ROUND the WORLD

with Michael and Valerie Lewis

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Report from Ecuador and Peru

FIELD MUSEUM OF NATURAL HISTORY BULLETIN

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World Music Programs
Weekends in July and August
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MOUNTAINS in the SEA, MOUNTAINS in the SKY

Field Museum's Founders' Council members see natural science firsthand and gain insights into the field research of Museum curators

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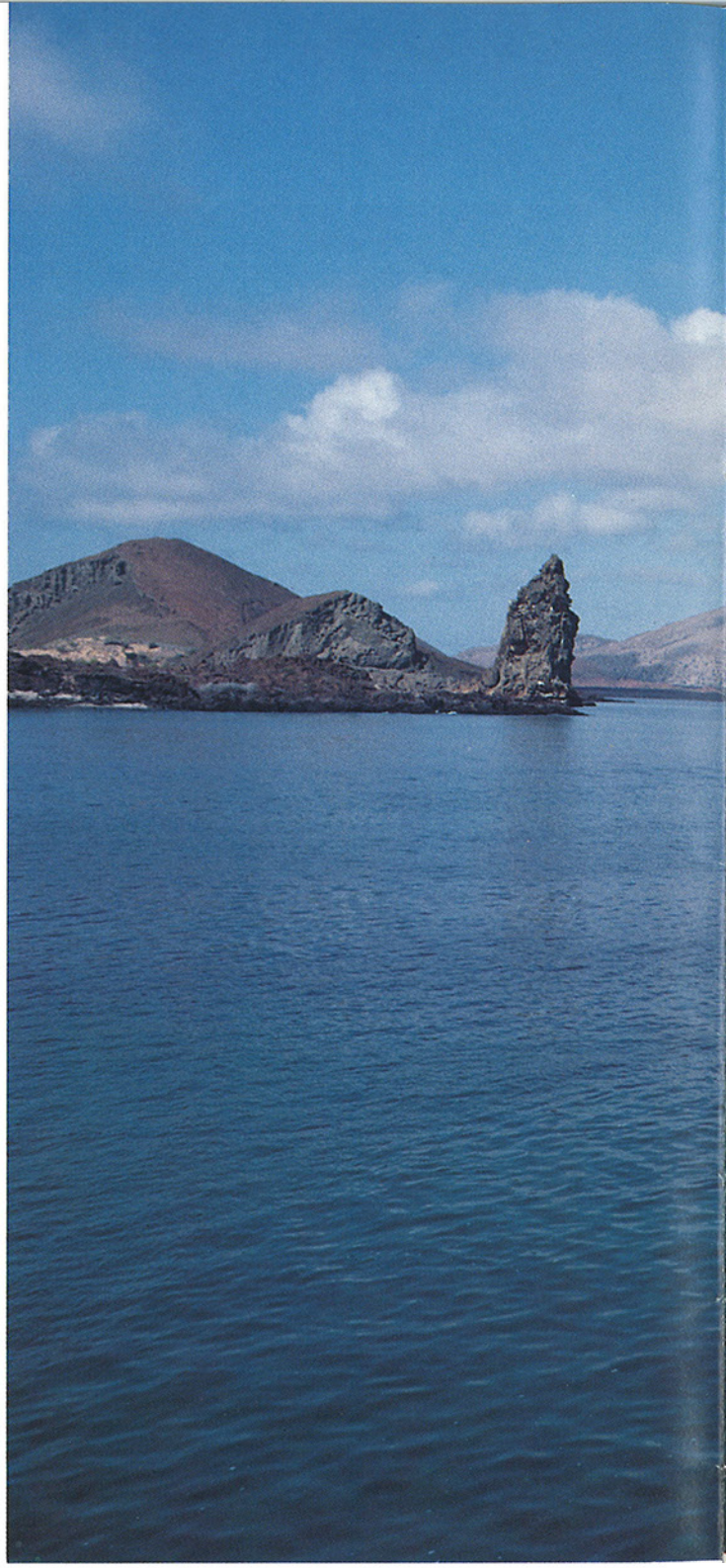

FIELD MUSEUM FOUNDERS' COUNCIL exists to support the many facets of the Museum, particularly collections and scientific research. Thus, in March this year, when Ecuador and Peru became peerless outdoor classrooms, members of the Council were able to see firsthand how vital is that research. Lectures, seminars, and instruction in the field, as well as accounts of current research projects, deepened the group's natural science and archaeological knowledge. In Ecuador our tutor was Dr. John Fitzpatrick, chairman of the Department of Zoology and curator of Birds. In Peru we benefited from the scholarship of Dr. Charles Stanish, assistant curator of Middle and South American Archaeology and Ethnology.

