

NOTHING HERE TURNS ALONE

Three parables on balance

. . .

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Right now, while your eyes move across this line, your body is running reactions you did not order, cannot feel, and could not perform on purpose, even if your life depended on it, which it does. Science calls this your autonomic nervous system.

You are not reading this alone. You are reading it on top of a stack of things that are working. Inside and outside of you. Most of them are invisible. None of them are yours.

Let me tell you three stories. They are the same story.

I. THE KINGDOM OF THE BRAIN

Begin small. Begin with the thing holding this page.

A body is a solar system with the lights off. Something on the order of thirty trillion cells, each one turning, each one keeping time to a drum in the chest that has never once asked permission to beat. Salt water and mineral. Weather. Tides that arrive on a schedule older than language.

And near the top of this small spinning arrangement sits the brain: three pounds of wet electricity, about two percent of the body's weight, and the only part of the whole system that has ever thought about itself.

One day the brain does the arithmetic and does not like the answer.

I am the seat of consciousness, it says. I am where the meaning is kept. Why am I taxed to move a foot? Why does so much of what comes into this house go down a corridor to a stomach, a place with no opinions?

From now on, I found myself.

The brain secedes.

It stops paying the legs, and the legs stop walking, which seems survivable, because where was it going anyway? It stops paying the hands, and the hands stop lifting food

to the mouth, which seems survivable, because the pantry is stocked. It stops paying the gut, and the gut stops breaking bread down into the things a body can use.

Now count what the brain has just cancelled.

It builds its own steadiness out of a molecule it cannot make. Tryptophan, the raw material of serotonin, is one of the handful of amino acids the human body cannot synthesize at all. Everyone arrives from outside: through a mouth, through a gut wall, into the blood, and then across the barrier into the brain, where it has to compete for passage with the other amino acids in the queue. The brain does not manufacture its own calm. It imports it, and the road runs through the stomach it was embarrassed to fund.

And underneath all of it, the shortest clock in the body has started.

The brain holds a reserve, but a small one: a little glycogen in the astrocytes, drawn down slowly, worth minutes and not hours. Two percent of the body's weight, and roughly a fifth of the oxygen it burns, delivered fresh, without pause, every second, by a muscle the brain has never once thanked.

Stop that delivery and consciousness is gone in seconds.

And the cells that begin to die first, after three to five minutes, before any of the tougher districts show damage, are the pyramidal cells of the hippocampus.

Which is where memory is kept.

The last thing the brain does, having declared that it alone was the seat of meaning, is forget.

The brain does not own consciousness. It rents it. The rent is paid in heartbeats, in footsteps, and in other people's bread.

When a body goes out of balance, there is almost always a reason, and the reason is rarely the part complaining loudest. And balance is never restored by one organ winning. It is restored when the whole system agrees to carry the part that fell and sometimes, when the fall is bad enough, by hands from outside the body altogether. A doctor. A neighbour. A stranger who knew what to do.

That is not weakness in a system.

That is what a system is *for*.

II. THE COUNCIL THAT VOTED AGAINST THE SUN

Now go up. Past the roof, past the weather, past the blue, until the blue thins out and the black begins.

The planets are in session, and they have a grievance.

The Sun is too much, they say. It holds the centre and never gives up the chair. It is unbearable up close. Everything here bends toward it. Nothing here is free.

And one of the cold ones at the back, far out, who has never felt more than a rumour of warmth, moves the motion.

Reduce it. Take it down ten percent. Let us have a solar system without a tyrant.

Here is what the minutes should record.

The Sun is not the centre because it rules. The Sun is the centre because it is ninety-nine point eight six percent of everything out here, and every scrap of that mass is spent holding eight worlds and hundreds of moons and ten million wandering stones in orbit around a single point, so that they do not simply fly off in straight lines into the dark, forever, alone.

Gravity is not a leash. Gravity is the only reason there is a *system* and not a scatter.

And the Sun pays for it out of its own body. Four and a quarter million tonnes of itself, every second, converted into light and given away. It has never sent an invoice. It has no mechanism for sending one.

But say the motion carries. Say the light drops a tenth.

