

Sunday May 26, 2013

Weightlessness has consequences

By Jim Taylor

The day after returning from five months of weightlessness in the International Space Station, astronaut Chris Hadfield commented on the effect of gravity on his lips and tongue when he tried to speak.

You and I never notice that gravity affects our lips. We never notice that our tongues have weight. And that we have to overcome that weight, that inertia, every time we move any part of our bodies.

We treat gravity as if it weren't there.

I'm fascinated by this realization, at least partly because of my own recent re-acquaintance with the power of gravity when I fell off a garden wall and smashed my elbow.

Okay, I experienced less than a second of weightlessness; Hadfield had five months. I travelled just over two metres; Hadfield covered about 67 million km. At 27,700 km/hr. Even at my maximum freefall, I didn't exceed 30 km/hr.

Despite those obvious differences, it will take both of us around six months to recover fully.

Mimicking the process of aging

Weightlessness, it turns out, has serious consequences.

Because there's minimal stress on an astronaut's weight-bearing bones, they don't bother renewing themselves. According to Raffi Kuyumjian, the chief medical officer of the Canadian Space Agency, Hadfield's "hip and back bones are not as dense as before his flight, since they lost calcium in weightlessness."

Astronauts can lose two per cent of bone mass every month in a weightless environment; it takes inactive elderly people a year to lose as much.

"This is similar to but not as severe as the osteoporosis that affects the elderly," noted Kuyumjian. "Chris will likely regain most of that bone density loss in about a year."

While in the Space Station, Hadfield delighted thousands by his agility at moving around in a weightless environment. He glided like a fish zooming through water. He twirled like a Cirque du Soleil gymnast.

Now, back on earth, he has to re-adjust. He shuffles when he walks. He may have dizzy spells. He has sore joints. His back hurts. He has difficulty navigating corners. He may bump into things. His eyesight isn't as good as it was.

If that sounds a lot like what many elderly people already experience, you're right. One of the things we're discovering about extended periods of weightlessness is that it accelerates the process of aging.

Bodily breakdown

Reduced activity and weightlessness both have similar effects. Muscles weaken and atrophy. Blood pressure changes. Eyesight alters. Tissues grow puffy – although for different reasons. On earth, ankles and legs get puffy because excess fluid accumulates in sedentary lower limbs; in space, with no gravity dragging fluids downward, heads and faces grow puffy instead.

These physical complications may mean that any attempt to send humans to Mars, or beyond, has to be a one-way ticket. After 18 months in a weightless environment, humans might not be capable of surviving a return trip to earthly gravity. They might even find themselves too weakened to cope with Mars' lesser gravity.

In a strange sort of way, we owe everything that we are to gravity. Simply because gravity constantly stresses every part of our waking bodies, we develop stronger bones, stronger muscles, better balance and navigation systems.

The greatest challenge for newborn babies may not be learning to breathe this strange stuff called air, but learning to use muscles against this constant and irresistible force called gravity.

Both friend and enemy

Without gravity, cars could not stick to roads. Rain would not fall. Lakes would not stay put in valley bottoms. When Steve Nash makes a jump shot on the basketball court, the ball would not arc down into the basket; it would soar straight up into the rafters. Of course, so would Steve.

But then, without gravity, there would be no Steve Nash anyway, because the air that he breathes would disperse into space. The planet we live on would not be held in orbit around the sun. The sun would have no nuclear furnace generating light and heat.

We are, all of us, indebted to gravity.

Paradoxically, gravity is both our friend and, as rock climbers and sky divers can attest, our enemy. Gravity is unforgiving whether you lose your footing on a mountain cliff or on a garden wall.

That sounds like a contradiction, but it's not.

In High School, I remember, we studied a 1942 poem by Earle Birney. "David" told of a mountain climber who slipped and fell. He landed, impaled on a spike of rock, on a ledge above a sheer cliff. His climbing partner faced agonizing alternatives. To stay with David while he died of his injuries. To leave him in a desperate attempt to bring help back before he died. Or to do as David asked, to push him over the edge and let gravity complete its job.

