Galapagos news

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ANNIVERSARIES 2009: DARWIN AND GALAPAGOS

The Floreana mockingbird is critically endangered, with just a few hundred individuals left on earth. It was more numerous when HMS *Beagle* passed through Galapagos in 1835. Back then, there were enough around that Charles Darwin managed to observe them and collect a single specimen, which resulted in this splendid drawing by John Gould, the Zoological Society of London's ornithologist and artist extraordinaire. As Gould noted in the *Zoology of the Voyage of the Beagle*, the Floreana mockingbird has white tips to its wing covets "forming three transverse bands", a characteristic that sets it apart from the other Galapagos mockingbirds and gives the species its scientific name *Mimus trifasciatus*, literally three-banded mockingbird (see pp. 8-9 for more). Reproduced with permission from John van Wyhe ed., The Complete Work of Charles Darwin Online (http://darwin-online.org.uk/).

Contents

Friends of Galapagos
Saving Darwin's treasured islands
GALAPAGOS CONSERVATION TRUST

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Celebrating Galapagos

Anniversaries are a time to reflect on the past and an opportunity to influence the future. Charles Darwin, who would have been 200 this year, explicitly acknowledged the importance of Galapagos in convincing him of the fact of evolution.

In July 1837, just back from the *Beagle* voyage, he noted that he had been greatly struck by the character of the fossils he'd found in South America and also by the species he'd seen in Galapagos. "These facts origin (especially latter) of all my views," he wrote. His opening sentence in *On the Origin of Species* says more or less the same thing, although he only made explicit reference to Galapagos later on in the book. Though the islands get brief mention in his second chapter on the variation found in nature, Darwin reserved most of his Galapagos material until his twelfth chapter, the second of two he wrote on the geographical distribution of species. This late appearance perhaps explains why it took 50 years for the association between Galapagos and Darwin to begin to form.

By 1909, however, the importance of Darwin's life work had become apparent. With celebrations to mark the centenary of his birth, everyone from journalists to celebrated scientists had a chance to think about what had turned Darwin onto the idea that species change and many of them settled, quite rightly, on his five weeks in Galapagos. In the 100 years since 1909, Darwin and Galapagos have forged an unbreakable partnership in the public consciousness.

In this special anniversary issue of *Galapagos News*, geologist Sally Herbert reflects on Darwin's primary interest as the Beagle sailed into Galapagos' waters in 1835 – rocks (pp. 6-7). I have also written a feature on the important role that one very special mockingbird (and Galapagos mockingbirds in general) played in Darwin's thinking and current efforts to conserve the critically endangered Floreana mockingbird (pp. 8-9).

After 1909, the next big Darwin anniversary in 1959 also had an influence on the future. When Ecuador ratified Executive Decree No. 31 in July 1959, the Galapagos National Park (GNP) became a legal entity and later that same month, the international community rallied around to found the Charles Darwin Foundation (CDF). These two organisations have completely revolutionised the way we see and treat Galapagos. On pages 10-12, we ask former directors of CDF to reflect on their time in charge and on the future of these islands.

In a Global Galapagos article on p. 13, historian John Woram takes an in-depth look at the role of anniversaries and wonders what the legacy of the 2009 celebrations will be for Galapagos.

There is, as usual, the latest news from the islands (pp. 4-5). There are also reviews of several new anniversary-themed books, including *Mrs. Charles Darwin's Recipe Book*, a lavish cookbook based on the comfort-food Emma Darwin served up to Charles and the rest of their family (p. 14). On page 15, you can bring yourself up to date with the latest achievements of the FOGOs and also test your knowledge of Galapagos trivia. Finally, *Galapagos News* is delighted to carry an interview with CDF's new executive director Dr J. Gabriel Lopez (p. 16).

Happy Darwin/GNP/CDF year.

Henry Nicholls
Editor

Officials gather for the inauguration of the CDF's research station in 1964. Along with representatives of the Ecuadorian government are Robert Bowman (white shoes) and David Snow (white laces). © *CDF.*

NEWS *from Galapagos*

© Gabriele Gentile

New colour for land iguanas

Geneticists have discovered that a group of mysterious pink iguanas belongs to an entirely new species.

The pink reptiles – nicknamed *rosada* – are found only near the summit of Isabela's Wolf volcano, the highest in the archipelago. Staff from the Charles Darwin Foundation (CDF) and Galapagos National Park (GNP) stumbled across them during an expedition back in 1986, but their existence has remained something of a secret until now.

DNA collected from 36 individuals is clearly distinct from other populations of land iguana in Galapagos – enough to warrant designating a new species, according to an article in *Proceedings of the National Academy of Sciences*. "These iguanas are all that remain of a lineage that originated between 5 and 6 million years ago," says Gabriele Gentile of Tor Vergata University in Rome, Italy and lead author of the study.

Whilst not much is known about this new species, there are concerns about the viability of the population. It's estimated there may be fewer than 250 individuals surviving, with around two males for every female. More alarmingly, nobody has ever seen a juvenile, says Gentile. "We really need to collect data to help the conservation of this form," he says.

Geneticists studying populations of land iguanas elsewhere in the islands are also adding definition to our understanding of this group of reptiles. What are currently recognised as two distinct species could, in fact, be more, they report in *Molecular Ecology*. In addition to *rosada*, two of the other populations – those on Plaza Sur and Santa Fe – have particularly low genetic diversity so face an increased risk of extinction.

"Our molecular results provide objective data for improving continuing *in situ* species survival plans and population management for this spectacular and emblematic reptile," says Michel Milinkovitch, professor of molecular genetics at the University of Geneva in Switzerland.

Rights of nature

In September, Ecuador became the first country in the world to grant legal rights to nature, further indication of President Rafael Correa's commitment towards the conservation of the country's ecological assets.

Ecuador's new constitution, approved by some 70% of the population, stipulates that nature "has the right to exist, persist, maintain and regenerate its vital cycles, structure, functions and its processes in evolution."

In the US, there are several municipalities that already recognise the rights of nature. Until recently, however, none of them had asserted the right of nature to evolve, says Mari Margil, Associate Director of the Legal Defense Fund, a Pennsylvania-based organisation that helped Ecuador draft this part of the constitution. The Ecuadorians came up with the idea of adding in a reference to evolution, she says. "Communities in the US are now taking Ecuador's language and using it to make their own laws."

The idea of giving forests, rivers and volcanoes rights is extremely new. When it comes to the law, natural ecosystems like these are typically treated as property, so are open to exploitation by whoever happens to own the land. "With this vote, the people of Ecuador are leading the way for countries around the world to fundamentally change how we protect nature," says Margil.