Understand first that ten percent is not a margin: ten percent is the edge itself. The simplest climate models put the tipping point at under two percent; even the most

stubbornly ice-resistant coupled model we have puts it at ten. Below that line, the ice comes down from both poles and does not stop at the mountains, and the whiter the world gets, the lighter it throws back, and the colder it gets, and the whiter it gets. There is no step in that staircase where the planet can stand still.

Then the rain slows, because rain is only the sea remembering warmth. The green goes — not dramatically, just a bad year and then a worse one. Everything that eats green follows. Everything that eats those follows them.

And at sea, the things too small to see, the ones doing nothing all day but turning light into sugar, go still. Just under half of all the photosynthesis on this planet happens out there, in organisms you could not pick out of a glass of water. As much living work as every forest, every grassland, every crop on every continent, combined.

Ten percent. That is all it took.

Now look down at your own hand.

The calcium in the bone of that hand was cooked in the hearts of giant stars and thrown out when they exploded. The iron riding in your blood, the atom that catches oxygen and carries it up to that four-minute brain, has a split parentage: about half from those same giant deaths, and about half from a quieter source, the detonation of white dwarfs, which are the burnt-out cores of small and ordinary stars.

Even the small dead ones are in you.

And the sugar burning in your muscles right now is sunlight. Not *like* sunlight. Is. Caught by a leaf, passed to a stalk, passed to a grain or an animal or a child, handed forward through the dark of a gut until it arrived in you this morning.

When the council votes against the Sun, be clear about what is on the floor.

You cannot save a system by attacking the thing that is giving it everything it has.

And you cannot tell a centre that gives from a centre that takes by measuring the chair.

You tell them apart by watching which way things flow.

III. THE LONG BRAID

Now the third story, which is the first two wearing clothes.

Everything that exists was once close enough to touch. Then the expansion, and the cold, and hydrogen. And then the first stars, which built every heavier thing in their bellies and scattered it when they died. Rock gathered. Water arrived. And in some shallow place, around three and a half billion years ago and possibly earlier, a chemical did the strangest thing in the history of the universe.

It made a copy of itself.

What followed is usually told as a story about winning. Read it closely, and it is a story about *fitting*, and about giving things up.

Every major jump in the complexity of life on this planet happened the same way: things that had been independent stopped being independent. Free genes bound into chromosomes. Free cells stopped reproducing on their own account and became tissue. Whole organisms folded into colonies where most individuals never breed at all. Each step up was paid for by something below giving up its right to go it alone.

And the largest merger in the history of life happened when one cell took in another and, instead of digesting it, *kept it, fed it, and let it stay*.

That guest never left. Some two billion years later, its descendants are in every cell you have, and they are the reason you can lift your arm. The engine of your entire body came from outside, from a different kingdom of life, and became family.

Nothing on this planet has ever survived alone. Not once. Not for a day.

Then us. Two hands around a fire. Then a family, a band, a tribe. Then a village, because a valley fed more mouths than a cave. Then a town. Then a city, where a species that had only ever trusted the faces, it knew had to invent a way of saying *we* about strangers.

Then walls around the *we*. Then armies to hold the walls. Then conquest, and countries, and flags, and borders drawn by men who had never once stood in the

rivers they were dividing. Then a planet that can photograph itself from orbit and still cannot agree that it is one planet.

Every level stands on the one beneath it. Every single one.

And here we are, in a system as interdependent as a body, as interdependent as a star and its worlds, living as though each household were a sealed jar.

Look at what the jar costs.

We rely on people who came from somewhere else. Nearly a quarter of everyone in this country was born in another one, and through the 2010s the overwhelming majority of all growth in the Canadian labour force came from immigrant workers. Thirty percent of the nurse aides and orderlies and patient service associates (the hands that turn your mother in her bed at four in the morning) are immigrants. A quarter of the people working in agriculture, and a tenth of those in food processing, are here on temporary permits, which means we have built the getting of food on people we have not agreed to keep.

We depend on them the way a cell depends on the guest it took in two billion years ago.

And then we decide that a name, a scarf, or a direction of prayer is the danger, while the same hands hold the door for us on the way out.

