

OUTSIDE THE DARKNESS

*A Hypothetical Viewpoint
from the Edge of a Black Hole*



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JULY · MMXXVI

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LEGIBLE TRACES

THE USUAL DISCLAIMER

What follows is philosophy speaking the language of physics, and I will not pretend otherwise. The laws of physics that appear here are real, reported honestly. The conclusions I draw from them are not physics at all. They are the kind of thinking a person does standing at the edge of something enormous, and I have tried to keep the seam between the two visible the whole way through any of my writing.

The seam is not a flaw. The seam is the entire point.

The Edge

Imagine standing somewhere no one can stand.

Not falling — standing. Hovering, if you like, at the last safe distance from the darkest object the universe knows how to make. Below you, or ahead of you, or within reach of you if you will — direction is relative, and it stops meaning much out here — is a black hole. And the first honest thing to say about it is that it does not look like anything at all. It is not a thing you see with your eyes. It is a place where seeing gives out because light cannot leave it. A perfect circle of nothing, cut out of the star field, with the light of everything else behind it smeared and bent around its rim like the universe leaning in to look over its own shoulder.

People call it a hole, and the name does its work: we picture a drain, a mouth, an ending. The place information goes to die. For most of my life that was the respectable position, and it was held by respectable people. A black hole eats, and what it eats is gone — not hidden, not stored, but erased, the way a word is erased when the paper burns.

I want to spend a few pages standing at this edge and asking whether or not that is true. Not because I have new physics — I don't, and I won't pretend to — but because the physics that exists has quietly changed its answer in the last few years, and the new answer rhymes with something very old. Old enough to be carved into Egyptian tombs. Old enough to be spoken on a road in Judea.

And when the newest thing we know starts rhyming with the oldest thing we believed, a philosopher is allowed to stop and listen, and write.

The Skin That Knows Everything

Here is the first strange fact, and I will keep the mathematics in its scabbard: everything a black hole is, it is on its surface.

This is not a metaphor. When physicists in the 1970s worked out how much disorder — how much hidden information — a black hole contains, the answer refused to scale with its volume, the way it does for a room or a library or a brain. It scaled with its area. The skin. As if the interior were not where the story is kept at all, and the boundary were the entire book.

This grew into one of the deepest ideas in modern physics, the holographic principle: that what happens inside a region may be fully written on the surface that encloses it. The inside, on this view, is a kind of projection — real, but readable from the edge.

Sit with that. The most extreme object in nature, the one we named for its interiority, its depth, its swallowing dark — and the laws of physics tell us its truth is carried entirely on the boundary. Nothing about it is legible from within. Everything about it is legible from without.

There is a second fact that sharpens this to a point. It has the best name in all of science: the no-hair theorem. It says that from the outside, a black hole — no matter what fell in to make it, no matter whether it swallowed a star or a library or a civilization — can be described completely by three numbers. Its mass. Its spin. Its charge. That's all. Everything else, every particular, every

history, every face, is compressed out of the visible record. Three numbers. The universe's most brutal summary.

And here the philosophy starts before I can stop it from landing on the page, because I know this move. I have felt this move. It is what the world does to a person. From the outside, a life is compressed to a handful of numbers — an age, an income, a diagnosis, a headline. The particulars, the interior, the whole burning specific of a person, rendered as three lines on a form. The no-hair theorem is not just a statement about gravity. It is a statement about what any boundary does to what it encloses: it summarizes. The question — the only question — is whether the summary is all that survives.

III

The Argument the Universe Had With Itself

Fifty years, physics said yes. The summary is all that survives, and eventually not even that.

The reasoning was clean and terrible. Stephen Hawking showed that black holes are not quite black — they glow, faintly, and in glowing they shrink, and in shrinking they eventually vanish. And the glow, he calculated, is thermal: pure heat, featureless, carrying no fingerprint of anything that ever fell in. When the black hole finally evaporates away, everything it swallowed would be — not hidden, not scrambled, not encrypted — but genuinely, finally gone.

The trouble is that the rest of physics forbids this absolutely. Quantum mechanics is built on a promise called unitarity, which in plain speech says: information is never destroyed. It can be shredded, scattered, encrypted beyond any hope of practical recovery — a burned letter is not truly gone; its content is smeared into fire and smoke and ash, hopeless to read but present in the world long after it's gone. What quantum mechanics forbids is true erasure. The universe does not forget. Neil deGrasse Tyson likes to make the gentler version of this point with a glass of water: there are more molecules in a single cup than there are cups of water in all the world's oceans, so the water you drank this morning has, given time, passed through the kidneys of Socrates, of Genghis Khan, of Joan of Arc. That is matter refusing to be lost —

recycled, redistributed, anonymous but present. What quantum mechanics claims is stronger still: not just that the stuff persists, but that the story does.

So for half a century the two deepest theories we own stood at this edge and contradicted each other, and the contradiction gave itself a name: the black hole information paradox. It was, I would argue, the closest physics has ever come to a genuinely theological question. Is there a place where the record ends? Is there an outer darkness where what entered is not transformed but annihilated?

And then — quietly, in the last several years, in calculations I will honor by not caricaturing — the paradox broke. It broke toward memory. Physicists tracking the information content of the outgoing glow found that it follows the curve it would follow if the information comes back out. Scrambled beyond recognition, folded into the radiation in ways no instrument could ever practically unwind — but out. Conserved. The black hole, on our best current understanding, is not a shredder. It is a scrambler — in fact, the fastest scrambler nature allows — an encryption engine of perfect ferocity. What falls in is not destroyed. It is re-written, at the boundary, in a hand no one can read.