Although it remains to be seen whether and how such revolutionary powers will be implemented, this is further evidence that President Correa was serious about his announcements that Galapagos is "at risk" and its conservation "a national priority". "There is now far greater protection for the Galapagos and other ecosystems in Ecuador than there was there before," says Margil. "That's very important."

© WWF-US/Eunice K. Park

Enhanced fuel

Extensive renovations to the main fuel-handling facility in Galapagos are now complete, a step that should reduce the risk of damaging fuel spills in the future.

The grounding of the oil tanker *Jessica* in 2001 and subsequent release of 240,000 gallons of fuel into Galapagos waters drew attention to the potential damage that oil spills can cause in the islands. Since then, Toyota and the World Wildlife Fund have helped advise the Ecuadorian government on changes to Baltra's fuel storage and handling facility, including replacing old, leaking tanks and installing a computer system to monitor tank levels.

Going, going, goats

It cost GNP $6.1 million to remove goats from Santiago, according to a recent article in the *Journal of Wildlife Management*. But, the researchers argue, this was money well spent and should act as a model for even more ambitious eradication efforts.

Between 2001 and 2005, GNP staff took out almost 80,000 feral goats from the 585km² island, the third largest in the archipelago. This was achieved using a suite of eradication techniques honed on Isabela, including packs of trained dogs, aerial hunting by helicopter and radiocollared "Judas" goats to help home in on remnant herds. This combination of approaches "likely decreased the length and cost of the eradication campaign," they report.

The last 1000 goats were the hardest to remove, sapping almost a third of all the money spent, a lesson to other countries attempting a similarly ambitious eradication programme.

No show for George

All the eggs laid by the female tortoises in Lonesome George's enclosure have been declared infertile.

Last year, the two females that have been with George for almost 20 years constructed three nests between them and produced a total of 20 eggs (see *Galapagos News* No. 27). GNP staff were able to recover most of these and incubate them artificially. After several months, however, with no sign of hatching, geneticists confirmed that there was no evidence of embryos in any of the eggs.


© CDF

Native plants

CDF botanist Rachel Atkinson has won the Merit Prize for Ecological Conservation for her innovative project to encourage greater use of native plants in Galapagos gardens (see *Galapagos News* No. 27). This recognition should increase the pressure on El Mirador, a new development to be constructed on Santa Cruz, to seed its gardens with native species.

Combing Wolf

An ambitious expedition to Isabela promises to reveal the hidden secrets of the tortoises on Wolf volcano.

Unusually for Galapagos, this volcano is home to several different kinds of tortoise, many of them hybrids between the Wolf tortoise and those from other islands. It's thought that the movement of tortoises by pirates and whalers may explain this strange mix.

In December, GNP staff and scientists from Yale University spent 11 days on Wolf and succeeded in collecting blood samples from 1663 giant tortoises. This, it is hoped, may turn up a female with Pinta-like genes that could be a more suitable mate for Lonesome George.


© GNP

Sinking feeling

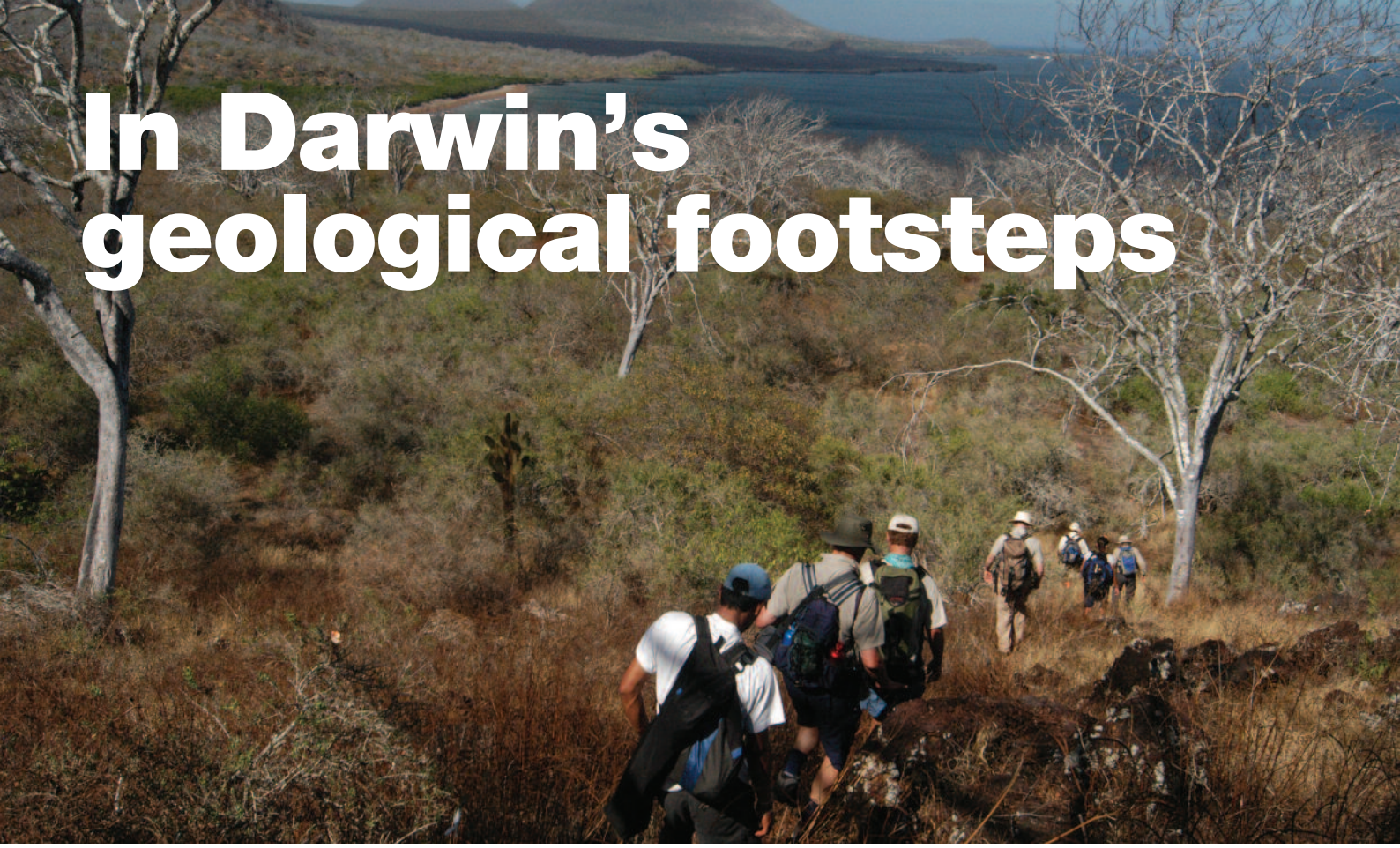
GNP officials are investigating the cause of a fire that led to the sinking of a tourist vessel just off the popular island of Bartolome.