We rely on women to hold the shape of households, classrooms, wards, and workplaces. In this country, women still do about four hours of unpaid work a day to men's two and a half; worldwide, women perform roughly three quarters of all unpaid care work. We have not priced any of it. We call it love so we don't have to call it labour.

Now follow the arithmetic down, the way you follow it in a body.

Being treated as a suspect is not only an insult; across nearly three hundred studies it tracks, consistently, with worse mental health. And belonging is not a soft thing. Across a hundred and forty-eight studies and three hundred thousand people, those with stronger social relationships were about fifty percent more likely to still be alive

at follow-up. Connection is not a nicety in a human system. It is load-bearing, and it is measurable, and we let it fail in whole neighbourhoods at a time.

If a family cannot make rent, someone takes a second job. If someone takes a second job, they are not home. If they are not home, the children raise each other.

And the childhood that follows is one of the most thoroughly documented risks in modern medicine. Four or more adverse childhood experiences, against none, and the odds of problematic drug use, of interpersonal violence, and of harm turned inward, rise more than sevenfold. Not a little. Sevenfold — and along a clean gradient, more harm for more of it, which is the signature of a real effect and not a story we are telling.

When the load is heavier than the strength a person was given, and no one is coming, what is there left to reach for? Some reach for what numbs. Some stop reaching at all.

We call this a personal failing. It is closer to arithmetic: a weight divided by nobody.

And what happens to that family ten years on, when a child who learned that no one comes finds a group that finally says *we came for you*, and it is the wrong one, because it was the only one offering? Young people join, by their own accounts, for belonging, for standing, for the feeling of being safe. The bitter part is that the research is detailed: the safety is not real; joining raises the odds of being hurt while lowering the fear of it. They were not chasing violence. They were chasing the thing we would not give them, and violence was what was bundled with it.

We build prisons at the far end of that equation and call it a crime problem. It was a belonging problem, two decades upstream, and it was cheaper then.

And the man at the top of it, the good suit, the long drive, the car, is not the villain of this poem. He is carried too, and mostly does not know it. His suit was sewn by hands he will never meet. His road was laid, his children taught, his mother bathed and turned in her bed by the very people he was taught to be wary of. He has been held up by an entire town and told it was a ladder he climbed alone.

That is its own kind of poverty: to be carried your whole life and never once feel the hands.

And the mother in the working-class house, in the middle-class house, who does all of it (the shifts, the lunches, the appointments, the aging parent, the birthday she stayed up until two to finish) who does *she* orbit?

Who is holding her?

She is the sun of a small system. She is spending her own body to keep it turning. And she has never sent an invoice either.

When we hurt one, we hurt all of us. Not as sentiment. As structure.

IV. THE MIRACLE NOBODY MENTIONS

And yet.

It is a miracle that a body works at all, given what we put into it and how little we sleep. It is a miracle the sky still holds, given what we send up into it. It is a miracle the animals have not turned on us, given what we have taken, paved, drained, and renamed as inventory.

It is a miracle that you can lie down tonight and simply *assume* a morning. That the water will be clean. That the lights will come on. That the shelves will have food. That the bridge will hold.

None of that is weather. Every bit of it is somebody.

Somebody drove through the night, so the shelf was full. Somebody sat up with a frightened stranger. Somebody tested the water. Somebody patched the line in the rain. Somebody taught your child to read. Somebody's hands were in the dirt that grew the thing you ate this morning without once looking up.

We have become expert auditors of the systems that spin our small worlds, and illiterate in the ten thousand things that did not fail today.

Gratitude is not a mood. It is accurate perception.

V. THE ONES WHO ALREADY KNEW

None of this is new information.

This land, the ground this is written on, is Treaty 7 territory, the territory of the Niitsitapi, the Blackfoot Confederacy: Siksika, Kainai, and Piikani, and home as well to the Métis. The Blackfoot held a severe and magnificent country in working order for thousands of years and governed from the fire outward rather than from a throne downward.

Far to the east, the Haudenosaunee wrote into their Great Law of Peace an instruction to their leaders: to weigh every decision not only against the present but against “the coming generations, the unborn of the future Nation.” It is remembered now as the seventh-generation teaching. It is a longer accounting horizon than any government on this continent has since attempted.

