

# Moonrise: August 27, 2016

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Author's notes to audience

I presented a piece to Anoo's class (led by Bart) last night 4 Aug 2015. I learned than non-technical people have no idea of the beauty of technical things. I was talking about my first moonrise and I brought in Telstar, the first peaceful space launch, which was fried by atom bomb testing in outer space. I cried as I talked about Telstar. No-one could understand why I cried about an object. The technical people had offered the world a dove and the US and Russia blasted it with a shotgun. No-one saw the irony. This was a little disappointing. It means that most people have little idea what's happened since the industrial revolution. An iPad is just a box to them.

Aug 2016

After listening to "America" by Simon and Garfunkel for most of the evening (after seeing Mike Meyer's acappella group perform it last night at the Blue Note Grill) I realised that this piece should be lighter, sketchier, like the phrases in "America" so people have to work out what really happened. People should not be overwhelmed with details. I don't know if I can do it.

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15mins

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3 mins Moonrise ... (wait 2 beats, look at audience)

I was driving home late one night (10 Dec 2014, 9:30pm, after Anoo's VIF class) and swung into a long straight stretch of freeway. There, down at the far end of the freeway, on the horizon, against the black sky, the orange waning gibbous moon had just risen. It

was only a degree above the horizon (about two moon diameters). It was exactly aligned with the freeway. I was headed straight for it.

The terminator was tilted 45deg to my horizontal and vertical frame of reference, a frame of reference derived from the earth's gravity. I saw that my frame of reference only applied locally and was not special or unique. I was reminded that there were other equally valid frames of reference in view. Because of the gibbous phase, the moon looked elliptical, squashed, a prolate spheroid. It looked like an orange (american/rugby) football in the sky inclined at 45 degrees to the horizon.

With it dark outside, and wrapped in a jacket inside the still cold car, I felt like an astronaut in a spacesuit in a sealed spacecraft. I was alone and heading towards the distant and unmoving moon. Soon I would be rotating my frame of reference, as I entered the moon's gravitational field. The only visual changes in the blackness were the flashes as the grey bridge overpasses intermittantly zipped past me and the lane marker stripes running under my headlights, locked up on the navigational markers on my green and red glowing dashboard.

Straight down the freeway, the tilted orange waning gibbous moon hung in the sky, just above the horizon, a beckoning lunar lintel on a Stonehenge trilithon, at the end of an interplanetary glide path.

It was an alien view of the moon, a view I hadn't seen before. When else am I out at the rising of the waning gibbous moon? Outside my spacecraft, it was cold and clear. The stars sparkled against the blackness. Jupiter shone brightly in the north-east. When I'm alone in a cold and dark environment like this, it's hard to imagine

such a hostile environment can be anywhere on earth.

Straight after WWII, the world returned to peaceful pursuits for the betterment of the planet. To many, the next goal for humanity, was the exploration of outer space and the solar system.

(Put out art. Set it up. Make sure it's safe. Do not speak till it's setup.)

In the 1950's, long before the launch of sputnik, space enthusiasts were electrified by the photorealistic paintings of Chesley Bonestell. This painting is of Saturn from it's largest moon Titan, and this painting is of Saturn from the small and innermost moon Mimas. Mimas orbits Saturn in the plane of Saturn's equator, and always sees the rings exactly on edge. Titan's orbit is inclined to Saturn's equator, so sometimes Titan looks down onto the rings and sometimes it views them from below.

Bonestell's art depicted places in the solar system that no-one had yet visited, places whose appearance we could only imagine, places I expected some of us would visit in my lifetime.

I planned to be one of the visitors, or to play a part in getting there.

Here I am 50yrs later; I still think I'm going to Saturn. In the isolated environment of my cold and dark spaceship, I'm transported to Jupiter or Saturn, to the same cold and dark places I had visited as a kid through Bonestell's paintings, to the places I knew humanity must go, if we were to be worthy of the planet and our 4G5yr heritage here on earth.

