

Introduction

(1) Nadia Drake, *How can we write about science when people are dying?* (Nov. 2015)

(<http://phenomena.nationalgeographic.com/2015/11/19/how-can-we-write-about-science-when-people-are-dying/>)

Paris was horrific.

Yet as I watched that horror unfold, in a city that was once known as “The Paris of the Middle East,” dust clouds were falling onto a street streaked with blood. Beirut had been hit by one of the deadliest bombings since the Lebanese civil war ended in 1990.

It was a story that was both a world away and yet deeply personal. My mother’s family came to the United States from Lebanon when she was a teenager. Decades earlier, my great-grandmother had left Syria and moved to a small fishing village north of Beirut (later, my grandparents would honeymoon near Aleppo, if you can even imagine a time when that was possible).

In other words, the blood that ran through that street also runs through me.

It was hard, in the face of such unrelenting violence, to focus on work. I found it incredibly difficult to try and describe bodies in the solar system when bodies on Earth were falling to the ground.

I felt utterly useless.

I stewed and stewed, and stewed some more, and emerged briefly and wrote to Kareem Shaheen, a friend who’s based in Beirut and covers the Middle East for the *Guardian*.

“I wish there were something I could do to help, or something that would at least make a difference. Want to swap jobs for a bit?” I suggested, half joking.

His response was, in a nutshell, that science has the power to redeem and inspire, and that casting our eyes to the stars can unite every human on Earth. Then he echoed a sentiment I’d heard a day earlier: Keep writing about science. It’s important, and it’s inspiring.

“There’s a unifying beauty to it—you can appreciate the stars and planets whether you’re Sunni, Shia, Hindu, Christian, Jew, atheist or Wiccan,” Kareem said. “Finding new things to discover, wondering at what could be up there, us being the universe contemplating itself, setting our sights at conquering a new frontier, that’s what we should be doing.”

It’s true. We can all walk outside and look up and admire the same stars, regardless of the stories we inscribe upon them. Kareem went on to describe how watching Venus cross the face of our sun helped bring him closer to his dad, and to the threads that connect our planet with the cosmos.

“I was in college and wanted to see the Venus transit but couldn’t find any filters to use on my telescope,” he recalled. So, his dad went out and found a welding mask that would let Kareem safely observe the sun. As he peered through the mask and into the eyepiece, Kareem saw Earth’s sister marching across the great golden disk that powers life on our planet.

“Venus was just a speck in my feeble excuse of a telescope, but it was gorgeous,” he said. “Seeing it as a tiny fleck against the sun was sort of like the pale blue dot idea—of how fragile and vulnerable the thread is—and now, thinking back to it, it drives home how insignificant our differences are in the grand scheme of things.”

I’m not an optimist by nature—“realist” is the description I prefer—but I’d like to think that he’s right, that sharing the wonder of science, exploration and adventure can be an antidote, in some small measure, to suffering and destruction.

In retrospect, I should have known this all along. Finding solace in the sights and patterns of the natural world has been a part of me since year one: Before I was old enough to walk or talk, my family discovered that showing me the shimmering moon was often the only way to calm me down.

Sometimes the best thing we can do is be good to one another and share stories of the human mind and spirit at their best.

The last story I published before Paris and Beirut erupted was about how Pluto's heart grew from the crater left by an enormous impact. Instead of turning into another big, ugly scar on the planet's surface, the crater instead played an important role in the birth of a feature that we see as a symbol of love and compassion. I hope there's a metaphor in there somewhere.

Iconic moments from Apollo

(2) Frank Borman (*Life*, 17 January 1969)

All of us had flown airplanes many times and seen airfields and buildings getting smaller as we climbed. But now it was the whole globe receding in size, dwindling until it became a disk. We were the first humans to see the world in its majestic totality, an intensely emotional experience for each of us. We said nothing to each other, but I was sure our thoughts were identical—of our families on that spinning globe. And maybe we shared another thought I had... *This must be what God sees.*

(3) Bereshit 1:1–10

In the beginning of God's creation of the heavens and the earth. Now the earth was astonishingly empty, and darkness was on the face of the deep, and the spirit of God was hovering over the face of the water. And God said, "Let there be light", and there was light. And God saw the light that it was good, and God separated between the light and between the darkness. And God called the light day, and the darkness He called night, and it was evening and it was morning, one day. And God said, "Let there be an expanse in the midst of the water, and let it be a separation between water and water." And God made the expanse and it separated between the water that was below the expanse and the water that was above the expanse, and it was so. And God called the expanse Heaven, and it was evening, and it was morning, a second day. And God said, "Let the water that is beneath the heavens gather into one place, and let the dry land appear", and it was so. And God called the dry land earth, and the gathering of the waters He called seas, and God saw that it was good.