These are different nations, with different laws, and they should not be blended into one convenient wisdom. What they share is a premise: that the land is a relative and not an inventory, and that balance is the thing you are governing for.

And balance is a far harder achievement than growth. Growth only asks you to take. Balance asks you to know when to stop.

This is not a romantic claim, and it does not need to be. Lands held or managed by Indigenous peoples make up more than a quarter of the surface of the earth, and the vertebrate biodiversity on them matches, and in places exceeds, that of formal protected areas. The record is in the ground. It was not lost. It was ignored, and it is still being offered, and it is still patient.

And this is not the place for blame. Every generation inherited a mess and added to it, mostly while trying to do right by the people in front of them. We are all in the middle of learning.

This is not an indictment. It is an inventory.

VI. ONE

So: we need everybody.

Not most of us. Not the reasonable half. Everybody. Because a body does not heal by a majority vote of its organs, and a solar system does not hold its orbits on the strength of its largest planets.

Stop trying to keep everything out. The gate was never what kept the town alive.

Let connection come back in.

It only takes one to begin.

One moment. One kindness. One open door.

One person turns toward another, and another turns, and then it is a current.

If each of us does a little, it adds to a great deal, and this is not optimism. It is the same arithmetic that built the tribe out of the family, the city out of the village, the body out of the cell. It is the only arithmetic that has ever worked.

Healing is not something that arrives. It is something that starts, and it starts where you are standing, in the next thing you say to somebody.

The layers of this go down further than any brain can hold.

That is all right.

*You do not have to understand the whole web
to be a good thread in it.*

NOTES ON THE EVIDENCE

Every empirical claim in the poem is keyed below to its source. Where the honest version of a fact is narrower than the popular version, I used the narrower one. Three widely circulated claims that would have strengthened the poem rhetorically were cut because they do not survive scrutiny; they are listed at the end.

I — The Kingdom of the Brain

“on the order of thirty trillion cells.” The best current estimates are 3.0×10^{13} human cells (Sender, Fuchs & Milo 2016) and ~36 trillion for a 70 kg adult male, ~28 trillion for a 60 kg adult female (Hatton et al. 2023). The older and more quotable figure of 37.2 trillion (Bianconi et al. 2013) carries a $\pm 22\%$ error bar and is sex- and size-dependent, so a rounded lower figure is used here. All exclude the roughly equal number of resident bacteria.

— Sender R, Fuchs S, Milo R (2016), *PLOS Biology* 14(8):e1002533, doi:10.1371/journal.pbio.1002533 · Hatton IA et al. (2023), *PNAS* 120(39):e2303077120, doi:10.1073/pnas.2303077120 · Bianconi E et al. (2013), *Annals of Human Biology* 40(6):463–471, doi:10.3109/03014460.2013.807878

“about two percent of the body’s weight... roughly a fifth of the oxygen it burns.” Standard and well established.

— Raichle ME & Gusnard DA (2002), *PNAS* 99(16):10237–10239, doi:10.1073/pnas.172399499 · original measurement: Kety SS & Schmidt CF (1948), *J Clin Invest* 27(4):476–483, doi:10.1172/JCI101994

“Tryptophan... one of the handful of amino acids the human body cannot synthesize at all... has to compete for passage.” Tryptophan is an essential amino acid and the precursor of serotonin. Unlike serotonin itself it crosses the blood–brain barrier, via the large neutral amino acid transporter, for which it competes with other LNAAs — so brain supply depends on the plasma tryptophan-to-LNAA ratio, not on tryptophan alone.

— Fernstrom JD & Wurtman RJ (1971), *Science* 173(3992):149–152, doi:10.1126/science.173.3992.149 · Young SN (2013), *J Psychiatry Neurosci* 38(5):294–305, doi:10.1503/jpn.120209

Qualification the poem deliberately does not overstate: experimentally depleting tryptophan does **not** reliably lower mood in healthy volunteers. It lowers mood in people with a personal or family history of depression, and precipitates relapse in remitted patients on serotonergic antidepressants — i.e. it exposes a vulnerability rather than demonstrating a monoamine cause of low mood.