Charles Darwin on HMS *Beagle* came upon the magical world of the Galapagos Islands slowly and peacefully, under sail. Today's travelers fly in by jet. But once on board the cruise ship, which was to be home and classroom for the next eight days, our group was soon overtaken by the utter tranquillity of what Darwin called these "enchanted islands."

In the Pacific Ocean 600 miles off the coast of Ecuador and right on the equator, the archipelago consists of about 13 major islands and many smaller ones. In 1959 the Ecuadorian government established the area as a national park. Today, the park administration and its wardens, aided by stringent rules governing tourism, are attempting to rectify the disastrous depredations wrought by man and to conserve this fragile ecosystem.

Geologically the Galapagos are young. A mere four to five million years old, they are the peaks of volcanoes which have built up vast accumulations of lava

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Valerie Searle Lewis, Louise K. Smith, Jean K. Carton, and Dr. Michael S. Lewis are members of the Field Museum Founders' Council.

Our cruise ship is anchored near Bartolome Island. To the left is an eroded tuff cone, known as a pinnacle rock, and in the background, several cones of cinder and lava. Michael Lewis

from the floor of the ocean. The westernmost islands are the most recently formed and still have a number of active volcanoes. To the visitor the lava on several of the islands seems like black mud which has just set hard after flowing in sticky swirls and folds. Plant life is often only just beginning to take hold. Huge calderas, or collapsed craters, are to be seen. Some islands have beaches of red or black lava. Bartolome Island offered a lunar-like landscape in every direction: cones of all sizes, frozen lava rivers, lava tunnels, jagged rocks, and almost no vegetation. In this silent, rugged landscape a solitary Galapagos hawk and a small lava lizard were the only signs of life.

Darwin's theory of evolution and subsequent, supplementary theories were elucidated for us by Dr. Fitzpatrick, our superb guide and teacher. Darwin pos-

Land iguanas, yellowish orange and reddish brown, feed mainly on prickly pear cactus. They grow to more than three feet in length and may live more than sixty years. Michael Lewis

Marine iguanas, the world's only seagoing lizard, sun themselves by the shore. From salt glands connected to their nostrils, they excrete salt which becomes encrusted on their heads. Their claws are sharp for clinging to rocks. Michael Lewis

tulated that organisms change over many generations in adaptation to new or changing environments. This conclusion was based in part on his famous observation that Galapagos finches became different species as a result of adapting to the distinct conditions of separate islands. Thus, from a single common ancestor evolved a seed-crushing large ground finch, an insectivorous warbler finch, a tool-using finch, and a leaf-eating vegetarian finch, each with its beak adapted to its specialized feeding habits.

The famed Galapagos giant tortoises also played an important part in the development of Darwin's theory of evolution. On islands where the vegetation is sparse and high off the ground, tortoises of the saddle-backed type, with a carapace that is raised in front, are able to stretch their necks to reach food. On islands with lusher vegetation, those of the dome-shaped type, with a carapace that is thick in front, are able to push through the dense undergrowth. Visitors now can see these slow-moving, drowsy looking creatures at the Charles Darwin Research Station on Santa Cruz Island. During the past two centuries they were prey to

The male great frigatebird is seen showing off his gular pouch. This is inflated during the mating season to attract females. Michael Lewis

pirates, whalers, and sealers who took them aboard as a meat supply. As many as 200,000 tortoises are estimated to have perished in this way. Today tortoise eggs and hatchlings are food for the wild dogs, pigs, and cats which are the descendants of domesticated animals introduced by sailors and settlers to some islands. Thus, tortoise eggs are brought to the research station by staff who watch over the early growth of the young reptiles. At about five years of age they are released back into the wild. The eggs of other endangered species, such as the land iguanas, are similarly hatched at the research station.

Remarkable creatures such as the marine iguanas have managed to survive by evolving new ways of life in the frequently inhospitable conditions of the islands. These reptiles arrived on rafts of floating vegetation washed out to sea after violent storms on the mainland. Over hundreds of thousands of years they have adapted to the very different life of the archipelago. They are the only sea-going lizards in the world, diving beneath the surface to feed on algae. When they settle back on the rocks they frequently appear to be sneezing, though they are, in fact, excreting excess salt that has been ingested in their high-salt diet. They huddle in groups —small black monsters on black lava rocks, immobile and menacing. When Museum President Sandy Boyd lay down on the rocks to confront them, his eyes only two feet from theirs, they were unmoved, like a brigade of indignant Victorian matrons.