The fire broke out on board the *Parranda* in the early hours of 14 January. All of the 15 passengers and 11 crew members were rescued unscathed. As it went down, the 125-ft-long vessel released small quantities of diesel fuel but is unlikely to cause significant environmental damage, according to GNP.

Species lists

The first ever comprehensive list of Galapagos species – marine and terrestrial – has gone online, thanks to CDF (see http://darwinfoundation.org/en/checklists/).

In Darwin's geological footsteps



Sally A. Gibson

Sally A. Gibson is a geologist at the University of Cambridge. ***The 2007 and 2008 expeditions to Galapagos were funded by the Geological Society of London, Mineralogical Society of Great Britain and Ireland, University of Cambridge and the National Science Foundation.***

(Above) Trekking towards James Bay on Santiago. © Andy Thurman and Sally Gibson.

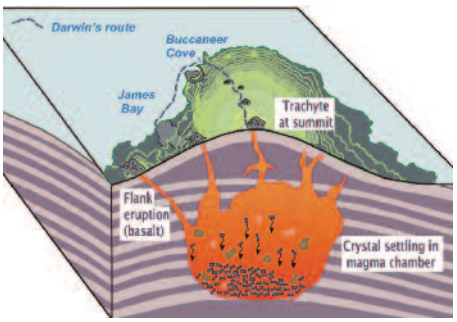
Charles Darwin's musings on giant tortoises and mockingbirds are so well known that it is easy to forget he was, first and foremost, a geologist. During the five years Darwin spent on board HMS *Beagle*, more than three quarters of all the notes he took were about geological matters and geology was a major concern in the five weeks that he spent in Galapagos in late 1835.

Darwin had been fascinated by volcanic islands and was keen to know how they formed. Indeed, even prior to arriving in Galapagos, he had described how eager he was to reach the islands and witness an active volcano. On 12 August 1835 he wrote:

"In a few days time the Beagle will sail for the Galapagos Isds.— I look forward with joy & interest to this, both as being somewhat nearer to England & for the sake of having a good look at an active Volcano."

As it turned out, there were no eruptions at the time of Darwin's visit, but this did not stop him from making some important geological observations. Many of these assumed a prominent place in his 1844 book on *Volcanic Islands* and remain fundamental to our present-day understanding of volcanoes.

Some of Darwin's greatest insights came from observations he made during ten days on Santiago (formerly known as James Island). On 16 September 1835, he and a few trusted assistants landed and set up camp at Buccaneer Cove in the northwest of the island. It was here that Darwin collected most of his geological samples, but he also made several excursions with Spanish-speaking tortoise hunters. One of these was to James Bay, where Darwin visited the salt mines and collected samples from a prominent, sparsely vegetated black-grey lava flow. He also went on two separate treks inland, each lasting two days. These were up the slopes of the inactive



Darwin imagined a magma chamber beneath Santiago. © Andy Thurman and Sally Gibson.

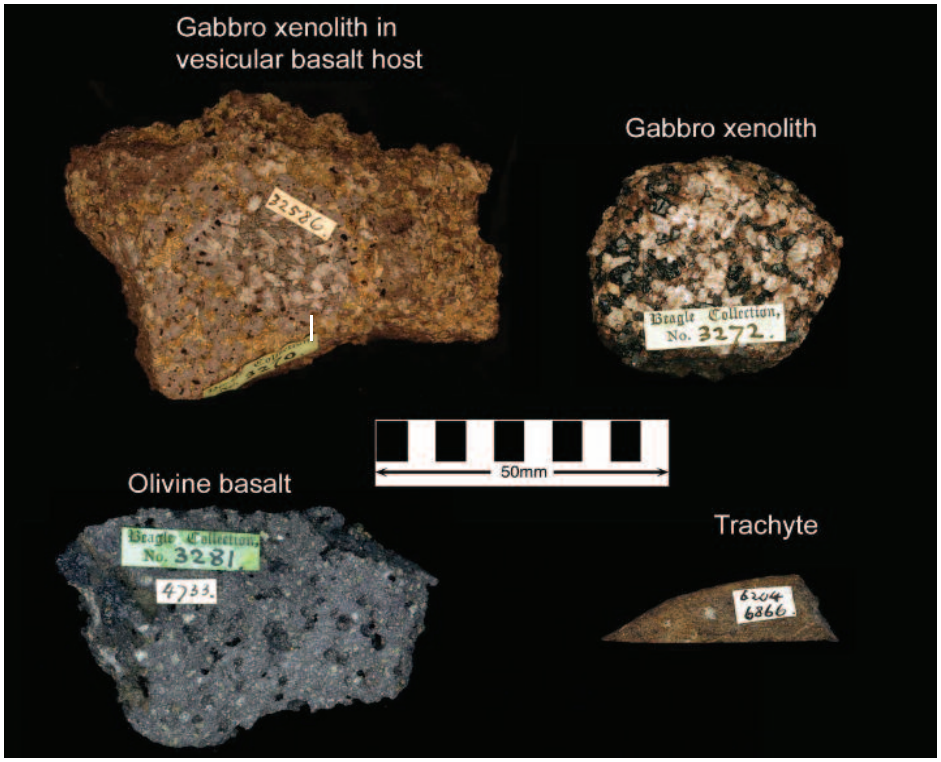
"Darwin was, first and foremost, a geologist"

volcano that dominates the northwest of the island.

In addition to dozens of plant, bird and animal specimens that Darwin took on these forays inland, he also collected several rock samples that proved fundamental to his theory of how volcanic islands form. He noticed that the lava near the green summit of the volcano was different to the rocks he had studied on its lower slopes at Buccaneer Cove and James Bay. As he described in *Volcanic Islands*, the base of Santiago's volcano seemed to be comprised of black rock or basalt. At the summit, by contrast, he had found a less dense, grey-green rock known as trachyte.

This led Darwin to propose that there might be subtle but important differences in the composition of magmas inside a volcano. He speculated that if these formed in a large chamber, the densest crystals would sink to the greatest depths and lightest crystals would rise towards the top. These differences would then be manifested in the lavas erupted from a single volcano, with the densest basaltic magma emerging at its base and the least dense trachyte at its greatest heights. This was a radical departure from the then widely held view that the composition of volcanic rocks changed over geological time and it's one that has influenced subsequent thinking on volcanoes.

