

THE TRAVELOGUE OF AN ASTRONOMER

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Roughly 3 million years back, a series of volcanic eruptions raised a huge mass of land to a height of over 3000 meters. The primary volcano lost its fight to gravity and eventually collapsed 500,000 years ago to form a huge caldera. Today this is the the most dominant feature on the island of La Palma in the Spanish Canary islands, located in the Atlantic Ocean off the coast of Morocco. The rim of the caldera is now populated with instruments designed to answer some of humanity's most profound questions about our place in the universe. Three million years of landscaping has provided astronomers an ideal place to gaze at the heavens.

I was awarded 4 nights to use the 2.5 meter Isaac Newton Telescope, one of the ten telescopes located at La Palma. The size denotes the diameter of the main mirror of the telescope; the bigger the mirror the more powerful is the telescope. The 10 meter Keck telescope is the largest in the world and is located in Hawaii.

My journey started from Amherst, Massachusetts. I packed my observing notebook in my backpack with other travel essentials, and just like my passport and my toothbrush, I was not going to let it separate from me at any cost. In order to get to La Palma, I had to fly first from Boston to Madrid, then from Madrid to the island of Tenerife, and finally on a small propeller plane to La Palma. Observatories are usually located in such remote and exotic locations because astronomers look for places that have little or no light pollution, are high-up on the mountain and also close to the ocean. The tall peaks of the mountains provide the necessary dry conditions and the ocean smooths the air that, as a result, improves the quality of the pictures taken through the telescope. Thus, volcanic islands, like La Palma and Hawaii, are some of the world's best locations for astronomy and provide astronomers an excuse to visit these visually stunning places.

I was expecting Tenerife to be a small sleepy island geared solely for entertaining tourists from western Europe. While tourism is indeed one of its main industries, Tenerife turned out to be a busy port with a population of over half a million. I stayed in a small university town, La Laguna, located roughly 6 km from the capital city of Santa Cruz. It was in Santa Cruz I learnt that, despite its remote location, Tenerife has played its role in history. The legendary British naval officer, Lord Nelson (1758-1805) or better known as Horatio Nelson, lost his arm in the battle for Tenerife in 1797. The guilty cannon has been preserved and is now one of the tourist attractions on the island. Horatio Nelson survived the cannon shot, but died at the hands of a French sniper in the battle of Trafalgar in 1805. I don't know what happened to the rifle of the sniper, but the Trafalgar Square in London can be seen as a memorial to the war achievements of Lord Nelson.

Tenerife also has a footnote in relatively recent Spanish history. General Franco, who was in exile on the island, flew from Tenerife to take control of Spanish troops in Morocco, an event that started the bloody Spanish civil war in 1936 leading ultimately to the Fascist victory in 1939.

After staying overnight in Tenerife, I flew to La Palma on a small plane that braved the winds of the Atlantic ocean. Even though the flight lasted only 20 minutes, the turbulence made it seem much longer. Perhaps this is the only occasion when I not only paid attention to the instructions given by the air-hostess regarding life-jackets, but also read additional material on plane safety and escape routes. At the La Palma airport I was

relieved to see a smiling taxi driver holding a sign of the telescope with my name on it.

La Palma is a small island with a population of roughly 80,000. This volcanic island is the youngest amongst the Canary islands and is still geologically active. I don't think I felt completely reassured to know that the last major volcanic eruption on the island occurred in 1971. The landscape of the island is dominated by the Caldera of Taburiente, formed by the collapse of the primary volcano. The rim of the caldera, roughly 10,000 feet above sea level, was my destination. The road up the mountain had endless twists and turns and the landscape changed dramatically in the hour long drive from the airport to the observatory. The sight and sound of waves crashing on the beach gave way to our passage through a forest of dense pine trees leading up to an almost barren top. Reflection of sunlight from one of the telescope domes provided the first greeting from the observatory. The secrets of the night sky seemed safely hidden in the stunningly beautiful dark blue sky.

The taxi dropped me at the residential area for astronomers which is like a small hostel with a cafeteria. My telescope was located a few kilometers away but I could see its shimmering dome from the window of my room. I was given keys to a car and my first afternoon was spent checking instruments at the telescope. Everything was ready now. All I had to do was wait for the Sun to go down.

