ended in the Tairāwhiti, 800 years ago. She is beginning a Genetic Ancestry Study of New Zealand, sampling the DNA of 2,000 New Zealanders, including some from Ngai Tāmanuhiri. Her analysis will reveal ancient lineages going back thousands of years, rather than recent family history.

Professor Hamish Spencer said, 'The scientists of the Allan Wilson Centre are concerned with the past and future evolution of humans, animals and plants, and their migration and unique development here over some 80 million years since the New Zealand landmass split from the Gondwana continent. In that timeframe, all humans are relative newcomers. Their arrival in Aotearoa is enormously significant and has had profound consequences for all other life in New Zealand.

'We hope this new partnership signals a future in which the best ideas and practices will combine to restore a healthy and balanced environment and achieve the goal of a sustainable economy'.



HUSON TEAM WINS MILLION DOLLAR PRIZE

A team led by Daniel Huson, a member of the AWC's International Science Advisory Panel, has just been announced as the winner of a hotly-contested international competition with a one million US dollar prize.

The competition's aim was to find the best way to analyse raw DNA sequence data to identify pathogens, with competitors challenged to develop the most accurate and rapid algorithm for the task. Daniel is Professor of Algorithms in Bioinformatics at the University of Tübingen - and his work includes several collaborations with AWC members.

The competition had entries from close to 3000 researchers worldwide, who used an online contest host to post results using their methods for several different datasets. Daniel and two colleagues - bioinformaticist Xie Chao of the Singapore Centre on Environmental Life Sciences Engineering and Benjamin Buchfink, a computer science graduate student at the University of Tübingen were relative

late-comers to the competition but worked rapidly to catch up, and demonstrate that they had developed the best methods.

The competition, which was organised and funded by the US Department of Defense (DoD), was a novel way to find solutions to very serious problems. It was an initiative of the Defense Threat Reduction Agency (DTRA), whose stated mission is to safeguard the United States and her Allies from Weapons of Mass Destruction (Chemical, Biological, Radiological, and Nuclear) and High-Yield Explosives by providing capabilities to reduce, eliminate and counter the threat, and mitigate its consequences.

Dr. Christian Whitchurch, the Devices Branch Manager for DTRA's Diagnostics, Detection and Disease Surveillance



Daniel Huson, Professor of Algorithms in Bioinformatics, University of Tübingen

Division says that 'Team Huson's solution to the challenge will lead to an enhancement of DTRA's capability to diagnose and treat biothreats to the U.S. Armed Forces by giving DoD the ability to process and analyse biological sequence data rapidly in a realistic, moderate-to-low resource setting...This is most likely to quickly yield a set of disruptive solutions to the threats posed by known, emerging, or engineered pathogens'.



Daniel Huson climbing Phipps Peak, Arthur's Pass. Picture courtesy of Mike Steel

SHELLEY AND THE LITTLE SPOTTED KIWI

Shelley Jefferies, a secondary school science teacher at Te Aho o Te Kura Pounamu (The Correspondence School), spent the first half of this year working with Allan Wilson Centre scientists at Victoria University of Wellington. Shelley was awarded an Endeavour Teacher Fellowship, which gives teachers the opportunity to develop and carry out a hands-on science project of their own over a two-term period.



Working with Dr Nicky Nelson and Helen Taylor of Victoria's School of Biological Sciences, Shelley devised a project to examine how nest characteristics affect the hatching success of little spotted kiwi eggs. Little spotted kiwi are the smallest species of kiwi, and they nest in a dug-out burrow. Females usually have a single egg at a time, (and lay, proportionally, the largest egg known in birds, at 26 percent of the adult's weight). Eggs are incubated by males for more than two months.

Shelley developed a set of 13 nest characteristics to measure for her study, including temperature, humidity, burrow slope and leaf litter depth. She then collected data from nests in Zealandia, a mainland ecosanctuary near Wellington, and Long Island in the Marlborough Sounds.

Shelley's project results contribute to our understanding of little spotted kiwi behaviour, and the factors that affect hatching success. This information is particularly important for the development of management and conservation strategies. Shelley also spent time during her Fellowship learning about the role genetics may play in the future management of little spotted kiwi populations, and became familiar with genetic techniques and technology used in conservation biology.



Shelley gets up close and personal with one of Ira's nests. Picture courtesy of Helen Taylor

CRAIG STANFORD'S VISIT TO A FUTURE PRIMATOLOGIST

During Craig Stanford's tour of New Zealand the primatologist took a little time out in Palmerston North to make a small boy's dream come true. Liam Adrian from Russell Street School was starstruck when he met Craig Stanford.



Professor Craig Stanford

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as the source of the information.

Hi, I'm a year 4 student at Russell St School.

In my free time at school I started a SlideShow showing deforestation, and what was happening to Apes when their homes are destroyed. I hadn't researched much about what was really happening at this stage I only knew about what I had seen on TV or magazines. I decided to make an animation about orangutans and the deforestation in Asia. To do this I went to the library and searched the internet to get as much information as I could. I took over Dads shed and spent probably 30 hours making my animation. I had to make my orangutans out of plastersine and paint the box to make it look like a forest. I took over 400 photos it takes along time because you can only move things slowly. I will be entering my animation in the Manawatu Digi Awards in November. I was nervous and excited to meet Craig Stanford and I felt very grateful that he took the time to look at my animation he even gave me a A+ for it. When I got home I thought to my self that was the best night of my life.

Liam Adrian