(look with google)

(show

<http://www.bonestell.org/Images/Slideshow/Slideshow10.jpg>,

[http://www.gavinrothery.com/storage/BONESTSATURN.jpg?  
\\_\\_SQUARESPACE\\_CACHEVERSION=1327068805827,](http://www.gavinrothery.com/storage/BONESTSATURN.jpg?__SQUARESPACE_CACHEVERSION=1327068805827)  
[http://www.gavinrothery.com/storage/saturn-moon\\_Bonestell.jpg?  
\\_\\_SQUARESPACE\\_CACHEVERSION=1327069132109\)](http://www.gavinrothery.com/storage/saturn-moon_Bonestell.jpg?__SQUARESPACE_CACHEVERSION=1327069132109)

In these cold and dark moments, I'm one of these visitors, standing on the surface of Saturn's largest moon, on an icy and craggy Titan, watching the rising of Saturn, between the gaps in the ice pillars.

But that night, in my cold and dark spacecraft, I wasn't going to Saturn. I wasn't going home. I was making an unscheduled high speed solo run, at short notice. I was headed back to the moon.

3 mins

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I want you imagine yourself as a 13yr old in the early 60's when I was growing up.

The Berlin Wall went up in 1961, completing the Iron Curtain dividing east and western Europe.

The Cuban Missile Crisis of 1962 brought the world to the brink of nuclear war. My whole school assembled to pray.

Your main supply of news was via the morning paper.

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0 mins (3mins)

Unless you track the moon, you don't know when it's going to rise. When you do see a moonrise, it's usually unexpected. Moonrise is always special for me, perhaps because it's unexpected and I see it so rarely and perhaps because I still remember my first moonrise.

I was in 7th or 8th grade. I was walking home from school. It was shortly after sunset. The sky was darkening, but still blue.

As I walked home, instead of the expected continuing darkening of the sky in the east, the sky there was brightening, as if the headlights of a huge car were looming over the horizon. I realised that the brightening on the horizon heralded a moonrise. I had never seen a moonrise. If I stopped to watch, I would see the moon coming through the horizon. At the speed of the earth's rotation, it would only take 2 minutes for the moon to rise through the horizon. I would be home in time for dinner and wouldn't have to explain my lateness.

I had been interested in astronomy, electronics and science, since grade school. I could identify the planets and constellations. I could navigate by the stars. I had seen several lunar eclipses, but didn't know why the moon became red. (I didn't understand the reddening till I was an adult).

I was one of the three high school students in the state with a ham radio license. For a teenager, there could be nothing more exciting than having your house strung with long antennas, using radio gear you designed and built yourself, staying up till 3am, when the band would open allowing you to talk to a person in a some far off and romantic place, a place that you could not possibly visit in your lifetime. I was one of the few people in the country to do this. I had the keys to contacting people anywhere in the world.

My grandfather lived in the US. Communication with loved ones was by letter. Travel was by ship. When someone left for overseas, they literally did go overseas, on a boat, and they didn't return for years, if at all. A transoceanic phone call was booked days ahead and was very expensive. When your time came, the operator called and put you on hold. You sat by the phone for what could be an hour. The operator would come on periodically saying "the line isn't

free yet". You continued to wait, till eventually you were connected through.

News came by teletype over undersea copper cables. Photos came by radio facsimile. When the era of the modern jetliner arrived, you'd hear the news from overseas on the day it happened, and two days later the film would arrive by plane, and you'd see the movie version of the same news two days later.

Humankind had gone into space and was exploring the solar system. The space probe Ranger had been deliberately crashed onto the moon, sending back black and white television frames to earth, till the instant of its destruction.

<http://nssdc.gsfc.nasa.gov/planetary/lunar/ranger.html>  
(show Ranger\_199.jpg).

I had a picture of this last frame on my wall, cut from a magazine. It was taken at a slant range of 6km, with the calibration lines 600m apart. You can see from the noise at the bottom of the frame, that the transmission stopped before the last of the frame was sent back to earth. This picture is a close up of our nearest neighbour in the solar system, our first steps away from earth.

Starting in 1957, the US and Russia had engaged in a contest in space, for the hearts and minds of the world. But space was only being used for military launches or for "scientific" purposes that never seemed to be published. As well, the US and Russia were testing nuclear weapons in space, in the atmosphere, underground, underwater, anywhere and everywhere, so that we could sleep peacefully at night.

