

## **South America 2013: Overseas Adventure Travel; Machu Picchu & The Galapagos (9 flights, 2 countries Peru, Ecuador, 16 days)**

**Monday, Dec 2, 13:** We, 6 of our OAT Adventurers, arrived at the Lima Airport in the wee hours of Tuesday Dec. 3 and made our way by bus to the Jose Antonio Hotel. After late breakfast and early lunch we explored the Pre-Inca Museum which has artifacts of the ancient cultures of Chavin, Mochica, Tiahuanaco, Pucara, Nazca, etc.

Then we visited some of the architecturally notable sections of the city and the Franciscan Monastery (Monastery of San Francisco, 1673). Some of the city has distinctly French architecture; I think the guide said from the time when Napoleon conquered Spain. Franciscans are usually frugal and plain, but this monastery is very opulent with tiles brought from Europe more valuable than gold, as gold was plentiful and close by in contrast to the ornate and distant tiles. This funded by the rich conquistadors who wanted to be buried in the catacombs of the Cathedral. Part of the tour was through these catacombs where the bones of thousands have been exhumed and displayed. Lima has *no* public transport so if you don't travel by tour bus or private car you are stuck with the prolific van system with the 5 fixed! No fixed route, fare, schedule, capacity (32 reported in ten-passenger van), and the van is never fixed. Lima is pleasant temperature and nearly always blanketed by overcast this time of year.

Next day we flew to Cuzco (11,200 ft), then traveled by bus a few miles to Chinchero, above 12,340 ft, where we inspected an Inca ruin and temple and visited a primitive Andean family weaving (from alpaca wool) operation, then down to Urubamba to our hotel. Urubamba is a rather trashy mountain village at about 7,500 ft and at the head of the sacred valley leading northwest to Machu Picchu. Actually looks neat, looking down from up the mountain – perhaps just our hotel was on a trashy street.

**Wednesday, Dec 4, 13:** Visited an elementary school in Urubamba, then traveled a few miles up the sacred valley to Ollantaytambo, a quite authentic present-day Inca village – much of which was built in the 15<sup>th</sup> century with Inca style heavy stone work and streets (passages) wide enough for walking only. The fortress at Ollantaytambo is one of the few places where the Incas won against Pizarro, during the Spanish conquest of Peru. This fortress is an impressive prelude to Machu Picchu. <http://en.wikipedia.org/wiki/Ollantaytambo> Next day, Thursday, we traveled by narrow gage rail to Agua Calientes, the village at the foot of the mountain hosting the Machu Picchu ruin, then by bus up 1,500 feet to the ruin. We have had a couple showers, but after a couple hours of clear weather at the mountain top, a heavy 1 hour down pour hit us – I had my Gempier along, but at the start of the rain was wearing a light weight REI “waterproof” windbreaker. The rain came on quickly enough that I hadn't the foresight to stop and dig in the backpack for the Gempier, so lost the one time on the trip when it was really needed. We got a good guided tour and briefing of the main ruin. After a dinner and a night in the hotel, we returned by bus up to the Machu Picchu ruin, for a long sunny half-day second look and some pleasant but strenuous hiking. I hiked the Inca Trail out to Sun Gate, then returned and hiked the trail to Inca Bridge. This bridge spans a gap in a ledge-trail a few hundred feet up the side of a sheer cliff, in contrast to the typical canyon spanning Inca bridges [http://en.wikipedia.org/wiki/Inca\\_rope\\_bridge](http://en.wikipedia.org/wiki/Inca_rope_bridge). It has a section of log floor that could be pulled along behind the retreating Inca to stop the advance of an enemy [http://en.wikipedia.org/wiki/Inca\\_Bridge](http://en.wikipedia.org/wiki/Inca_Bridge). Someone reportedly just ahead or behind me on this hike saw an Andean Spectacled Bear, [http://en.wikipedia.org/wiki/Spectacled\\_bear](http://en.wikipedia.org/wiki/Spectacled_bear), the only bear in South America. Our group was deprived of the fantastic day hike to Wayna (Huayna) Picchu for lack of the required permit that must be acquired well in advance – I was disappointed OAT did not have some available. After returning to Cusco, on Saturday we visited yet another ruin on the edge of the city, Sacsayhuaman (sexywoman) <http://en.wikipedia.org/wiki/Saksaywaman>, a large fortress built with huge rocks, some up to 125 tons, moved into place and precisely fitted by the Incas from a quarry several miles away – mysteriously with no machinery! Also in exploring the city we visited the Qoricancha Sun Temple, whose wall were covered with gold and emeralds before Spanish looting, and which exhibits a large painting of the Last Supper, with many more than Jesus and 12 followers eating Peru's traditional guinea pig. On our final day, Monday, we went southeast from Cusco, to the village of Huasao noted for its bread making and Inca shaman (witch doctors). We got a demonstration of the bread making, but skipped the shaman, as we had all been bestowed with health and good luck the day previous by one of those. Also today we visited a

very elaborate Inca irrigation facility that Wright<sup>1</sup>, from University of Colorado, calls an “engineering master piece.” This is a very interesting park or agricultural center in impressively good condition, almost like original, but “master piece?” – doesn’t look that complex to me, the Incas learned that water runs down hill, but they didn’t seem to have wheels.