(4) Jonathan Sacks, *To Heal a Fractured World* (Continuum, 2005), p. 40

The nineteenth-century biblical commentator R. Zvi Hirsch Mecklenberg gave a striking interpretation of Genesis 1. That chapter sets out creation as a series of stages in which God says, 'Let there be...' and there is, and 'God saw that it was good.' Mecklenburg notes that the word 'that' in biblical Hebrew more often means 'because'. God saw, not '*that* it was good' but '*because* he is good'. *To be good is to do good.* God created the world so that others could enjoy it. Goodness is not an attribute of the soul but a way of acting and creating: creating happiness for other people, mitigating their distress, removing even a fraction of the world's pain. We worship God *spiritually* by helping his creations *physically*.

(5) Robert Poole, *Earthrise* (Yale, 2008), p. 55

In 1968 men at the bow wave of progress voyaged out and saw for themselves the vision of the ancients, an Earth apparently untouched by the human race. It was fitting that they searched within for meaning and chose to read not from some manifesto of human progress but to start again: 'In the beginning...'

(6) Frank Borman, *Countdown: An Autobiography* (New York, 1988), p. 212

I happened to glance out of one of the still-clear windows just at the moment the Earth appeared over the lunar horizon. It was the most beautiful, heart-catching sight of my life, one that sent a torrent of nostalgia, of sheer homesickness, surging through me. It was the only thing in space that had any colour to it. Everything else was either black or white, but not the Earth.

(7) William Anders [quoted in Poole, *Earthrise* (Yale, 2008), p. 2]

We'd spent all our time on Earth training about how to study the Moon, how to go to the Moon; it was very lunar oriented. And yet when I looked up and saw the Earth coming up on this very stark, beat up lunar horizon, an Earth that was the only colour that we could see, a very fragile looking Earth, a very delicate looking Earth, I was immediately almost overcome by the thought that here we came all this way to the Moon, and yet the most significant thing we're seeing is our own home planet, the Earth.

(8) Robert Poole, *Earthrise* (Yale, 2008), p. 77 & p. 81

In black and white, seen against the Moon, the Earth really was just another planet. Without colour, without a human eye behind the camera, without an astronaut to describe the setting, it came over as just a page from an astronomy textbook.

For NASA, as for most space-minded observers, what was important was that it was a picture of the Earth from the moon, not that it was a picture of the Earth, full stop. It was the view of the imaginary space voyager, not yet of the homesick astronaut.

(9) *Christian Science Monitor*, 27 December 1968

No man, no nation, no race can fail to think more broadly as a result of men's having circled the Moon. With such an achievement in their eyes, fewer persons will be tempted to believe that Earth's problems, however stark, are beyond settlement... the space programme's greatest and healthiest impact is almost certain to be on events back here on Earth.

(10) Archibald MacLeish, *Riders on the Earth* (New York Times, 25 December 1968)

For the first time in all of time, men have seen the Earth: seen it not as continents or oceans from the little distance of a hundred miles or two or three, but seen it from the depths of space; seen it whole and round and beautiful and small... To see the Earth as it truly is, small and blue and beautiful in that eternal silence where it floats, is to see ourselves as riders on the Earth together, brothers on that bright loveliness in the eternal cold—brothers who know that they are truly brothers.

(11) *Sunday Denver Post*, 29 December 1968

No man ever before has looked at the world in one piece and told us about it. Perhaps with the new understanding will come reverence for our planetary home and for the uniqueness of life.

(12) *Christian Science Monitor*, 27–30 December 1968

We should cherish our home planet. Men must conserve the Earth's resources. They must protect their planetary environment from spreading pollution. They have no other sanctuary in the solar system. This, perhaps, is the most pertinent message for all of us that the astronauts bring back from the Moon.