— Ruhé HG, Mason NS & Schene AH (2007), *Molecular Psychiatry* 12(4):331–359, doi:10.1038/sj.mp.4001949

“a little glycogen in the astrocytes, drawn down slowly, worth minutes and not hours.” Human brain glycogen is $\sim 3.5 \mu\text{mol/g}$, three- to fourfold higher than free brain glucose, held mainly in astrocytes, with slow turnover ($0.16 \mu\text{mol}\cdot\text{g}^{-1}\cdot\text{h}^{-1}$). The common assertion that the brain has *no* fuel reserve is false; the defensible claim is that the reserve is negligible relative to demand.

— Öz G et al. (2007), *Am J Physiol Endocrinol Metab* 292(3):E946–E951, doi:10.1152/ajpendo.00424.2006

“consciousness is gone in seconds.” Abrupt complete cerebral circulatory arrest produced loss of consciousness in 4–10 seconds in the classic human experiments; a modern scoping review of 39 studies concludes clinical loss of consciousness and loss of EEG activity occur within 30 seconds.

— Rossen R, Kabat H & Anderson JP (1943), *Arch Neurol Psychiatry* 50(5):510–528, doi:10.1001/archneurpsyc.1943.02290230022002 · Pana R et al. (2016), *Journal of Critical Care* 34:77–83, doi:10.1016/j.jcrc.2016.04.001

“after three to five minutes... the pyramidal cells of the hippocampus.” There is no single whole-brain death threshold; vulnerability is regional and graded. CA1 hippocampal pyramidal neurons are the most sensitive population, sustaining irreversible injury after roughly 3–5 minutes of complete normothermic ischemia, while medium-sized striatal neurons tolerate 15–20 minutes. The familiar “the brain dies in four minutes” is clinical shorthand, not a measured constant — which is why the poem names the specific cells, and why it is true that memory goes first.

— Harukuni I & Bhardwaj A (2006), *Neurologic Clinics* 24(1):1–21, doi:10.1016/j.ncl.2005.10.004

II — The Council That Voted Against the Sun

“ninety-nine point eight six percent.” Computed from NASA fact-sheet masses: $M_{\odot} = 1.9885 \times 10^{30} \text{ kg}$ against $2.667 \times 10^{27} \text{ kg}$ for the eight planets, giving 99.866%; the figure survives a generous allowance for moons, asteroids, the Kuiper Belt and Oort Cloud. NASA’s public pages round to 99.8%.

— NASA Planetary Fact Sheet, nssdc.gsfc.nasa.gov/planetary/factsheet/

“Four and a quarter million tonnes of itself, every second, converted into light.” $\dot{m} = L/c^2 = 3.828 \times 10^{26} \text{ W} \div c^2 = 4.26 \times 10^9 \text{ kg/s}$. Distinct from the ~ 600

million tonnes of hydrogen *fused* per second, of which only 0.7% is destroyed as mass. The poem says “converted into energy,” not “lost” — total solar mass loss including the solar wind is higher, around 5.5–6 Mt/s.

— IAU 2015 Resolution B3 (nominal solar luminosity) · NASA Solar Fact Sheet

“the simplest climate models put the tipping point at under two percent; even the most stubbornly ice-resistant coupled model we have puts it at ten.” Budyko’s energy-balance model gives runaway ice-albedo glaciation at a 1.6% reduction in solar constant; Sellers ~2%; the CCSM3 coupled GCM at 286 ppmv CO₂ gives 10–10.5%, with global sea-ice fraction jumping from 49% to 100% between 0.90 and 0.895 TSI₀. The early energy-balance models are known to overestimate ice-albedo feedback, which is why the poem brackets the range rather than claiming a safety margin. **This holds atmospheric composition and albedo at present-day values, over timescales short compared with the carbonate–silicate weathering cycle** — the qualification that keeps the claim standing against the faint young Sun paradox, in which a Sun 25–30% dimmer in the Archean did not freeze the Earth because the greenhouse, albedo and weathering thermostat all differed.