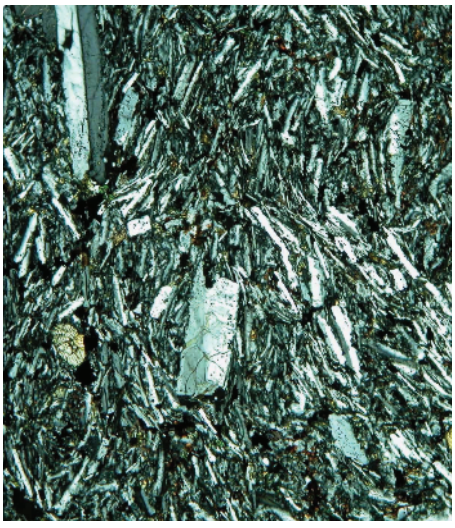
The particular specimens that led to this insight are held at the University of Cambridge's Sedgwick Museum. They are small, typically measuring less than 5 cm across and are covered in lichen and unsuitable for detailed study (above). Together with an international team of scientists, I set out, in 2007, to collect similar samples. An additional goal of our expedition was to use these geological samples to pinpoint the exact route Darwin took as he scoured the island for



Some of the rocks Darwin collected from Santiago. © Andy Thurman and Sally Gibson.

ornithological, zoological and botanical specimens.

Starting our journey in Buccaneer Cove, just as Darwin had done more than 170 years ago, we hiked to James Bay and also to Santiago's summit. It was there that we located a small outcrop of grey-green trachyte, the rock type so crucial to Darwin's theory of how volcanic islands



A microscopic view of Darwin's trachyte. © Andy Thurman and Sally Gibson.

form. In spite of our best efforts, we could not find trachyte anywhere else on the island, strongly suggesting that Darwin had indeed reached Santiago's summit on at least one of his treks inland from Buccaneer Cove.

With hindsight, it is fortunate that it was in northwest Santiago where Darwin and his assistants had the opportunity to explore, for this part of the island boasts a diverse range of volcanic rock types in close proximity to the sources of freshwater on which they so depended. Each of Santiago's different rock types is present in Darwin's modest haul from the island. His exceptionally keen collecting 'eye' enabled him to find the rare trachyte, the specimen so vital to one of his most significant contributions to the geological sciences. Just as Santiago's rocks proved an inspiration for Darwin, we hope the samples collected in 2007 and on a subsequent trip in 2008 will hold secrets that will reveal more about the causes of widespread volcanic activity in this extraordinary archipelago.

Life in the old bird

Henry Nicholls

This is a story of a mockingbird that once lived on the Galapagos island of Floreana. It starts in late September 1835 when Charles Darwin loaded his rifle, took aim and fired. The influence of this single specimen on Darwin and its importance for us today are hard to overestimate.

HMS *Beagle's* first Galapagos stop was San Cristobal (then known as Chatham Island), where Darwin bagged a single mockingbird. This was interesting enough – it might turn out to be a species unknown to science and one he could claim credit for finding. It was, however, on Floreana (then Charles Island), when he collected his second Galapagos mockingbird, that he noticed something crucial. "I fortunately happened to observe, that the specimens which I collected in the two first islands we visited, differed from each other, and this made me pay particular attention to their collection," he wrote of his mockingbirds.

So when Darwin subsequently stepped ashore on Isabela and then on Santiago, he made a special point of collecting a mockingbird from each. In total, Darwin sailed away from Galapagos with four mockingbirds, one from each of the islands he had visited, but he also had a chance to study other mockingbird specimens collected by Captain FitzRoy and others on board. En route to Tahiti, he noted a remarkable possibility. Each of his four birds might turn out to be "distinct species".

He was more or less right. When John Gould, the Zoological Society of London's expert ornithologist, taxidermist and artist, formally described the Galapagos mockingbirds in 1837, he decided there were three different species, one found only on Floreana, one exclusive to Isabela and one inhabiting both San Cristobal and Santiago. Gould made beautiful life-like drawings to illustrate Darwin's *Zoology of the Voyage of the Beagle* that came out a few years later in 1839 and it's his incarnation of the second specimen that Darwin collected on Floreana that graces the cover of this issue.

Whilst Darwin was on Floreana, the vice-governor of the islands – Mr Lawson – told him that each island in the archipelago had its own particular type of tortoise and boasted he could tell them apart from their shells. Though Darwin did not collect enough tortoises to confirm Lawson's

Darwin's mockingbirds advertising the Natural History Museum's Darwin exhibition. © Natural History Museum, London.

(Above) Floreana mockingbird (Mimus trifasciatus) *today. © Paquita Hoeck.*

hunch, he was able to demonstrate that the same was true for the mockingbirds, with different islands inhabited by subtly different forms. Such facts, he felt, would "undermine the stability of Species", offering a glimpse into "that mystery of mysteries – the first appearance of new beings on this earth".

So suggestive of evolution were Darwin's Galapagos mockingbirds that in *On the Origin of Species* he painted a picture of how a few birds from mainland South America might have reached the archipelago, their descendents gradually populating other islands and adapting to the slightly different conditions found on each. From there he broadened out his argument: "We see this on every mountain, in every lake and marsh," he announced with a characteristic flourish.

"Now, in 2009, Darwin's mockingbirds are staging a comeback"

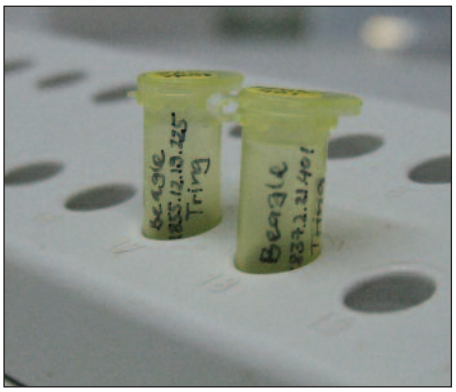
For most of the 20th century, however, it was the Galapagos finches not the mockingbirds that were credited with turning Darwin into an evolutionist, even though he left them out of the *Origin* entirely. This is largely down to the pioneering work of British ornithologist David Lack, whose influential 1961 book *Darwin's Finches* nested this phrase securely in the public imagination. Since then, a long-term study by Peter and Rosemary Grant, where they have been able to witness evolution taking place, has kept the focus on the finches.

Now though, in 2009, with fresh attention focused on Darwin's intellectual journey, his mockingbirds are staging a comeback. The Natural History Museum in London has been looking after these birds ever since they landed in its care more than 150 years ago and they have played a central part in the ongoing celebrations of Darwin's bicentenary. Indeed, the museum used the first mockingbird Darwin collected on San Cristobal and the all-important second from Floreana in a striking poster to advertise their big exhibition on Darwin (opposite).