Since it was spring, the air on islands with large bird populations was heavy with passion and ardor. Male great frigatebirds, with their extraordinary scarlet gular sacs puffed up like a soccer ball between bill and breast, sat in the bushes with their enormous wings widespread, fluttering and undulating to attract the females who cruised overhead. From her decidedly su-

Male and female blue footed boobies with chick. One to three eggs are laid on the bare ground and incubated by both parents under their feet. Michael Lewis

Sea lion pups are inquisitive and playful. Ms. Louise Smith seems pleased with the attention. Michael Lewis

sand diminutive Galapagos penguins are evidence of successful adaptation to living on hot land and feeding in the cold waters of the Humboldt Current. The flightless cormorant seems to have developed a more streamlined body for swimming, at the expense of flight. This example of natural selection probably came about because of the close proximity of its feeding grounds and because of the lack of indigenous terrestrial predators. This latter fact is the reason the Galapagos fauna—sea lions in particular—have little fear and

An endearing sea lion pup preparing to nurse from his mother. Female sea lions have a nine-month gestation period and give birth to a single pup, which is suckled from one to three years. Michael Lewis

perior vantage point, the female might eventually select an alluring fellow, fly down beside him and be entranced by his physical and vocal prowess. The elegant swallowtailed gulls were also engaged in much courting and mating. But it was the bluefooted boobies' wooing which was most engaging. We found it hard to take these creatures seriously, with their large, bright blue feet, dancing in ponderous slow-motion as if caught in a puddle of glue. But they, like all other courting birds, were simply showing off their own important assets to one another.

The birds and reptiles of the Galapagos enchant the visitor with their strangeness, their striking appearance, and their closeness to the viewer. Penguins seem very out of place on a tropical island, yet several thou-

do not shy away from humans. These mammals, the largest animals on the islands, would lie like cumbersome mounds on the beaches of many of the islands which we visited, regarding us with large, baleful eyes as we photographed and stared at them from a few feet away. But once in the water they were lithe, graceful, and playful. We watched them body-surfing in the big Pacific waves and could not doubt that they were having fun. One of the most memorable and exciting times of the whole trip was the afternoon we snorkled on James Island. The sea lions wanted to play and made

Above: Masked boobies are the largest and heaviest boobies in the Galapagos Islands. Therefore, they often nest in colonies near cliffs, so that upward air currents make it easier for them to launch themselves in flight. **Below:** Male and female red footed boobies are seen resting in a tree, a most unusual habit for a seabird. They are able to do this because they have prehensile feet. Michael Lewis

this clear by cavorting around us. They would swim so close that we could touch them; before swooping past us they would look right into our eyes with curiosity and, it seemed, a desire to communicate.

Since visitors come to the islands by way of mainland Ecuador, our journey in fact began in Quito, a city which is noteworthy for a number of reasons. At 9,000 feet above sea level it is the third highest capital city in the world and is only fifteen miles from the equator. Set within a bowl in the Andes Mountains, the city boasts views of snowy peaks, including the majestic volcano Cotopaxi. In the old part of the city more colonial buildings remain than in most other South American cities, thus offering picturesque sights of narrow streets and whitewashed buildings with balconies.

From Quito we visited the spectacular Indian market at Otavalo. The women are eye-catching in their white embroidered blouses, navy skirts, and many rows of gilded beads around their necks. The men have striking profiles under homburg hats and a single, long braid down their backs over their ponchos. The market was alive with the colors of their weavings. The vegetables, fruits, and meats added other hues to the spectrum. On the wall of the surrounding buildings were splashed posters and slogans for the forthcoming presidential election in Ecuador.

An exhilarating day of bird watching followed in the Pasachoa Nature Preserve under the skillful guidance of Dr. Fitzpatrick. In this green valley near Quito we were able to see some of Ecuador's immensely rich birdlife while delighting in their equally ornate names: streak-throated bush-tyrant, scarlet-bellied mountain tanager, red-crested cotinga and hummingbirds called sapphire-vented puff-leg, amethyst-throated woodstar, and collared Inca.

When our Field Museum group left Ecuador our comprehension of the major conservation measures undertaken by the Ecuadorian government in the Galapagos National Park was greatly enhanced, as was our sensitivity to the fragility of the environment and the need for its protection in the future. Each one of us certainly will always have an intense appreciation of nature's most spectacular laboratory of evolution—the incalculably valuable treasure that is Galapagos.