— Budyko MI (1969), *Tellus* 21(5):611–619, doi:10.1111/j.2153-3490.1969.tb00466.x · Yang J, Peltier WR & Hu Y (2012), *Journal of Climate* 25(8):2711–2736, doi:10.1175/JCLI-D-11-00189.1 · Feulner G (2012), *Reviews of Geophysics* 50:RG2006, doi:10.1029/2011RG000375 · Walker JCG, Hays PB & Kasting JF (1981), *JGR* 86:9776, doi:10.1029/JC086iC10p09776

“Just under half of all the photosynthesis on this planet happens out there.” Global net primary production is 104.9 Pg C/yr, of which oceanic is 48.5 Pg C/yr — 46.2%.

— Field CB, Behrenfeld MJ, Randerson JT & Falkowski P (1998), *Science* 281(5374):237–240, doi:10.1126/science.281.5374.237

“about half from those same giant deaths, and about half from... the detonation of white dwarfs.” Calcium is an α -element produced mainly by core-collapse supernovae (~70%) with a substantial Type Ia contribution (~30%). Iron is roughly half core-collapse and half Type Ia — and Type Ia progenitors are white dwarfs, the remnants of low- and intermediate-mass stars. The familiar line that “the iron in your blood was made in massive stars” is therefore only about half right, and the correction happens to be the poem’s own argument.

— Kobayashi C, Karakas AI & Lugaro M (2020), *ApJ* 900:179, doi:10.3847/1538-4357/abae65

“the sugar burning in your muscles right now is sunlight.” Essentially all carbon entering the human food chain is photosynthetically fixed; gluconeogenic substrates trace to the same origin. Chemosynthetic vent and subsurface ecosystems are a real exception to the general statement about the biosphere, and a negligible one for human diets.

“around three and a half billion years ago and possibly earlier.” Robust multi-biosignature evidence at the 3.48 Ga Dresser Formation; the 3.7–3.8 Ga Isua and Akilia graphite signatures are suggestive but not definitive, with viable abiotic explanations. Universe 13.797 ± 0.023 Gyr (Planck 2018); Earth 4.54 ± 0.05 Ga.

— *Phil. Trans. R. Soc. B* 380:20240106 (2025) · Planck Collaboration (2020), *A&A* 641:A6, doi:10.1051/0004-6361/201833910 · Patterson C (1956), *Geochim Cosmochim Acta* 10:230, doi:10.1016/0016-7037(56)90036-9

III — The Long Braid

“Every major jump in the complexity of life... things that had been independent stopped being independent.” The major evolutionary transitions framework: entities capable of independent replication before the transition can replicate only as part of a larger whole after it. Note that the poem deliberately avoids the popular framing of “cooperation *instead of* competition” — mainstream social evolution theory explains cooperation among lower-level units as a product of selection among higher-level units, and the two are not opposites.

— Maynard Smith J & Szathmáry E (1995), *The Major Transitions in Evolution*, Oxford · Szathmáry E (2015), *PNAS* 112(33):10104–10111, doi:10.1073/pnas.1421398112 · West SA, Fisher RM, Gardner A & Kiers ET (2015), *PNAS* 112(33):10112–10119, doi:10.1073/pnas.1421402112

“one cell took in another... some two billion years later.” Mitochondria descend from a bacterial endosymbiont related to modern Alphaproteobacteria, acquired by an archaeal host lineage. Recent site- and branch-heterogeneous phylogenomics favours mitochondria as *sister to* known Alphaproteobacteria rather than nested within them; molecular-clock estimates place the endosymbiosis around 2 Ga, with the last eukaryotic common ancestor by ~1.8–1.7 Ga. Dates remain actively contested.

— Sagan L [Margulis] (1967), *J Theor Biol* 14(3):225–274, doi:10.1016/0022-5193(67)90079-3 · Roger AJ, Muñoz-Gómez SA & Kamikawa R (2017), *Current Biology* 27(21):R1177–R1192,

“Nearly a quarter of everyone in this country was born in another one.”

Immigrants were 23.0% of Canada’s population (8.36 million) at the 2021 Census, the highest share since Confederation; projected 29.1–34.0% by 2041. Through the 2010s, immigrant workers accounted for 84% of total labour force growth.

— Statistics Canada, *The Daily*, 26 October 2022 · Statistics Canada 11-631-X, 22 June 2022

“Thirty percent of the nurse aides and orderlies and patient service associates.” Adult immigrants were 22% of the nursing and health care support workforce against 16% of all employed, and 30% of nurse aides, orderlies and patient service associates specifically.