Floreana as it appears in the Admiralty map of Galapagos produced following the Beagle *voyage. © John Woram.*

What's more, visitors to the exhibition have been able to see and appreciate the importance of these exact same birds, with carefully labelled tags hanging from their feet. "These two specimens have unique value in showing how a careful scientist can develop a single field observation into a deep insight – in this case, one that has helped toward a grasp of one of the essential factors in natural life." says Randal Keynes, a historian and great-great-grandson of the famous naturalist.

Darwin's Floreana mockingbird is also feeding into a bold project to restore Floreana to something of its former glory.



DNA samples from Floreana mockingbirds collected by Darwin (left) and FitzRoy (right). © Paquita Hoeck.

Not long after Darwin's brief visit, this species disappeared from the main island completely. Though it did not go extinct, for two small populations still survive on the islets of Champion and Gardner-by-Floreana just offshore. The Charles Darwin Foundation and Galapagos National Park are now working to reintroduce surplus birds back to the main island in an effort to sure-up the long-term future of this species, one of the most critically endangered left on earth.

Incredibly, Darwin's Floreana specimen, though long-dead, is contributing to this conservation effort. DNA extracted from it and from a second Floreana mockingbird collected by FitzRoy has enabled researchers to get a feel for the genetic makeup of the Floreana population as it was in Darwin's day. "The two old specimens from Floreana show a genetic makeup that is intermediate to those of birds still on Champion and Gardner, telling us that we can use individuals from both satellite islands for reintroduction onto Floreana," says Paquita Hoeck, a geneticist at the Zoological Museum of the University of Zurich.

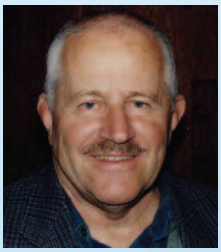
When Darwin scooped up the limp, warm body of this bird back in 1835, smoothed its feathers and admired its simple beauty, he can hardly have imagined the immense influence it was to have on him and, through his ideas on evolution, on all of us today.

Looking back, looking forward …

To mark the 50th anniversary of the Charles Darwin Foundation (CDF), Galapagos News *asks eight former directors to recall something from their time in charge and to reflect upon the islands' future.*

Raymond Lévêque (director from 1960-1962)

"We put up a generator and water tank so we could have light and fresh water"



Lévêque arrived to find "nothing, simply nothing". © CDF.

When I arrived in Galapagos, there was nothing, simply nothing. We had to improvise from the beginning, bringing in supplies to build the Van Straelen building that would form the heart of the Charles Darwin Research Station on Santa Cruz. We also put up an outbuilding to house a generator and a water tank so we could have light and fresh water. When I left there were just these two buildings standing.

The future of Galapagos lies in education. So long as there are people who think Galapagos is just like anywhere else on earth, there is not much we can hope to achieve. For example, the residents simply cannot bring plants with them from the mainland just because they want nice flowers. Not only are these invasive species themselves, but insects also reach the islands through this route. This doesn't sound like something that is particularly difficult to stop, but even this apparently simple task presents a huge challenge.

Roger Perry (1964-1970)

"The most urgent task was to protect the surviving populations of giant tortoise"

With sleeves rolled up, Perry prepares for action. © CDF

The most urgent task in 1964 was to protect the surviving populations of giant tortoises. So far as we knew there were only the remnants of colonies on Santa Cruz and the northern volcanoes of Isabela. Two other races, those of Pinzon and Espanola, were critically endangered. I proposed that we should begin a captive-breeding programme. This was to become one of our most encouraging ventures, eventually being taken over by the newly formed Galapagos National Park (GNP). By the end of 1970, the first batch of young Pinzon tortoises had been repatriated to their home island, and the first Espanola hatchlings were being raised at the new tortoise-rearing centre.

As one who long ago came under the spell of these islands, I was saddened to learn that the archipelago has been relegated to a World Heritage Site "in danger". I hope the Ecuadorian government can yet restore the status of the islands and resolve the underlying problems of spiralling human population growth and development.

Peter Kramer (1970-1973)

"I hope awareness will be raised to such a degree that it will be possible to contain the immigration of alien species"

Sitting at the wheel of CDF's jeep, Kramer drives HRH Prince Philip around Puerto Ayora in the early 1970s. © Peter Kramer.

I am proud to have played a part in educating and training people, most of them Ecuadorians, about the precious nature of Galapagos. It is these people that are now leading, taking decisions, managing and educating others about the importance of science and conservation in Galapagos, Ecuador and beyond. Without this capacity, none of the very significant advances in, for example, removing invasive mammals would have been possible.

It is my hope that awareness of Galapagos will be raised to such a degree that it will be possible to contain the immigration of alien species to the islands, even reducing the arrival of new species to something like the levels that occurred before humans reached the archipelago in 1535.

Hendrik Hoeck (1978-1980)

Hoeck and his young daughter Paquita at work on Santa Cruz in the late 1970s. © Hans Kruuk.

Before coming to Galapagos, I had been working on the hyrax in Africa's Serengeti. So I was immediately interested in the impact that mammals were having in Galapagos. Shortly after taking up office, I remember seeing feral dogs wandering along the shoreline in southern Isabela. In 1979, renowned zoologist Hans Kruuk (who had worked on spotted hyenas alongside me in Africa) came to Galapagos and assisted by two keen local biologists – Hernan Vargas and Felipe Cruz – advised on an eradication plan. Within just two years, feral dogs had gone from Isabela.

"Cooperation is very important for successful conservation"

This kind of cooperation is very important for successful conservation. I hope National Parks around the world follow this model, making greater efforts to share their knowledge and experiences. This can be done by encouraging frequent visits from scientists, students, wardens and administrative personnel and the greater involvement of young, local people.

Friedemann Köster (1981-1983)

Köster with a juvenile swallow-tailed gull he and his family saved and reared to independence. © Friedemann Köster.

I have many unforgettable memories of Galapagos: my first recce of the islands on board the brand new *Beagle IV;* my days among the vampire finches of Wolf Island, which even came to taste my blood; and those awesome scuba-dives amidst enormous shoals of hammerheads, all but gone today. But also unforgettable are my many sorrows and long sleepless nights, when the money promised to keep the research station going didn't arrive, when letters took ages to reach their destination and answers even longer to return.