Then 5 yrs later, in 1962, Telstar, the first communications satellite, was launched. It was a private venture, the first space launch

for the people of earth.

(Show wikipedia photos of Telstar, the Arthur dish at Goonhilly Downs and the horn at Andover ME).

Telstar heralded an era when no longer were transoceanic phone calls booked days ahead. Soon you would be able to direct-dial overseas. News was now realtime. You'd see the newsreel on TV along with the story, the day it happened and not two days later.

The world celebrated the arrival of Telstar. A tune and later words to the tune were written, Both the instrumental version and song made it to the top of the hit charts around the world. It was the technical age and I wanted my place in it.

Telstar relayed 400 phone calls, faxes and television transmissions before going silent. I didn't know what had happened to Telstar. All I knew was that one day I didn't see any images or stories via Telstar on the evening news. I didn't find out what had happened to Telstar till the arrival of wikipedia, 50yrs later. Telstar had been fried by multiple nuclear explosions in space, explosions that were required to make our lives safe. The engineers managed to restore partial functionality to Telstar after each blast, but Telstar finally died 6months later. Telstar, the first peaceful space launch, had not been designed to survive atom bombs. The technical people had offered a dove to the world. The US and Russia had blasted the dove with a shotgun. It was all covered up. The technical people knew to cooperate with the thugs running the world. They were dependant on military rockets for their launches. So the technical people kept quiet and for 50yrs, no-one found out what had happened to Telstar.

Telstar is still up there 50yrs later. It's still in its original orbit, but the Telstar up there is dead.

Later, when Early Bird, the next communication satellite, a geosynchronous satellite, was launched, I was able to look up into the sky, amongst the stars, to the spot where it was located and know that up there was a satellite, linking people to their grandfathers in far away places.

Back then, science and rational thinking only explained a small fraction of the world. Just about everything was explained by "that's the way it is" and "because I said so". Science and rational thinking only applied in areas that weren't of interest to the people who said "that's the way it is" or "because I said so". The amount of understanding that came from science and rational thinking was so small, that a normal person could live a full and happy life without knowing any of it. If ever I doubted this obvious truth, my mother would remind me that she was a living example.

I'd accepted that much of the world wasn't explainable and would never be explained. Why? "that's the way it is".

Science was only allowed to tread carefully into areas not already claimed by "that's the way it is". Sometimes science would blunder into a new and completely empty area, only to suddenly have the "that's the way it is" people loudly exclaim that they owned it. You found that they always had owned it, even though they'd never once said a word about it. Science had to be careful and always exited such situations with an apologetic "excuse me".

I was told that after rain, God showed a rainbow. He did that to let us know that he loved us so much, that he'd never again send a flood like the great flood that beset Noah, a man whose actions had preserved all extant life forms.

I later found out that that a rainbow could be explained by the



optically dispersive properties of raindrops, but I had to be careful who I talked to about it.

It's taken a lifetime of working as a scientist to realise that there's an explanation for everything, even if we don't know it right now. This understanding didn't come overnight. It was hard won. I had to fight for it, for each new area of understanding, one piece of information at a time. Now if someone says "that's the way it is", I know they're lying to me, to get an advantage. But this is only new; I haven't always understood what they were doing to me.

Back then, the moon had been rising since time immemorial. There was nothing to explain about it. The moon just rose. It always had and always will. There was nothing remarkable about it. If there had been, someone would have told me so. That's the way it is. I expected a beautiful, but otherwise unremarkable, rising of a white moon against dark blue sky.

I had time to see the moonrise. I stopped and watched. The horizon brightened as it does for sunrise. Spectacularly, the sky lit up as the moon rose through the horizon and then silhouetted the trees. There it was, my very first moonrise. From its outline through the trees, to my delight, I saw the moon was full.

However, as the moon cleared the trees, I was horrified to see that the moon was orange. I had never seen or heard of an orange moon. It stayed orange well after it cleared the trees.

I knew what it was straight away; it was the end of the earth. I knew that this was going to happen someday, I just didn't know how it would happen, or if it would happen in my lifetime.