Finally, food in Peru is pretty plain, frequently cold, then placed in very cold dishes, primarily comprised of 12 kinds of potatoes and 14 kinds of corn (that we would grind to meal or feed livestock with), sometimes accompanied by rice. When lucky enough to get fried eggs they were like rubber cocktail glass coasters. There is little edible meat, like in India but the Indians camouflage it well with spices. The alpaca was good, but the popular guinea pig wasn’t. One tasty cereal grain not well established in North America, quinoa is grown in the high Andes and served frequently as a pleasant variation. Peru food just might be more boring than London or Australia.

**Tuesday, Dec 10, 13:** We fly back to Lima and then to Quito, Ecuador. Quito has a new international airport opened this year far (20 miles) and at much lower elevation (2,000 ft) than the city.

**Wednesday, Dec 11, 13;** Quito, we first visited a school for disabled children to hear the Sinamune Disabled Children’s Orchestra. The school, founded some 20 – 30 years ago by Ecuador’s world famous trumpet player Edgar Palacios teaches a small group (~75) of disabled children, blind, autism, downs, etc. The students, all disabled in some way, study music 2 hours per day, and the other usual subjects the remainder. This was another of those OAT excursions that seem beforehand like just something we have to do. But, no, the concert and seeing the performance and hearing the music was *very* moving. And Edgar is there playing his trumpet with them. The school is supported by donations and by paid performances of the orchestra. Quito is the world’s 3<sup>rd</sup> highest capitol city at 9,350 ft, and is sandwiched in a valley growing north-south to 35 miles length, while only about 3 – 4 miles wide. Socialism is prevalent, and gasoline at \$2/gal is about half the US price, and apparently not subsidized like Venezuela? The US dollar is used for currency.

A visit to the equator<sup>2</sup> is a real and interesting phenomenon but, without pretending it, they have surrounded it with a Riley’s *Believe it or Not* show. I choose not! There is a red line on the pavement marking the equator. A basin of water somehow rigged so when they put it on the equator, water drains without swirling, but when positioned on each side 10 ft it swirls in opposite directions, implied to be due to the Coriolis force induced by Earth’s rotation. Next, they allow you to balance a raw egg on a nail head right over the red line – if you can, I failed – but I will practice in my Redondo Beach kitchen soon. The first clue something was wrong arose from the claim that the red line used to be 200 ft farther north until GPS came along and more accurately located the equator. While trying to compute in my head the angular fraction of earth’s rotation picked up by the water basin 10 ft north of the red line ( $\delta r/r_e = 10 \text{ ft} / 3441 \text{ nm} = 27 \times 10^{-6} \text{ deg}$ ; i.e., 27 millionths of a degree), I wondered that they didn’t use the water basin on each side of the old red line to locate it more accurately<sup>3</sup>. By this time they have you believing that the Coriolis force can be felt at fractions of an inch on each side of the red line, so they have you try to “walk the line” with arms outstretched if you can – darn that bloody mary for breakfast – or was it that I was unbalanced by Newton’s apple in one side pocket<sup>4</sup> <sup>5</sup>. I didn’t seem to be very successful in convincing my fellow adventurers that this was a magic show, but I will keep trying, and will entertain other opinions.

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<sup>1</sup> Kenneth R. Wright, *Tipon: Water Engineering Master Piece of the Inca Empire*

<sup>2</sup> I thought I heard our guide say that the French had come to Quito in the 18<sup>th</sup> century to accurately measure the location of the equator. Puzzled by why they wouldn’t choose a place much closer to France, a little research finds that the French did come [http://en.wikipedia.org/wiki/French\\_Geodesic\\_Mission](http://en.wikipedia.org/wiki/French_Geodesic_Mission) in 1735 to measure the earth’s roundness (oblateness) by measuring the circumferential distance of 1° of latitude ( $\approx 60 \text{ n mi}$ ) for comparison with like measurement near the pole in Lapland. I suspect my poor hearing combined with the guide’s accent and perhaps imperfect English, confused these measurements, though I still don’t know why Ecuador?