Meal times at observatories are dictated by the Sun. Dinner is usually served 2 hours before the sunset. Fish was on the menu for the first night. I got my plate and looked for a table with english conversation; this is usually the table of astronomers. It is exciting to meet astronomers from all over the world and to learn about their research. The astronomer sitting next to me had flown from England and was working on galaxies that formed when our universe was "only" a billion years old. A Dutch astronomer was searching for exploding stars in nearby galaxies, while giant eruptions from stars was the interest of another. The conversation at dinner ranged from the latest science results to politics and local culture. Now we were all ready to go to our respective telescopes.

After dinner I waited outside for the sky to get dark. My mind wandered off about the indigenous people that lived here several centuries ago and how they would have looked at the sky. La Palma (and the other Canary islands) were first settled by native Canarians, called Gaunches, whose origin is still controversial. Gaunches are now extinct, but are thought to be an offshoot of the race of Berbers from northern Africa. The Spanish conquest of the Canary islands began in 1402 and went on until 1496. Despite having enormous technological advantage, the Spanish Conquistadors faced stiff resistance from the natives, in particular from legendary Tanausu, who ruled the Kingdom of Acero on the island of La Palma. Tanausu fought from the base of the Caldera and was finally defeated with treachery in 1493. The sight of a majestic sunset brought me back to the present. Earth's rotation was taking the rays of the Sun away from the Earth. A layer of clouds could be seen covering the ocean below us. Like the eyes of a giant but curious beast, I could see the slits of the neighboring telescope domes open up.

I pointed my telescope first at a galaxy named NGC 210, the two hundred and tenth object in the New General Catalogue of galaxies. Apart from a few nearby galaxies, most galaxies have numerical numbers assigned to them. Still, that does not take away the majesty of an individual galaxy containing roughly a hundred billion stars. I was looking for birth places of stars in some of these galaxies. My journey to the Canary islands took only two days from Massachusetts, but in the case of NGC 210, the light photons hitting the mirror of the telescope started their journey 17 million years ago. The light has taken so long to get to us that some of the stars are probably already dead and we are only getting the story of their birth. After taking several images of NGC 210, I turned my

attention to NGC 660 followed by other galaxies.

The night goes smoothly, and my work is interrupted only by the increasing brightness of the sky due to dawn. I close off the telescope dome and walk outside to look at the caldera. Inside the Caldera stands the monolith Idafe, an altar for the original indigenous people to worship their god Abora, surrounded by a vast amphitheater of mountains. I could not help but wonder if telescopes are the new altars for humanity helping us uncover the secrets of our own origin.

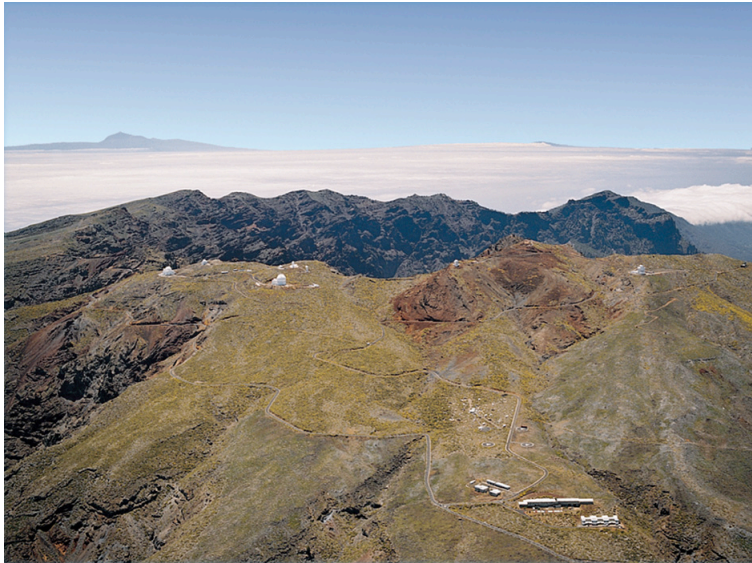


Figure 1 Top of the World: Telescopes on the rim of the caldera on La Palma. The residential area of the astronomers is in the lower-right corner of the picture. The clouds are covering the ocean underneath and the two peaks in the background are volcanoes on two neighboring islands. (Photo courtesy of the Isaac Newton Group of Telescopes, La Palma)



Figure 2 Clear blue sky above La Palma. (Photo courtesy of the Isaac Newton Group of Telescopes, La Palma)