— Statistics Canada 75-006-X, 28 May 2021

“A quarter of the people working in agriculture, and a tenth of those in food processing, are here on temporary permits.” Temporary foreign workers were approximately one-quarter of all agriculture workers and roughly one-tenth of employees in food and beverage manufacturing (2021). The poem keeps *immigrants* and *temporary foreign workers* as distinct categories throughout, because they are.

— Statistics Canada, *The Daily*, 13 June 2022

Related figure the poem does not use: Canada’s total fertility rate fell to a record 1.25 in 2024, far below replacement. It is tempting but no longer accurate to say Canada “relies on immigration for population growth” in the present tense — the population contracted slightly over 2025 following reductions in non-permanent residents.

— Statistics Canada, 22 April 2026; *The Daily*, 18 March 2026

“about four hours of unpaid work a day to men’s two and a half... roughly three quarters of all unpaid care work.” Canadian General Social Survey time use, 2022, population 15+: women 3.7 h/day of unpaid work against men’s 2.6 h (with paid work running the other way, men 3.9 h against women’s 3.0 h). Internationally, across 64 countries covering two-thirds of the world’s working-age population, women perform 76.2% of total unpaid care work hours — 3.2 times men’s share. The two measures use different definitions and are not interchangeable.

— Statistics Canada Table 45-10-0104-01 · International Labour Organization (2018), *Care Work and Care Jobs for the Future of Decent Work*

“across nearly three hundred studies it tracks, consistently, with worse mental health.” Meta-analysis of 293 studies: self-reported racism associated with poorer mental health ($r = -0.23$, 95% CI -0.24 to -0.21) and, more weakly, poorer physical health ($r = -0.09$). The poem says *associated*, not *causes*; effects were stronger in cross-sectional than longitudinal designs.

— Paradies Y et al. (2015), *PLoS ONE* 10(9):e0138511, doi:10.1371/journal.pone.0138511

“a hundred and forty-eight studies and three hundred thousand people... about fifty percent more likely to still be alive.” 148 studies, 308,849 participants, mean follow-up 7.5 years: OR = 1.50 (95% CI 1.42–1.59) for survival as a function of stronger social relationships. Note the direction — this is increased survival with stronger ties, not increased mortality from isolation, which is a separate and smaller effect (social isolation OR 1.29; loneliness OR 1.26).

— Holt-Lunstad J, Smith TB & Layton JB (2010), *PLoS Medicine* 7(7):e1000316, doi:10.1371/journal.pmed.1000316 · Holt-Lunstad J et al. (2015), *Perspectives on Psychological Science* 10(2):227–237, doi:10.1177/1745691614568352

“Four or more adverse childhood experiences... rise more than sevenfold... along a clean gradient.” Meta-analysis of 37 studies, 253,719 participants: against zero ACEs, four or more gave odds ratios above 7 for problematic drug use and for interpersonal and self-directed violence; 3–6 for mental ill health and problematic alcohol use; 2–3 for smoking, cancer, heart and respiratory disease. The dose–response gradient was first established by Felitti et al. Heterogeneity is considerable ($I^2 > 75\%$ for nearly half the outcomes), and the original ACE data are retrospective and drawn from a single insured population.

— Hughes K et al. (2017), *The Lancet Public Health* 2(8):e356–e366, doi:10.1016/S2468-2667(17)30118-4 · Felitti VJ et al. (1998), *Am J Prev Med* 14(4):245–258, doi:10.1016/S0749-3797(98)00017-8

“they join for belonging, standing, the feeling of being safe... the safety is not real.” The belonging-and-protection account is well represented in qualitative and theoretical criminology and in members’ own accounts, though the quantitative base is thinner than the theoretical literature implies — the Campbell systematic review found only nine eligible studies, all cross-sectional. What is firmly established

is the poem's sting: gang membership *increases* violent victimization while *decreasing* subjective fear of it.