—Valerie Searle Lewis

THE TOUR REGROUPED IN LIMA, PERU, the colonial Spanish city built on the Pacific coast of South America in the midst of one of the great temperate deserts of the world. Despite its lack of rain, however, the boulevards bloom from irrigation waters flowing down from the Andes, just to the east. The group was accompanied during this phase of the trip by Field Museum's assistant curator of Middle/South American archaeology and ethnology, Charles "Chip" Stanish, who is in the process of starting a new project, a dig in Peru near the Bolivian border on Lake Titicaca, where he will be continuing his research on the Aymara Indians, closely related to the Incas.

Lima's central square, Plaza de Armas, strongly reflects the city's Spanish heritage. Enormous public buildings, all terra cotta pink with white trim, shelter

active entrepreneurial markets in the promenades under graceful arches. Other old buildings are festooned with magnificent carved mahogany balconies, one of the architectural hallmarks of Lima. These structures, dating from the sixteenth-century Spanish tradition, serve as elaborate window screens which allow the (ventilated) tenant to look out while not being seen. Our visit to Lima was necessarily short, as it was merely a stopover on the way to Cuzco.

An Otavalo Indian woman with gilded necklace and embroidered blouse. Everyone wears some protection on their head, however makeshift, against the strong equatorial sun.
Michael Lewis

Cuzco was for centuries the capital of the Incas, until Francisco Pizarro conquered the Incas and captured the city in 1553. It sits 11,000 feet above sea level in a valley between two spurs of the Andes. (When we arrived at Cuzco we all drank the special tea made from coca leaves to alleviate dizziness from the altitude, and were cautioned to rest for an hour or so.) The Incas were master builders, superb civil engineers and architects, and must have had a bureaucracy which rivalled those at Memphis and Rome. They planned and developed a network of roads and bridges which ran the length of the empire, up and down the Andes. Communication was effected by a system of runners who jogged at a steady pace, despite the altitude, sufficient in numbers and strength to keep the various ends of the empire in touch with each other. Legend has it that the roads and the runners were efficient enough to bring fresh fish from the seashore to the Inca kings in Cuzco.

The city of Cuzco is a curious mixture of Spanish on top of Incan—literally. The ancient narrow cobblestone streets of Cuzco are lined on both sides by walls of the houses of these two cultures. Magnificent huge dark grey boulders, each weighing as much as ten tons, were quarried and then moved to the building site. There, each facing surface was painstakingly ground to abut its four neighbors so exactly that not only was no mortar required but one even now cannot insert a slender blade between them. The walls rise

Founders' Council members who are also members of the Field Museum Women's Board shown in the volcanic landscape near the summit of Bartolome Island. Standing (l. to r.): Mrs. Robert W. Carton, Mrs. Willard L. Boyd, Mrs. Malcolm N. Smith, Mrs. Henry T. Chandler, Mrs. John C. Meeker. Seated: Mrs. Robert D. Kolar and Mrs. Michael S. Lewis. Michael Lewis

seven feet, and current thinking is that the houses were then thatched. The Spanish built their houses on top of the Incan walls, But these were clearly cruder, clinging together by mortar rather than by skill.

Politics are uncertain these days. One afternoon we stepped out into one of the narrow streets to discover a rather long, peaceful Communist protest march snaking along. The marchers were representatives from local farming communes who were protesting for more electricity and better roads. Women in modern skirts and sweaters but with a variety of traditional headdresses —often a piece of magenta cloth folded several times and draped on the head, and men with tall felt hats, marched by, chanting slogans, under the watchful yet perhaps sympathetic eye of the local army/police representatives in their buses.

The remarkable building skills of the Incas found expression in several other marvelous sites around Cuzco, in particular at the fortress of Sacsayhuaman, built probably between the fourteenth and fifteenth centuries. Although the boulder building technique is the same as in the city of Cuzco, the scale is expanded fifty-fold: here some boulders weigh as much as 500 tons. The fortress offers a magnificent view of the clay tile roofs and white stucco walls of the houses of Cuzco, now a town of over a quarter million. Yet, standing on the ancient stone wall and listening to a small boy, wrapped in colorful and intricately woven alpaca poncho and playing a piercing, haunting tune to his pet llama on pan-pipes, certainly evoked the mood of bygone centuries.