Something horrible was happening to the earth, but what? The whole of the surface of the earth would have to be in flames for it

to be reflected in the moon. But there were no other signs of alarm; no earthquakes, no conflagrations, no-one running around screaming "the end of the earth is here, turn on the radio to listen to the govt's plan telling you what to do".

What to do? How much time did I have? I looked around. An adult walked past as if everything was normal. He didn't even look up at the moon, though I was staring straight at it. A normal person would have stopped to look at the beauty of the full moon, grazing the tops of the trees, just above the horizon, even if he didn't understand that it signalled the start of the apocalypse. Adults were useless. I would have to handle this myself.

Was the earth disintegrating from a inter-planetary impact, that no-one had foreseen? Had the sun suddenly increased in temperature just after it set, triggering raging fires on the side of the earth facing the sun. I would die without ever understanding what had happened.

All I can say is thank goodness for the church. They were the only people who'd prepared me for this. They told me of the coming of the end of the earth. Well, of course, I did as I was told. My heart was pure and I loved Jesus.

Every night I kneeled by my bed and thanked the Lord for my blessings. I was white, I lived in Australia, a protestant country. The country was prosperous, thanks to the diligent efforts of our sort of people, to make sure that the Labor party, the party of the dreadful working class and the catholics, had been kept out of power for decades.

It wasn't just a one-way street. God showed that he recognised the virtues of our sort of people, and because we were white and protestant, he had never allowed our country to be invaded. Dur-

ing WWII he had answered our prayers and prevented the heathen Japanese from invading Australia. God's intervention confirmed that our sort of people were amongst God's chosen.

My blessings were manifold.

God was looking out for me. He had specifically chosen my mother, to manage and educate the willful boy that I was. When I learned humility and understood my place in life, my mother would teach me all I needed to know about my soul. It was a difficult task.

As we all know, every generation has its war. If I was lucky, mine would come when I was young. Then I would return a hero and as a reward for my valour, get my pick of a bride, just as my father had. My mother was praying for an early war on my behalf. I wanted so much to be a hero like my father and uncle. I wanted my father, now in heaven and sitting at the right hand of God and watching my every move, to see that I was being a good boy for my mother to be proud of me. I couldn't imagine how I'd measure up. What would I do in a hail of machine gun fire?

If worst came to worst, and my promised war didn't come till mid-adulthood or later, I needed a career to provide status, while I was awaiting my chance to prove my valour. God had prepared for this and had chosen that I would be a medical doctor. I still would be assured of my pick of a suitable bride, one of our sort of people. As the town doctor, I would be friends with the mayor and the banker, and she would be friends with the mayor's wife and the banker's wife. We would all play tennis together, while we waited patiently for God to deliver our righteous war.

I asked my mother to send me to the best academic school in Sydney, so I could become a scientist. I wanted to make the world

a better place. My mother mocked my foolishness. I was so stupid, would be lucky to graduate from high school.

Instead, I needed toughening up. I needed someone to make a man out of me. She sent me to a christian military school. It was the most expensive private school in Sydney. Possibly it was the most expensive private school in Australia. I learned to be with OUR sort of people. I learned to play Rugby. I was confirmed. I learned discipline; I marched up and down in formation for hours carrying a rifle. I became a soldier for God. I willingly shouldered the responsibility of doing God's work; killing people. I learned that all that was good in our society, order, culture, respect, stemmed from the British Royal Family. They made a man out of me. This school was a much better choice for my education, than the one I, as a foolish 6th grader, had wanted.

But now I was looking at the orange moon. I realised with dread that no-one had ever checked whether my heart was pure or if I loved Jesus enough. You just had to keep doing it over and over, without ever knowing whether you'd done it properly. What if I'd done it all wrong, all this time, and all my efforts had been for nothing? What if at the moment of destruction of the earth, I would be found wanting?

Neither had they told me what to do when the actual moment arrived. Still, as unprepared as I was, the church was the only one that had made an honest effort to ready me for this event, this event which they'd foretold and which was now was playing out all around the earth. They were the only ones who cared.