— Melde C, Taylor TJ & Esbensen F (2009), *Criminology* 47(2):565–594 · Higginson A et al. (2018), *Campbell Systematic Reviews* 14(1), doi:10.4073/csr.2018.11

V — The Ones Who Already Knew

Treaty 7, the Niitsitapi, and the seventh generation. Lethbridge and the surrounding country lie within Treaty 7 territory, signed 22 September 1877 at Blackfoot Crossing, and within the traditional territory of the Blackfoot Confederacy — Siksika, Kainai and Piikani — with the region also part of Métis Nation of Alberta Region 3. The seventh-generation teaching is **Haudenosaunee**, from the Great Law of Peace, whose instruction to leaders is to have in view “not only the present but also the coming generations... the unborn of the future Nation”; the “seventh generation” formulation is the transmitted oral articulation rather than a quoted clause. It is *not* a Blackfoot teaching, and the poem keeps the two nations and their laws explicitly separate rather than merging them into a single pan-Indigenous wisdom, which would be both inaccurate and a familiar form of erasure.

— University of Lethbridge land acknowledgement (Board of Governors, 2019, rev. 2022) · City of Lethbridge land acknowledgement (rev. July 2024) · Graham LM (2008), *Harvard Human Rights Journal* 21(1):47–103 · Lyons O (1980), “An Iroquois Perspective,” in Vecsey & Venables eds., *American Indian Environments*

“more than a quarter of the surface of the earth... matches, and in places exceeds.” Indigenous peoples manage or hold tenure rights over at least 38 million km² across 87 countries — over a quarter of the global land surface — intersecting about 40% of terrestrial protected areas and ecologically intact landscapes. Vertebrate species richness on Indigenous-managed lands was slightly higher than on existing protected areas in Australia, Brazil and Canada, with more threatened vertebrates in Brazil and Canada.

— Garnett ST et al. (2018), *Nature Sustainability* 1:369–374, doi:10.1038/s41893-018-0100-6 · Schuster R, Germain RR, Bennett JR, Reo NJ & Arcese P (2019), *Environmental Science & Policy* 101:1–6, doi:10.1016/j.envsci.2019.07.002

Three claims cut because they do not survive scrutiny

“Most of your serotonin is made in your gut — so the gut governs the mind.” The premise is true: 90–95% of the body’s serotonin is made by enterochromaffin cells in the gut. The inference is blocked, because peripheral serotonin does not cross the blood–brain barrier. The two pools are functionally separate and the brain synthesises its own. This is the most common error in popular writing on the gut and the mind, and the first thing a referee would catch. The poem uses tryptophan instead, where the dependency is real and the mechanism is intact.

— Martin AM et al. (2017), *Endocrinology* 158(5):1049–1063, doi:10.1210/en.2016-1839 · Hardebo JE & Owman C (1980), *Annals of Neurology* 8(1):1–31, doi:10.1002/ana.410080102

“Every second breath you take comes from the ocean.” This conflates net primary production with net atmospheric oxygen supply. Nearly all oxygen produced by marine phytoplankton is re-consumed within the ocean; the net long-term contribution to the atmosphere depends only on the small fraction of organic carbon buried in sediments, and the atmospheric oxygen reservoir has a residence time of thousands of years. The poem claims the photosynthesis, which is real, and not the breath, which is not.

“Eighty percent of the world’s biodiversity is found on Indigenous lands.” Widely repeated, including by governments and NGOs, and without basis — formally repudiated in *Nature* in 2024 by a group of authors including Stephen Garnett, lead author of the 2018 paper the claim is usually attributed to. The poem uses the defensible finding instead.

— Fernández-Llamazares Á, Garnett ST et al. (2024), *Nature* 633:32–35, doi:10.1038/d41586-024-02811-w

And one claim used only with its hedge: “Dunbar’s number” — the idea that humans can sustain about 150 stable relationships — is cultural shorthand whose statistical derivation has been seriously challenged; re-analysis with modern phylogenetic methods gives point estimates from 16 to 109 with 95% confidence intervals running from 2 to 520, and concludes no specific limit can be defended. The poem therefore says only that our species “had only ever trusted the faces it knew,” and names no number.

— Lindenfors P, Wartel A & Lind J (2021), *Biology Letters* 17(5):20210158, doi:10.1098/rsbl.2021.0158