We visited the royal baths at Tambo Machay and the tombs at Q'enko, also on the outskirts of Cuzco, both locations used for cermonies by the ancient Inca kings. The sacred baths feature icy, sparkling waterfalls cascading through a system of stone terraces. At Q'enko there are a series of some 19 niches which were used to "sun" mummified royal ancestors and certain loyal retainers who were sacrificed, we think, when their masters died. Dr. Stanish explained that as with so much of what we visited, however, archaeologists can only hypothesize the details of usage, since the In-

The façade of La Compania is part of a 17th-century Jesuit cathedral, the most ornate of Quitos' churches. The six Solomonic columns on either side of the main entrance are modeled on those of Bernini in the Vatican. Michael Lewis

cas had no written language and thus left no record. Rather, a complicated but obviously effective scheme of knotted cords *(kipu)*, carried by the aforementioned runners, sufficed to transmit information over long distances. Fortunately, Dr. Stanish gave several impromptu lectures on Incan history and culture by drawing on current archaeological research, which in and of itself was fascinating.

We drove along the white-water Urubamba river to reach Piscar. Dr. Stanish took advantage of an important regional market to acquire several antique weavings for Field Museum from an ad-hoc fund gotten up by the Founders' Council group. These textiles are highly symbolic and convey considerable information regarding community, occupation, status, etc. of the wearer. Not only beautiful, they are of anthropological interest and also are relatively easy to store and gain access to in the Museum, so we hope these five pieces will be just the beginning of a good new collection to be augumented by subsequent expeditions and other contributors. As we strolled through the colorful market, munching on roasted giant corn kernels, we admired the many handicrafts, especially the hand-knitted alpaca sweaters and sweaters which often bore a picture of the llama itself.

The Andes range is, simply put, spectacular. The mountains rise ten, twelve, twenty thousand feet above sea level, some almost vertically. And yet on virtually every mountainside are brilliant green farming terraces which may be ancient Incan, contemporary, or both, used to farm potatoes, corn, or beans or to accommodate an occasional grazing goat or cow. These terraces often appeared to be completely inaccessible and remote, yet were clearly a part of the community agricultural activities.

At Ollantaytambo we climbed several hundred feet up some of these terraces, which were apparently used for ceremonial purposes, not farming. This fortress guards the Urubamba Sacred Valley, was an important settlement during the expansion of the Incan Empire, and probably was home to several hundred people. Today's visitor can stroll around an inhabited village that has remained mostly unchanged from Incan days and imagine what life was like then, up in these high, rugged, magnificent mountains.

Incas came to Machu Picchu to escape and hide from Pizarro and his Conquistadors; they were completely successful. However, they mysteriously abandoned the settlement in the 1570s, and Machu Picchu remained unknown to the outside world until 1911 when Hiram Bingham, having heard stories of its existence, explored the region determined to find it. Even now, Machu Picchu is remote, accessible only by train or, for the ambitious, by foot along the Inca Trail. High on the mountainside, the ruins are completely hidden from the valley. When finally at the site, the view is breathtakingly gorgeous: the extensive ruins of this final outpost of Inca civilization, encircled by even higher mountains on the other side of the crashing Urubamba River, which can be heard these hundreds of feet above it.

The settlement appears to be a complete microcosm of the civilization, accommodating royalty, engineers, farmers, workers who were all necessary for living in this place. First were the royal areas for altars, chambers, thrones, and public squares where food and drink were ceremonially divided. These buildings were all crafted from particularly fine and enormous boulders

View of the long-lost city of the Incans: Machu Pic chu. The spirit is still there. Jean Carton

In the sleepy valley of Ollantaytambo, an inn—Alahambra II. Jean Carton

painstakingly brought up here and fitted together. The buildings for mere mortals (runners, farmers, etc.) were clustered on terraces close together.

As we walked in the brilliant sunshine, suddenly we were enshrouded by mist and clouds as the rains came for an afternoon's downpour complete with a dramatic show of lightning. Were the gods angry at the intrusion of modern touristadors into the confines of the Incan?

Muddy, exhilarated, tired, and happy, the Founders' Council members reacclimated from Machu Picchu through Cuzco and Lima and back to Chicago.

The voyage would have been special under any circumstances, but the contributions made by Drs. Fitzpatrick and Stanish enabled us to *start* to understand ornithology, natural history, archaeology and anthropology and to acquire a respectful realization of the research methodology used by experts to explore the mysteries of their fields.—*Louise K. Smith*

"Flowers, flowers—who wants to buy my flowers?"—on the road to Machu Picchu. Jean Carton