I watched the moon paralysed. There wasn't anyone I could tell about the unfolding disaster. I couldn't talk to my mother. She

would laugh at my worries, giving an explanation that was the Word Of God, while all around me the earth was being destroyed, by a collision with another planet, an event my mother wouldn't notice. It would be more important to her that I tidy my room and comb my hair in time for dinner.

I walked home, warily watching for a wall of flame, which could come from any direction, at any moment. I turned on the radio. All appeared normal. The announcer clearly wasn't aware of the orange moon, and was pumping out the usual good cheer and advertisements. Inside my mother and brother were engaged in their normal activities, while outside we were only minutes away from a blast, that would not even leave matchsticks.

I sat in my room. If there was nothing wrong, why was the moon orange? If there was something wrong, I was the only person who knew and the whole world was about to die, sitting in front of their TVs.

What could I do to save them? I was just a kid. I had to accept that I could do nothing.

I prepared myself to die. I would be the only member of humanity who would do so, with full knowledge of what was about to befall me. At least I would die in a tidy room and with my hair neatly combed, my mother happy that her world was in order.

I sat through dinner in silence, while my brother and mother babbled about their inconsequential lives, oblivious of the wall of flame heading towards Sydney at ultrasonic speed.

I returned to my room. I couldn't do my homework, due the next morning. About an hour later, I found myself alive and untouched. I had to check the moon. What if it was still orange? Who could I

alert? Certainly not my family. My mother couldn't handle a leaking faucet; that was my job. My family would have been useless in an emergency of this magnitude. Do I call the Police, the Fire Brigade, the Church, who do I tell about the orange moon? Whose job is it to handle the end of the earth? No-one tells kids these things.

I snuck out of the house. I would only be gone for a few minutes. I didn't want my mother to know I was gone from my room. Hopefully I would be back before she completed her next round. She'd want to know why I wasn't doing my homework, studying my French and History, so I could fulfill God's plan for me to be a medical doctor.

It would be futile to say "Because I'm checking if the earth is about to end". My mother would see that I was upto no good once again and I would be beaten for making up more of my lies, defying God and wasting all that good money she was spending at the military school, in order that I get the very best christian education.

I couldn't be caught.

I found a clear spot. The moon was now against black winter sky. It was its normal harsh cold white. Whatever had happened was over, if indeed anything had happened. While I'd been sitting fearfully in my room, had whole cities been annihilated? But if there had been no disaster, why had the moon been orange?

I awoke the next morning. This was a significant indicator in the circumstances. Breakfast was unremarkable. I urgently scanned the morning paper for disasters. I expected horrific scenes of charred bodies; there was nothing. The trains were on time. The buildings were all intact. No-one at school commented on earth's near brush

with destruction, but I had no confidence that my peers at the military school would be any more likely than my mother to know if half the earth had been destroyed.

What had happened? I waited a couple of days, and when no reports had come in from far away places, like Africa, I casually told my physics teacher about the orange moonrise.

(Show picture of orange rising full moon [http://www.nightskyinfo.com/sky\\_](http://www.nightskyinfo.com/sky_)

I waited in trepidation for his reaction. Would he mock me too?

He explained that the moon is orange at every moonrise and moonset. It's a result of the optically dispersive nature of the atmosphere, which also makes the sun red at sunrise and sunset. My physics teacher's explanation showed that moonrise wasn't explained by "that's the way it is". Strangely the "that's the way it is" crowd had claimed rainbows, but not the orange moon at moonrise, even though both depended on the same optical dispersion. I decided I wouldn't tell them. I saw that few people know about the orange moonrise and even fewer people thought it of interest.

There had been an emergency that night; it just wasn't the emergency I noticed. The emergency was that I was living in a society, where people no longer saw a moonrise and no longer took their kids out to see it. The emergency is still going on this very day. It's a normal part of our society. I am one of the few that know about it.

50yrs later, I'm still a little kid sitting in my room trying to figure out who to tell that the moonrise is orange. It turns out that there still isn't anyone to tell. No-one wants to know and no-one wants to show their kids. Everyone has accepted that "that's the way it is".

16mins (19mins)