<sup>3</sup> The equator, Earth’s rotation, and Coriolis force have almost nothing to do with the direction of swirl, which is primarily determined by initial conditions, irregularities in the vessel and the *ice skater effect* of reducing inertia and conserving angular momentum as the water is moved in to the drain.

<sup>4</sup> A man weighing  $W = 150 \text{ lb}$  walking east or west at speed  $v = 5 \text{ ft/sec}$  at latitude  $\phi$  would feel a Coriolis force of  $2\Omega v(W/g)\phi = 2\{(2\pi \text{ rad})/[24 \text{ hr}(3600 \text{ sec/hr})]\}5 \text{ ft/sec}(150 \text{ lb}/32.2 \text{ ft/sec}^2)\phi = (3.4 \text{ milli-lb/rad})\phi$ . This is zero on the equator where latitude  $\phi = 0$ , and 0.06 milli-lb = 60 micro-lb if the man is at latitude  $\phi = 1^\circ$ , 60 nautical miles north or south of the equator. Coriolis force due to Earth’s rotation appears to be negligible to any consideration except large scale weather circulation patterns or observation of the stars.

<sup>5</sup> This writer’s knowledge of the subject was refreshed and enhanced by [http://en.wikipedia.org/wiki/Coriolis\\_effect](http://en.wikipedia.org/wiki/Coriolis_effect).

After visiting the equator and lunch we toured several architecturally significant and historical areas of the city, Independence Plaza, Iglesia de la Compania (Church of the Society of Jesus, which must have most of the gold in South America on its interior walls) Presidential Palace, La Basilica of the National Vow.

**Thursday, Dec 12, 13;** We took an AeroGal domestic flight from Quito through Guayaquil, Ecuador's largest city, to Baltra Island in the Galapagos. Then by bus and ferry to a private ranch in the middle of Isla Santa Cruz. Here we spent an hour learning about and seeing one specie of the Galapagos giant tortoises. These tortoises, though up to 400 kg, are smaller, than the sea turtles I saw (up to 800 kg actually laying eggs in the moon light in the hole they dough in the beach) 18 years ago in French Guinea [http://en.wikipedia.org/wiki/Leatherback\\_sea\\_turtle](http://en.wikipedia.org/wiki/Leatherback_sea_turtle) . No mention was made of their hibernation – what do the tourists do when they are hidden in hibernation? Then we drove to the south shore village of Port Ayora to board our 90 ft catamaran Archipell II. On a walk around the Darwin preserve we saw many of “the world's only marine iguanas” and the other main category of giant tortoise with the long neck and ability to reach the high hanging fruit. Oblivious of the 6 small sharks folks reported swimming around the boat last night, I took a 6 am swim on this Friday 13<sup>th</sup> morning. A short time later someone spotted a manta ray swimming about the boat with its two “horns” cruising above water like shark fins – these rays eat plankton only. On a trip ashore we found a beach with numerous green sea turtles, (the creatures that are attracting too many sharks out my front door on Maui), some on the beach and perhaps 15 in the shallow water near the beach. Also many sea lions and dozens of the small sting rays that rest on the beach sand just past the tide line. Walking with a shuffle to assure not stepping on them, there is negligible danger of a sting, even though the rays touch your feet and ankles.

Aside from the great excitement noted above! the Galapagos are pretty much fulfilling my expectations of “nothing much new.” We are going out twice a day in the dingy (panga) to a different beach to see many sea lions, a smaller variety than those prolific around Redondo beach, and some new birds that the ornithologists have declared unique to this locale – like blue footed boobies. The terrain is like Baja California on the north side of islands and like Bonaire or Catalina on the south side. The adventurers from the north express great excitement and take thousands of pictures. A high light, during the last day transit to Puerto Baquerizo Moreno we encountered the largest pod of bottle-nosed dolphins. *maybe 300*, I have ever seen. Nevertheless, the people are pleasant, both adventurers and boat staff, the weather and water are relatively warm for swimming and the food is far the best on this trip, our boat facilities are comfortable and adequate. We visited 5 islands, Baltra, Santa Cruz, Floreana, Espanola, San Cristobal. I tried in vain all week to arrange a SCUBA dive but failed, because we were never in proximity of a population center for long enough and there was no equipment on the Archipell II.

Cusco, Lima and Quito were much more *adventurous*. A couple mistakes I made: hiding two \$50 bills in my luggage while on the boat, where they disappeared forever, and running up a \$70 data bill on my phone though I never knowingly used it for anything but taking pictures!

**Tuesday, Dec 17, 13;** Homeward bound.

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