"We stubbornly refuse to see ourselves as an invasive species"

Although we stubbornly refuse to see ourselves as an invasive species in Galapagos, the damage we're causing is now more obvious than ever; we are, in fact, the worst offender. Our growing numbers and detrimental activities should thus be curbed immediately, and our comfort in these islands not enhanced anymore - this frenzy has to stop. These wonderful if not enchanted islands, worth protecting for their own sake, were never meant to be a paradise for man!

Gunther Reck (1984-1988)

Reck (right) shows former Ecuadorian president Febres Cordero around the Charles Darwin Research Station in the mid-1980s. © Gunther Reck.

When I arrived in Galapagos in 1984, there were no computers on the islands. CDF's decision to buy some was surprisingly controversial. The concern among scientists and students was that it would set a trend, with the wider community following suit, resulting in rapid and undesirable development. To a degree this turned out to be the case, although computers simultaneously revolutionised reporting, accounting, budgeting and planning of conservation efforts in the islands.

"I no longer imagine that the human population in Galapagos can be reduced"

Since then, my views towards the islands have changed a lot. I no longer imagine that the human population can be reduced. Instead, my main hope at the moment is that a younger generation of 'Galapagueños' will be able to raise local, regional, national and international acceptance that ongoing development must be accompanied by very serious rules and controls to prevent further introductions of invasive species.

(continued on page overleaf)

Robert Bensted-Smith (1996-2001)

Bensted-Smith oversaw the implementation of the Special Law for Galapagos. © CDF.

The decision to introduce a non-native ladybird to the islands to control cottony cushion scale, a pest threatening scores of native plants, was momentous: the first use of biological control in Galapagos. It illustrates the value of science in informing conservation decisions and of collaboration across the scientific and conservation communities. Just before leaving the Islands in 2002, my wife and I accompanied GNP staff on an expedition to release the ladybirds on the summit of Fernandina, the most pristine island in the archipelago. The occasion and the spectacular setting brought a strong sense of shared responsibility, mixed with satisfaction, even elation.

"I would like to see radical measures to reduce the influx and spread of alien species at least 100-fold"

Looking forward, I would like to see Ecuador implement radical measures to reduce the influx and spread of alien species at least 100-fold. This will require strict limits on the volume of transport of people and cargo and a massive upgrading of quarantine controls on transport to and within the islands. With investment of a small fraction of the Galapagos economic product, plus leadership with a long-term vision, both nationally and in the islands, it could be done.

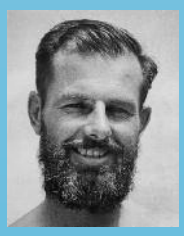
Graham Watkins (2005-2008)

Watkins prepares to talk to members of the Galapagos Conservation Trust. © Peter Tulley.

I was delighted to discover that the 1840 portrait of Charles Darwin – a picture I have used in hundreds of presentations – was painted by George Richmond, the great uncle of my grandfather. It shows what a small world we live in and how, in some senses, families have interacted with Galapagos for hundreds of years – some famous and some less famous. For me, this distils the importance of appreciating the interconnectivity of Galapagos with the rest of the world.

"What Galapagos lacks is the leadership to bring together disparate interests and move toward a single shared vision"

What Galapagos really needs is a charismatic and effective leader from the islands with a strong conservation bent. Galapagos does not lack resources, and yet seems to consistently move in the direction of growth and unsustainable development. Excellent laws, plans and ideas are developed but very few are implemented. So ultimately, it would appear that what Galapagos lacks is the leadership to bring together disparate interests and move toward a single shared vision that incorporates conservation and sustainable development.



© CDF

Obituary

David William Snow, director of the Charles Darwin Research Station from 1963 to 1964, died on 4 February 2009 after a short illness, aged 85. He was one of Europe's foremost ornithologists, especially in the field of the ecology of South American forest birds. He arrived in Galapagos after working in Trinidad and at Oxford. As well as steering the Station through a difficult period under logistical and living conditions that few now can envisage, the Snows, as David and Barbara (who died in 2007) were universally known, made a major contribution to the study of the archipelago's seabirds. The Snows were among the most approachable and erudite of scientists. In 1965, the year after they left, I inherited their seabird studies on South Plaza and they could not have been more supportive. The world has lost two outstanding naturalists and Galapagos two longstanding supporters.

Mike Harris, Centre for Ecology and Hydrology, UK

See Islanders *on page 16 for an interview with current CDF executive director Dr J. Gabriel Lopez*

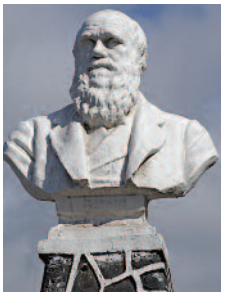
John Woram

is a historian, writer and lecturer, frequently invited as a speaker on board tourist vessels in Galapagos. He is the mastermind behind www.galapagos.to, a website dedicated to the human and cartographic history of Galapagos and the author of *Charles Darwin Slept Here* (Rockville Press, 2005).

We humans are obsessed with anniversaries. Each of us has our annual birthday, some have wedding days to celebrate and there are historic events (like an independence day or the end of a war) that we consider important enough to remember every year. In a decimal world, we also pay special attention to centennial (100th), sesquicentennial (150th), bicentennial (200th) anniversaries of such events and millennia to mark the passing of time.

Exactly 100 years ago, in 1909, there were celebrations on the centenary of Charles Darwin's birth and the golden anniversary of the publication of *On the Origin of Species*. The American Museum of Natural History in New York inaugurated its new Darwin Hall of Invertebrate Zoology and graced it with a large bronze bust of the man himself. The museum's president Henry Fairfield Osborn presented a replica of the sculpture to Cambridge University in England in time for their own Darwin Centenary Festival.

The Darwin bronze was "very gratefully accepted by the authorities of Christ's College," Osborn informed the sculptor William Couper. "Unfortunately, it was exhibited in a very small room with other memorabilia of life size, and its heroic size threw it somewhat out of proportion. Sir George Darwin said that he regarded it as a very good likeness. Professor Francis Darwin was rather reserved in his opinion." Couper took these reservations in good humour, replying to Osborn that "I am in hopes that as soon as Prof. Francis Darwin becomes used to seeing his father's head so large, he will feel differently about it."



The Darwin monument on San Cristobal. © John Woram.

In recognition of another anniversary, the centenary of HMS *Beagle's* visit to Galapagos, anthropologist Victor Wolfgang von Hagen arranged for another bust of Darwin to be erected on San Cristobal. "Raising the monument was more than an act of biological piety," von Hagen wrote in his 1940 book *Ecuador the Unknown*. "It was the beginning of a campaign to bring to the attention of naturalists all over the world, and to the attention of the Republic of Ecuador, to which the Galápagos Islands belong, the need for conserving the irreplaceable natural phenomena of the archipelago, and to save from extinction this living laboratory for the study of evolutionary processes."