The record does not end. It becomes illegible. And illegible, as I have spent a great many pages of my life arguing in other places, is not the same as gone.

I V

The Kingdom Within

Now the theology, and I will keep it to a touch — but the touch matters.

When the Pharisees asked when the kingdom of God would come, the answer they received was a refusal of the question's geometry: the kingdom does not come with observation. It is not out there to be watched for. The Greek is *entos hymōn* — within you, or among you; the preposition holds both readings at once and I have never wanted to collapse them. Either way, the claim is the same shape: the decisive boundary is not located in the sky. It is located in the person.

This idea — that the gate is inward, and that what determines passage through the great darkness is not strength or station but inner condition — is one of the oldest structures in human religious thought, and it appears with a consistency that ought to make us listen and pay attention. The Egyptians weighed the heart against a feather; the same scale gave two different verdicts to two different hearts. The rabbis spoke of a divine fire that is torment to one soul and warmth to another — one fire, two experiences, sorted by the state of the one who enters it. Gregory of Nyssa, in the fourth century, taught that heaven and hell are not two locations but one Presence, encountered differently by souls in different conditions. Dante built a mountain that crushes the unready and lifts the purified — the same mountain.

One object. Two fates. The sorting done not at the gate but in the heart, long before arrival.

I want to be very careful here, because this is the exact place where a lesser honesty would blur the seam. So let me say it plainly: gravity does not work this way. The equivalence principle — the founding insight of general relativity — says that everything falls identically. Saints and stones. The horizon does not audit the soul; tidal forces do not read the heart. If you take the old religious structure and assert it as physics — that the aligned pass through and the incoherent are destroyed — you have not built a bridge between the traditions. You have made a category error, and worse, you have flattened both things: the physics into magic, the theology into mechanism.

And yet. Standing at the edge, neither side will stop whispering.

What Survives Scrambling

Because there is a sorting at this boundary. Not of souls — of structure.

When the information paradox resolved toward conservation, it resolved with a condition attached, and the condition is worth saying slowly. What survives passage through extreme scrambling — what remains recoverable, in principle, on the far side of the most violent encryption in nature — is whatever was most robustly encoded. Information that is redundant, self-correlated, error-correcting — coherent, in the strict technical sense — retains recoverable structure. Information that is noisy, decoherent, internally contradictory, dissolves into the thermal blur and joins the illegible background.

The horizon, in other words, does not sort by mass or worth or strength. But it does, in the mathematics, distinguish between what holds together and what does not. Coherence is what survives the crossing — not because the darkness is merciful to the coherent, but because coherence is simply what surviving is. To be conserved through scrambling and to be internally coherent are, at the deepest level physics currently reaches, nearly the same property.

And here I will slow myself down, because rhymes this good ask to be believed. A human being is not a quantum state, and alignment of the soul is not error-correcting code, and anyone who tells you the mathematics of horizons proves the doctrines of the heart is selling something.

But I am a philosopher, and philosophy is allowed to notice a rhyme without claiming a proof. And the rhyme is this: the oldest religious intuition we have — that the great passage is destruction from one side and transformation from the other, and that what makes the difference is carried within, prepared long before the edge — turns out to be structurally identical to the newest thing physics has learned about its most extreme boundary. The gate does not choose. The condition of what arrives at the gate was always the whole story. The kingdom is within is, at minimum, excellent information theory.

There is even a doorway, in the serious literature, for the oldest dream of all — that the darkness is not an ending but a connection. Two of our era's leading physicists have conjectured, in an equation of almost scriptural brevity, that wormholes and entanglement are the same phenomenon: that the "tunnel" between distant regions is the web of correlation between them. If they are right, then passage was never going to be a matter of traveling through anything. The connected are already on both sides. The tunnel is the relationship.

VI

Outside the Darkness

Stand at the edge one last time, and say out loud what can honestly be said.

The darkness below you is not an eraser. Our best physics now says the universe keeps its records even here — scrambled, boundary-written, compressed to a summary from the outside, but kept. The hole named for ending is, on current understanding, a keeper of a strange and total archive: everything that ever entered, re-written on the skin in the universe's most private hand.

Whether it is also a passage — whether anything coheres tightly enough to come through the far side of that re-writing as itself — is a question physics cannot answer for persons and I will not pretend it can. But I notice where every tradition that ever stood at a great darkness planted its flag, and I notice that the flag was never planted at the edge. It was planted in the heart. Prepare inwardly, the traditions say, because the boundary does not negotiate; it only reads. And now the physics of boundaries says, in its own dialect: what is written coherently survives the reading.

I do not know what is on the other side of the darkness, or whether "other side" is even a phrase that survives the crossing. Nobody standing outside can know; that is what outside means, and it is why this piece is titled the way it is. But I know this much, and it is enough to walk home with:

Nothing that we can find in the universe truly forgets. It only writes itself in any number of languages, or equations, or parables. As time goes on, the story gets more complicated. And the oldest advice we ever gave each other about the darkness — make yourself coherent before you arrive — has not been contradicted by anything we have learned at its edge.

It has, if anything, been transcribed.

