In the Middle of Chile's Earthquake

- By Ramón Bannister

When the huge earthquake of 8.8 on the Richter scale took place in Chile near the city of Concepción, the media reported it having been 500 times more intense than the one in Haiti. There was ample video and photographic evidence, at least 1-2 days after the incident, of the destruction the earthquake caused. Journalists were quick to label this one of the biggest seismic events in recorded human history. They coupled that with first-hand accounts of the destruction, and played back videos of the actual earthquake recorded by security cameras.

For all of the media coverage allotted to the Chilean earthquake, something was missing. I've always wondered what it would be like to be in the middle of it. It's one thing to see shocked people yelling and screaming. It's another story to talk to someone after emotions have had a chance to settle.

I have family in Chile, so one can say I was indirectly affected. I had someone give me a glimpse of what it was like to wake up to the beast. I have experienced small tremors before, so I know what it's like – but I haven't had the misfortune of being in the middle of a full-blown earthquake.

Earthquake tremors are scary. I remember waking up to some minor ones in the middle of the night back in 2002 in Chile. Every time I go I feel one. I felt it in 2006, and again in 2008. It's disconcerting, discombobulating. You think the ground underneath you is solid, and then it moves like you're standing on an elephant. Sort of redefines the fear of flying. Flying as a passenger can also be scary, especially when there's lots of turbulence. And when I get back to solid ground I feel like kneeling down and kissing it! But not so fast: is the ground as solid as you think? Not really. Waking up to tremors is not unlike riding a boat in the ocean. As the waves move, you move too. But whereas you expect the ocean waves, you don't expect solid rock to move like water! And you hear strange noises…as a family member of mine explained the day after the Chilean earthquake of a few weeks ago:

> "I've been awake on other occasions, before the tremor from last night. You start hearing some subterranean noises, and the dogs start barking because it hurts their ears. Before a tremor begins, and I have heard the noise, about 30 seconds before, I tell myself: 'There's going to be a tremor.' If it's slow, I stay calm until it ends and I then turn on the television or radio to see what they say.
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> "In the earthquake of 1985, I took my daughter in my arms, since she was 2 years old, and I stood under the front door frame, which is the safest place. The dividing wall of the house moved like a snake in a very obvious way, and I thought it was going to break. I

held onto my daughter tightly, thinking that at least she would survive, because evidently I was going to be smashed. To this day I don't understand how the wall did not break.

"In that same earthquake [of 1985], a friend of mine told me that he was in the middle of a field, and that the ground thundered. He thought it was the end of the world. Looking at the field, he saw that the land moved like the waves of the ocean."

He then begins talking about the recent earthquake.

"I already told you about last night. At a particular moment it looked like the building would fall, and I was about to go outside despite not being clothed. I told you about the rattling, that it went on and on and didn't stop. On the contrary, it intensified. I was able to walk, with difficulty, due to the fact that in the beginning the movement was forward and backward, and then changed to left and right.

"The building waivered forward and backward, and I heard the noises of the houses falling to the ground. 8 hours after the earthquake, I still could not communicate with my two sons in Valdivia.

"People from the building did not want to return to their apartments, so they stayed in the first floor entrance, wrapped in blankets or sleeping bags, or just their plain clothes, some 15 people. The electricity and water was shut off. We didn't have light, television or radio, so we went down to our car to listen to the news, at approximately 4:00 AM. There, I fell asleep and woke up at 6:30 AM, freezing. I returned to my apartment, which still didn't have electricity, water, or news. Around that time came the first after shock, about 3.0 on the Richter scale, small for us.

"We felt many aftershocks, around 8:30 AM, at 12:00 PM and the third at 3:00 PM, which was much stronger. There were many more, but weaker and not felt in Santiago.

"Homes in the fields, near Rancagua, collapsed. Where there used to homes, now you can see to the other side because everything fell to the ground. They are homes made out of adobe. "In Cauquenes, a very long bridge fell, which connected the Southern sector with the center of the city. The people on the other side became isolated."

Being a sort of mathematician, he dealt with the horror of the earthquake by analyzing, calculating, and explaining its strength.

> "The three drawers of my desk on top of which I am writing, which faces North, opened due to the telluric movements. The top drawer opened by 4.5 cm; the second one by 17 cm; and the bottom one by 24 cm. A few things fell from bookcases, but not many."

He went a little deeper in his math. He directly contradicts calculations reported by all other media outlets, which state that the earthquake in Chile was 500 times stronger than Haiti. Note:

> "The earthquake was 30 times stronger than the one in Haiti. The intensity was 8.8 degrees on the Richter scale, as stated on the television. The intensity of the one in Haiti was 7.3 degrees. Since the Richter scale corresponds with a logarithm of base 10 of the free energy of the earthquake, the relationship of energy freed in both earthquakes is equal to 6.31 x 10,000,000 / 2 X 1,000,000 = 31.6.
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> "You'll see that the calculation is easier:
> Log A – Log B = Log A/B
> 8.8 – 7.3 = 1.5
> Antilog 1.5 = 31.6

I questioned him further about his calculation. I told him that everyone else is saying that the Chilean 8.8 earthquake was 500 times more powerful than Haiti's 7.3 earthquake. He disagreed:

> "What the Richter scale measures is the free seismic energy - not the actual energy, but its logarithm in base 10. Consequently, an earthquake of 4 degrees has 10 times more energy than an earthquake of 3 degrees, and one of 5 degrees has 10 times more energy than one of 4 degrees. That is, an earthquake of 5 degrees has 100 times more energy that one of 3 degrees. "From 7.0 to 8.0 the freed energy grows by 10 times. From 8.0 to 9.0 it grows by 10 times again. So, from 7.0 to 9.0 it would be a difference of energy by 100 times. Therefore, from 7.3 to 8.8 there has to be an energy difference of less than 100 times. That means that the Chilean earthquake could not have been 500 times more powerful.
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> "The Richter scale does not measure the seismic amplitude, but rather it is proportional to the amplitude at 100 Km of the distance divided by the cube of the difference of time between the primary and secondary waves. The primary waves are faster and move the ground forward and backward. The secondary waves move up and down. Finally, the superficial waves come which cause the most damage."

In the end, I have family in Talca, which was near the epicenter, who lost their home. Some received minor injuries. But they all survived. It was interesting that Facebook became the communication means of choice. Family members got on each other's Facebook walls and wrote

messages similar to this one: “I haven't heard from you! Are you ok?!!!!!” One hour later would be the response. “I'm ok. Have you heard from our brother?” This communication continued for a few days.

As you can imagine, the situation is still complicated in Chile. Most interesting to me is that some complain about the lack of oversight for building codes. For example, most of the buildings that had heavy damage were newly constructed with modern technology and techniques. With some exceptions, it was the older buildings that survived, not the new ones. I asked myself the obvious question: why? Simple. The old buildings were built to be much stronger and compensate for tremors and major earthquakes. After all, Chile has had earthquakes since the beginning of modern civilization, so societies have developed the know-how to construct buildings that wouldn't fall during seismic events.

Though I was not able to confirm the validity of the following information, I think it is important to relay what people have said. In modern Chile, I was told that contractors are not required to get the architectural plans inspected by the city governments. Though the city does have to give final approval, it seems that, according to my source who relayed this information to me through Facebook, the city does not inspect the plans for meeting code. All the city approval does is confirm that the plans exist.

Chile will undoubtedly bounce back from this disaster. But that will take some time, considering that strong aftershocks are still being reported, such as the one on March 11 during the inauguration of the new President, Mr. Sebastian Piñera.