It took several years before the conservation movement began to take shape, with the foundation of the International Union for the Conservation of Nature (IUCN) in 1948, the US Nature Conservancy in 1951 and the World Wildlife Fund in 1961 to name just a few important milestones. During this period, another significant Darwin anniversary (the sesquicentenary of his birth and the *Origin* centennial) provided the impetus to act on von Hagen's vision: in July 1959, Ecuador enshrined the Galapagos National Park in national law and the Charles Darwin Foundation for the Galapagos Isles was founded later that month in Belgium.

Now it is 2009. There are celebrations this year to mark the bicentenary of US president Abraham Lincoln (who, like Darwin, was born on 12 February 1809) and poet Alfred Tennyson (born later that same year). But these are likely to be overshadowed by the extraordinary number of events taking place throughout the world to commemorate Darwin, his work and his immense legacy.

There are too many to mention here (see http://darwin-online.org.uk/2009.html for a fairly comprehensive list). Many will explore the importance of Darwin's work in Galapagos and at least three events are being organised in the archipelago itself. In July, on CDF's actual birthday, a specialist symposium in Puerto Ayora will explore the role of science in developing a sustainable future for the islands. In August, the Universidad San Francisco de Quito will host the Second World Summit on Evolution on San Cristobal, an opportunity for researchers from around the world to share recent advances in understanding evolution. In October, Darwin enthusiasts will be able to join his great-great-grandson Randal Keynes on board the *M/V Eclipse* for the official Charles Darwin Foundation anniversary fundraising cruise.

All of these anniversary events might just as well have been held at some other time. But a milestone anniversary seems to call for a milestone event and this year's Darwin-related celebrations offer a great opportunity for Galapagos to bring more attention to the work that needs to be done in the islands before the next significant anniversary.

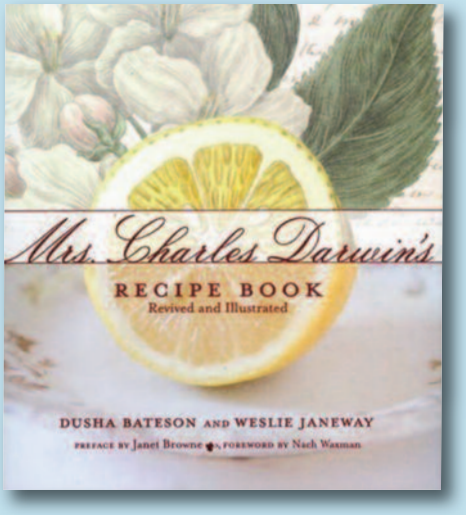
Reviews

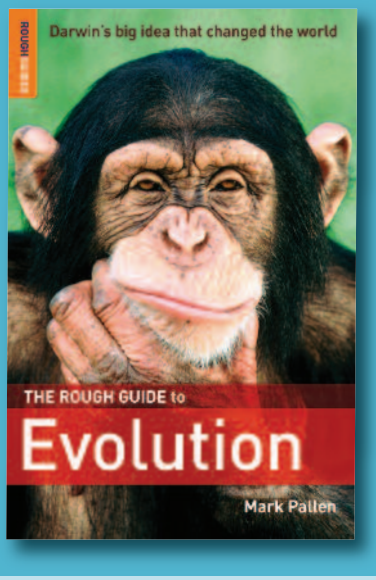
A TASTY SLICE OF HISTORY

Mrs. Charles Darwin's Recipe Book: Revived and Illustrated
by Dusha Bateson and Weslie Janeway. Glitterati Inc., $35.00;
ISBN 978-0980155730

Mrs. Charles Darwin' s Recipe Book contains much more than just recipes. It is also a beautifully illustrated history book, compiled from the 19th-century notebooks of Emma Wedgewood Darwin, wife of celebrated scientist Charles Darwin. This lavish volume proves that society hostess Emma was more a modern-day woman than we had believed, sourcing produce from the grounds of her estate to turn out simple yet wonderful recipes. There are also plenty of anecdotes offering a unique insight into life in 19th-century England. Emma was meticulous in her methods, particularly when it came to preserving, and owing to her husband's sweet tooth there are plenty of desserts that will be hard to resist, whether you are a serious foodie, a history buff or both.

Reviewed by Lucy Gemmell, founder of "rhubarb" food design (www.rhubarb.net)





THE ESSENCE OF EVOLUTION

The Rough Guide to Evolution
by Mark Pallen, Rough Guides Ltd., $16.99/£10.99,
ISBN 9781858289465

This year, we run the risk of drowning in books about evolution and Darwin. This little book is a truly useful primer. Mark Pallen has pulled together a vast array of information, from early pre-Darwinian ideas about organic change to an entertaining section on evolution on cult TV. He has even got it right about the role of Galapagos finches in Darwin's thinking, and cites much useful literature for anyone interested in exploring further. He does not pull any punches in the "controversy" of "evolution versus religion" but tells it like it really is. It's a worthwhile book for anyone wanting a quick review or an easy start into the way the world works.

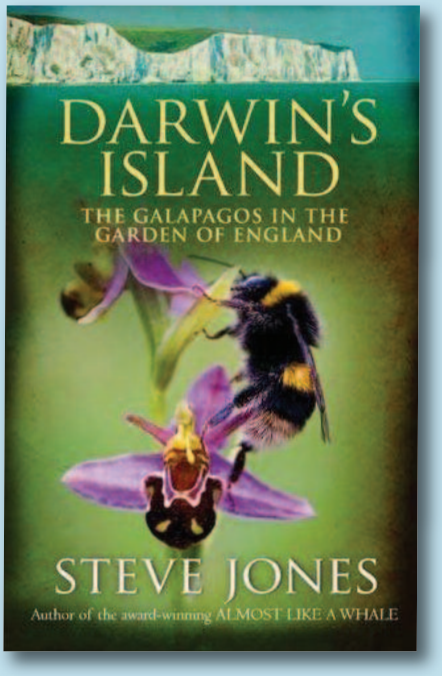
Reviewed by Sandra Knapp, The Natural History Museum, London

DARWIN AT HOME

Darwin's Island: The Galapagos in the Garden of England
by Steve Jones, Little Brown, £20,
ISBN 9781408700006

In his lifetime, Charles Darwin set foot on some 40 islands, the last of which was Great Britain. In *Darwin' s Island*, Steve Jones pays particular attention to the county of Kent – the Garden of England – where Darwin spent the last 40 years of his life. This domestic setting, says Jones, "was as much, or more, a place of discovery than had been the jungles of the Amazon or the stark cinders of the Galapagos." Putting *On the Origin of Species* aside to make room for Darwin's lesser-known writings – on subjects like domestic species, orchids, emotions and earthworms – Jones reveals the extraordinary breadth of Darwin's influence on modern biology. This is another great book by the past master of science writing.