(13) *Los Angeles Times*, 29 December 1968

In retrospect, a remarkable effect of the Apollo 8 Moon voyage was not so much its capacity to draw men's gaze outward, as its powerful force in turning their thoughts inward on their own condition and that of their troubled planet... The flight of the astronauts produced great mental and spiritual ferment among men. The feat that should have been the perfect object for extroverts made introverts of us all.

(14) Robert Poole, *Earthrise* (Yale, 2008), p. 95

The 'Blue marble' picture de-centres the traditional map of the Earth. The viewpoint is over Africa, an equatorial continent notoriously diminished in size by traditional map projections that stretch the polar regions to achieve navigational, rather than visual, accuracy... 'Blue marble' offers equity without distortion. Now Africa appears at the centre, with Europe and Asia visible as narrow bands towards the northern horizon. The winter tilt towards the southern hemisphere reveals the hidden continent of Antarctica, never before seen by astronauts. It also shows a high proportion of sea, as if to remind people that not only the Earth, but even the habitable part of it, is only a small part of a more significant whole. The whole is wreathed in clouds, showing that it is a planet rather than a globe, but not so many clouds as to obscure the continents. Although no one found the words to say so at the time, the 'Blue marble' was a photographic manifesto for global justice.

The rise of the environmental movement**(15) Robert Poole, *Earthrise* (Yale, 2008), p. 142**

Facing the Earth was exactly how the space programme ended up. The idea that the Earth was a finite system, which needed to be carefully managed, had been taking shape in the generation after the Second World War—in fields of thought as diverse as cybernetics, ecology, and theology. But it only really took off when the sight of the whole Earth gave humanity a picture to think with... The Apollo years of 1968–1972 coincided almost exactly with the take-off of the environmental movement. Earthrise was followed by Earth Day. As man journeyed from Earth to the Moon, the human race made the philosophical leap from Spaceship Earth to Mother Earth.

(16) John Caffrey [quoted in Oran W. Nicks (ed.), *This Island Earth* (NASA SP-250)]

I date my own reawakening of interest in man's environment to the Apollo 8 mission and to the first clear photographs of Earth from that mission... I suspect that the greatest lasting benefit of the Apollo missions may be, if my hunch is correct, this sudden rush of inspiration to try to save this fragile environment—the whole one—if we still can.

(17) *Our Common Future*, UN Environmental Commission (1987)

From space, we see a small and fragile ball dominated not by human activity and edifice but by a pattern of clouds, oceans, greenery, and soils. Humanity's inability to fit its doings into that pattern is changing planetary systems, fundamentally... From space, we can see and study the Earth as an organism whose health depends on the health of all its parts.

(18) Rio Declaration on Environment and Development, Principle 7, UN (1992)

States shall cooperate in a spirit of global partnership to conserve, protect, and restore the health and integrity of the Earth's ecosystem.

(19) Chief Rabbi Mirvis, 30 November 2015

With the freedom to sample the fruits of God's creation comes the responsibility to protect and steward, not abuse, our environment. I pray that the efforts of those participating will be blessed with the far-sighted wisdom to agree outcomes that reflect what is, undeniably, in all our best interests.

(20) Kohelet Rabbah 7:13

When the Almighty created Adam He led him round the Garden of Eden. 'Look at my works', He said. 'See how beautiful they are; how excellent! I created them all for your sake. See to it that you do not spoil and destroy my world; for if you do, there is no-one to put it right.'

(21) Devarim 20:19–20

When you besiege a city for many days to wage war against it to capture it, you shall not destroy its trees by wielding an axe against them, for you may eat from them, but you shall not cut them down. Is the tree of the field a man, to go into the siege before you? However, a tree you know is not a food tree, you may destroy and cut down, and you shall build bulwarks against the city that makes war with you, until its submission.

(22) Rabbi Joseph Soloveitchik, *The Emergence of Ethical Man* (Ktav, 2005), p. 56

There is a very close kinship between man and nature. Nature, when confined within the God-intended scheme of things, is perfect. The same applies to man. As long as man lives within the bounds set by his Creator, which accentuate his naturalness, he remains *ben adam*, the son of Mother Earth, and may claim asylum in her lap.