For David, gravity was both merciless, and merciful.

Chris Hadfield and I are fortunate. We've been enabled to rediscover something special that we had taken for granted.

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YOUR TURN

Not surprisingly, last week's no-column mailing didn't generate a lot of mail. However I did get one valuable letter, about how spam and phishing works, from Judyth Mermelstein. I hope you find this informative.

Judyth wrote, "You are right about spammers using Web spiders to collect e-mail addresses, but there is another way a person's legitimate address can appear as the sender of messages they didn't send besides that and actively hacking into the e-mail account.

"It's called 'spoofing' and it's pretty common. The software that enables one to put a different address in the From:, Reply-to: and other fields in a message has been around for over a decade, and the means of doing it can be a built-in or add-on with e-mail clients like the Thunderbird I use.

"People don't need to have their addresses on Web sites to be spoofed, either. For at least a decade, there has been Windows malware that collects e-mail addresses from files on infected computers and 'phones home' with the lists. The malware creator can use those lists in many ways, including selling them to other spammers and scammers at something like a penny a name.

"Most users have no idea what their software allows people to run in the background, and literally millions of Windows users have all kinds of malicious software on their machines (for want of good, regularly updated

protection), not to mention an operating system that makes it easier for people who make using the Internet so insecure. Microsoft is ***finally*** starting to take security a bit more seriously but once-a-month hole-patching is no protection against malware that runs using ActiveX controls, javascripts, Java, Flash, and such in people's browsers.

"Internet Explorer 10 is better than its predecessors but both Chrome and Firefox are still better choices since they let users use add-ins like NoScript, Flashblock and many more to control what is allowed to run in the background, and make it easy to set things up to work more securely. I dare say most people don't want to spend hours learning about these things (I certainly didn't!) but it is easier nowadays to find preventive measures one can use without understanding all the details.

"It's a sad thing that what was once a safer and friendlier place has been so largely co-opted by greed and predation on the unwary. It's even sadder that so much of such behaviour is completely beyond the user's control.

"Though we can't stop 'spoofing' as individuals, there are things people can do to keep the Web spiders from finding their addresses. That's why on some sites there is no "mailto:" link. Instead, there may be a line like 'e-mail me at John AT Doe DOT com' or a Web form that sends the message without revealing the destination address. It's probably too late for that to help you or me, but it might help somebody else."

TECHNICAL STUFF

This column comes to you using the electronic facilities of Woodlakebooks.com.

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You can access several years of archived columns at <http://edges.Canadahomepage.net>.

I write a second column each Wednesday, called Soft Edges, which deals somewhat more gently with issues of life and faith. To sign up for Soft Edges, write to me directly, at the address above, or send a note to softedges-subscribe@quixotic.ca

PROMOTION STUFF...

If you know someone else who might like to receive this column regularly via e-mail, send a request to jimt@quixotic.ca. Or, if you wish, forward them a copy of this column. But please put your name on it, so they don't think I'm sending out spam.

For other sources worth pursuing, try

- Ralph Milton's HymnSight webpage, <http://www.hymnsight.ca>, with a vast gallery of photos you can use to enhance the appearance of the visual images you project for liturgical use (prayers, responses, hymn verses, etc.)
- David Keating's "SeemslkeGod" page, www.seemslkegod.org;
- Alan Reynold's weekly musings, punningly titled "Reynolds Rap" -- reynoldsrap@shaw.ca
- Isobel Gibson's thoughtful and well-written blog, www.traditionaliconoclast.com
- Wayne Irwin's "Churchweb Canada," an inexpensive service for any congregation wanting to develop a web presence, with free consultation. <http://www.churchwebcanada.ca>
- Alva Wood's satiric stories about incompetent bureaucrats and prejudiced attitudes in a small town are not particularly religious, but they are fun; write alvawood@gmail.com to get onto her mailing list.