Reviewed by Henry Nicholls



Friends of Galapagos Organisations

© *Richard Lewisohn.*

Since 1997, the **Frankfurt Zoological Society** (FZS) has supported the restoration of the endemic flora of Galapagos and conservation of critically endangered species, especially on the uninhabited islands. Following successful eradication projects on northern Isabela, Santiago and Floreana, the focus is now on the inhabited islands where livestock are still present and the consequences of an increased human population are intensifying. In January FZS signed an agreement with the **Charles Darwin Foundation** (CDF), confirming $150,000 support this year.

On 12 February, the UK's **Galapagos Conservation Trust** (GCT) held a prestigious fundraising dinner with Christ's College Cambridge to launch a lasting research link between Cambridge University and Galapagos. CDF was represented by their Patron HRH the Duke of Edinburgh, new executive director Gabriel Lopez and director of technical assistance Felipe Cruz. Special guests at the event included Sir David Attenborough (pictured with Cruz), Sarah Darwin, Randal Keynes and the Vice Chancellor of Cambridge. Following a successful pilot study, GCT is also funding a programme to integrate environmental education into the local school curriculum in Galapagos. The aim is to support teachers and students alike to develop a greater awareness and understanding of the natural world around them.

The **Friends of Galapagos Netherlands** have provided support for the expansion of solar power capabilities at CDF's Galapagos-based research station. The use of solar rather than diesel-generated power would reduce energy costs by 30% or around $500 each month. In addition, it would demonstrate to the local community and visitors how solar energy can be used.

CDF's social science team is now up and running thanks to support from **Galapagos Conservancy** (GC). Their investment will strengthen CDF capacities to address key underlying issues in Galapagos relating to the social and cultural sciences. Tied in with this is GC's support for the publication of the 2007-2008 Galapagos Report. This publication has had an important impact on decision-making and public perceptions of the issues in Galapagos. It will also help to ensure better collaboration and a more integrated approach to research.

Quiz Corner

CLOSE READING

How thoroughly have you read and digested this issue of *Galapagos News*? Test yourself with the following questions …

Q1 When were the pink iguanas on Wolf volcano first spotted?

Q2 What was the cost of eradicating goats from Santiago?

Q3 What is the name of the grey-green rock Darwin found on Santiago?

Q4 How many mockingbird specimens did Darwin collect?

Q5 Which American president shares a birthday with Darwin?

NUMBER CRUNCH

435 The estimated number of flamingos currently in Galapagos, according to a census carried out by the Galapagos National Park. Wardens stationed at each of the 27 lagoons across the archipelago made their observations simultaneously, finding most flamingos on Isabela and Santiago.

NOT ANOTHER BOOBY...

(Right) A juvenile Galapagos petrel *(Pterodroma phaeopygia)* sits in a nest in Santiago's highlands. Introduced black rats have caused a dramatic decline in population numbers of this species, which is listed as "critically endangered" in the World Conservation Union's Red List of Threatened Species. © GNP.

A1 1986 (p. 4) **A2** $6.1 million (p. 5) **A3** Tachyte (p. 7) **A4** Four (p. 8) **A5** Abraham Lincoln (p. 13)

Islanders

Dr J. Gabriel Lopez ...

... is the new executive director of the Charles Darwin Foundation (CDF). He comes to Galapagos with 25 years' experience in conservation, philanthropy, public policy, environmental management and community development.

Tell us about your early years.

I was born in Cuba but grew up in New York. As a child, I had a wide range of interests – in academic pursuits, sport and the arts – but I also had a great love of the outdoors and beautiful natural settings. I so looked forward to major hiking, canoeing and sailing trips during holidays. They offered a refuge away from the concrete canyons of the city. It's distressing that many children today are not as drawn to the outdoors. This has potentially major ramifications for those of us who advocate on behalf of conservation and the environment.

When did you first visit Galapagos?

In the 1990s, before tourism really took off. The number of visitors back then was around 40,000 a year and the islands had a resident population of some 12,000 people. Today the annual number of visitors is 173,000 and climbing and the resident population is well into the 30,000s. Puerto Ayora in the 1990s was a small town where most people either walked or rode bicycles. Today, the number of cars, trucks and taxis is approaching 400 and they can cause traffic tie-ups at times. Remarkable and very worrisome.

What is your enduring memory from that trip?

The magnificence, the beauty and diversity of the islands. I remember diving with penguins and sea lions. Penguins at the equator! But beyond these magical moments I also observed the great fragility of Galapagos and even then I was concerned that unplanned and poorly managed growth could potentially endanger this global treasure.

Can you highlight a couple of achievements from your career to date?

I have worked on scores of major conservation and sustainable development initiatives in nearly 50 countries on five different continents, so this is a very difficult question to answer. But I am particularly proud to have been a part of efforts to build several research and training centres for sustainable development in Mexico, southern Africa and Brazil and also in various parts of Asia. I am also very proud to have helped forge strong social movements for conservation and sustainable development in Mexico, Central America and the Amazon. These have led to major advances in community-based management of forests and other natural resources that can serve as a model for sustainability in other settings. And I am proud of our pioneering work in Zimbabwe on CAMPFIRE – a landmark community-based natural resource management programme that is a model in the region.

What is your vision for Galapagos?

Sustainability by 2020. This is an enormous challenge, as current trends of growth and development threaten to overtake our efforts to conserve and restore this magnificent ecosystem. But I remain optimistic that we can set in motion a process for creating a Galapagos where economic, urban and tourism development are very carefully managed under the highest of socio-environmental standards and guided by the realities of life on a small archipelago in the middle of the Pacific. This must start with education. Attaining a sustainable Galapagos will require a complete change in how people view their relationship with this very fragile ecosystem.

What else do you hope to achieve?

I would like to see CDF become a globally recognised centre of excellence, providing highly rigorous empirical knowledge and information for informing and shaping sound decision-making at multiple scales. CDF needs to have its greatest impact in helping agencies of the Government of Ecuador and other key partners sustainably manage, conserve and restore this vital ecosystem. But CDF is more than that. As a major institution working on the frontline of conservation and sustainability, CDF is well positioned to play a lead role in shaping the vision, policies, practices, partnerships and institutional frameworks needed to advance local and global sustainability. Our work can serve as an example to others in other settings on the important role that a cutting-edge institution can play in shaping positive change for a sustainable future.