'Tikkun olam': Chessed/collective responsibility**(23) Jonathan Sacks, *To Heal a Fractured World* (Continuum, 2005), p. 75**

The phrase *tikkun olam* appears in a series of Mishnaic teachings, where it serves as the explanation of certain laws relating, among other things, to divorce, the freeing of slaves, and the redemption of captives. Common to these provisions is that they address areas in which the law contains anomalies which, if not rectified, would have adverse consequences for individuals or for society as a whole. *Tikkun olam* is, in this sense, a jurisprudential principle which we might translate as 'for the better ordering of society'.

The phrase, however, also appears in one of Judaism's best-known prayers, *Alenu*:

Therefore it is our hope, O Lord our God, that we may soon see the glory of Your power, to remove abominations from the earth so that idols are utterly cut off, to perfect the world [le-takken olam] under the sovereignty of the Almighty.

(24) Jonathan Sacks, *To Heal a Fractured World* (Continuum, 2005), p. 47

Hessed is born in the phrase in the second chapter of Genesis, 'It is not good for man to be alone.' The duality of the human condition is not just that we are body conjoined with soul, 'the dust of the earth' joined to 'the breath of God'. It is also that we are self-conscious and therefore capable of being lonely, not just alone. *Homo Sapiens* is uniquely creative yet also uniquely vulnerable. There is something incomplete within the self that seeks completion in an

other. That cannot be achieved by power, forcing the other to do our will, for that humiliates the other by treating him or her as an extension of ourselves. It can only be achieved by conferring dignity on the other, by bringing him or her a gift that—whatever its tangible form—is really the offer of our person. *Hessed* is the redemption of solitude, the bridge we build across the ontological abyss between I and Thou.

(25) Rabbi Shimon bar Yohai, *Vayikra Rabbah*, 4:6

A man in a boat began to bore a hole under his seat. His fellow passengers protested. 'What concern is it of yours?' he responded, 'I am making a hole under my seat, not yours.' They replied, 'That is so, but when the water enters and the boat sinks, we too will drown.'

(26) Russell Schweickart, *No Frames, No Boundaries*, 1983

And you think about what you're experiencing and why. Do you deserve this? Have you earned this in some way? Are you separated out to be touched by God, to have some special experience that others cannot have? And you know the answer to that is no. There's nothing you've done that deserves this experience, that earned it. It's not a special thing just for you. And you know very well at that moment, for it comes through to you so powerfully, that you are the sensing element for all of humanity, you as an individual are experiencing this for everyone. You look down and see the surface of that globe you've lived on all this time, and you know all those people down there and they are like you, they are you—and somehow you represent them. You are up there as the sensing element, that point out on the end, and that's a humbling feeling. It's a feeling that says you have a responsibility. It's not for yourself. The eye that doesn't see doesn't do justice to the body. That's why it's there. That's why you are out there. And somehow you recognize that you're a piece of this total life. And you're out there on that forefront and you have to bring that back somehow. And that becomes a rather special responsibility and it tells you something about your relationship with this thing we call life. And that's a change. That's something new. And when you come back there's a difference in that world now. There's a difference in that relationship between you and that planet, and you and all those other forms of life on that planet, because you've had that kind of experience. It's a difference and it's so precious.

(27) Michael Collins, *Carrying the Fire* (New York, 1974), p. 470

I really believe that if the political leaders of the world could see their planet from a distance of, let's say, 100,000 miles, their outlook could be fundamentally changed. That all-important border would be invisible, that noisy argument suddenly silenced... What I am saying is that all countries must begin thinking of solutions to their problems which benefit the entire globe, not simply their own national interests.

(28) Jonathan Sacks, *To Heal a Fractured World* (Continuum, 2005), p. 106

Our human situation as embodied souls, physical beings, means that we share needs and vulnerabilities. When it comes to acts that address such needs, it is irrelevant who performs them, for whom they are performed, and with what motive or intention. What matters is that they do good, relieve suffering, bring comfort.

'Tikkun olam': Peace**(29) Isaiah 2:4 / Micha 4:3**

And they shall beat their swords into ploughshares and their spears into pruning hooks. Nation shall not take up sword against nation; neither shall they learn war any more.

(30) Jonathan Sacks, *To Heal a Fractured World* (Continuum, 2005), p. 100

The difference between the rabbinic and prophetic conceptions is striking. 'The ways of peace' are clearly not peace as Isaiah or Micah envisaged it. At first sight these rabbinic laws lack the grandeur of the prophets: they are small-scale, local, even prosaic. They envisage no transformation of the universe or human sensibility. They seem to be no more than pragmatism, generously conceived. They are attempts to avoid the kind of civil strife from which Jews suffered so often during the long night of exile. For these reasons 'the ways of peace' has not been seen for the innovation it is... 'The ways of peace' is in its way as an original idea as that of peace itself. We can define it: it is a programme for *peace in an unredeemed world*.

(31) Tom Stafford [quoted in Poole, *Earthrise* (Yale, 2008), p. 104]

You don't look down at the world as an American but as a human being.

(32) Sultan Bin Salman al-Saud [quoted in Poole, *Earthrise* (Yale, 2008), p. 104]

The first day or so we all pointed to our countries. The third or fourth day we were pointing to our continents. By the fifth day we were aware of only one Earth.

(33) Jonathan Sacks, *To Heal a Fractured World* (Continuum, 2005), p. 108

Darkhei shalom is a set of principles of how to live graciously with people whose beliefs and way of life are incompatible with ours. Despite profound differences, we must engage in common citizenship, contributing to the welfare of other communities as well as our own. That is the political significance of rabbinic, as opposed to prophetic, peace.

Concluding thoughts**(34) Shoshana Weider, *A whole world's wake up call* (July 2015)**

(<http://intrepidpostcards.blogspot.co.uk/2015/07/a-whole-worlds-wake-up-call.html>)

At a time when humanity seems to be as fractured as ever, perhaps we need a wake-up call like these ones from NASA. We need to be reminded every once in a while that we are all one family, stuck together here on our little spaceship Earth. We should do our utmost to look after it—and each other.

(35) Jonathan Sacks, *To Heal a Fractured World* (Continuum, 2005), p. 150 & 173

An awakening from below lacks the drama of an awakening from above. It is not miraculous. It does not change the order of nature. We do not count it as one of God's wondrous deeds. But its impact is greater, its effect deeper and longer-lasting. It changes us. If an awakening from above is God's gesture of reaching down to humankind, an awakening from below is a human gesture of reaching up toward heaven. When that happens, the horizons of human possibility are enlarged. We are what we do, and what human beings have done once, they can do again. The first tablets, made entirely by God, were an awakening from above. The second, hewn by Moses, involved an awakening from below. That is why Moses was transformed, and why, only after the second tablets, did his face shine.

The holy and the good are not the same but they are linked in a cyclical process of engagement and withdrawal. Our prayers, texts, and rituals hold before us a vision of how the world might be. Our work, service to the community and social life take us into the world as it is, where we make a difference by mending some of its imperfections, righting wrongs, curing ills, healing wounds. The juxtaposition of the two creates moral energy, and when they are disconnected, the energy fails. The holy is where we enter the ideal; the good is how we make it real. Long ago, alone at night, Jacob dreamed a dream of a ladder connecting heaven and earth, and of angels ascending and descending. Life is that ladder, for earth cannot be mended without a glimpse of heaven, nor heaven live for humankind without a home on earth.

(36) Robert Kennedy, 7 June 1966

Each time a man stands up for an ideal, or acts to improve the lot of others, or strikes out against injustice, he sends forth a tiny ripple of hope, and crossing each other from a million different centres of energy and daring, those ripples build a current that can sweep down the mightiest walls of oppression and resistance.

(37) Jonathan Sacks, *To Heal a Fractured World* (Continuum, 2005), p. 265

Rabbi Isaac Luria framed a vision of hope in the midst of catastrophe. The divine light which initially flooded creation proved too strong. There was a 'breaking of the vessels', as a result of which fragments of God's light lay hidden under the rubble and wreckage of disaster. It is our task, he said, to 'heal' or 'mend' the world by searching for those fragments and rescuing them, one by one. It was a lovely image, because it refused to accept the fractures of the world as incurable, but neither did it suppose that repair would be instantaneous, easy, or dramatic.

Video clips come from:

In the Shadow of the Moon (2007)

From the Earth to the Moon (HBO miniseries, 1998)