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Life After People

By David de Vries

What would happen?
If every human being on earth
Disappeared?
[music]
At some point in the future,
This could be the fate
Of our planet.
This isn't the story
Of how we might vanish.
It is the story of what happens
To the world we leave behind.
The disappearance of humans
May seem like science fiction,
But eventually,
There will come a day like this;
A day when people
No longer walk the earth.
it's no great stretch
To imagine humans disappearing
From the face of the earth.
Every generation has its tales
Of Armageddon or apocalypse.
We're the first generation
That could,
By deliberate actions,
Cause its own doom.
What will life be like?
After people?
We're tantalized by our myths
About our own destruction,
But also tantalized
By the notion,
"hey, maybe it's the turn
Of someone else."
What will they do?
If we're gone?
What will the earth do?
When I'm gone?
It's the most natural question
In the world.
[alarm buzzing]
Time has run out for man.
Our hold on the planet is over.
Welcome to earth,

Population zero.
Within hours after we're gone,
Lights start going out
Around the world.
More than 70 percent of power
In the United States
Is generated by the burning
Of fossil fuels.
the plant will only continue
To produce electricity
As long as the fuel
Takes to be consumed.
If there's no one around
To provide the new fuel
Into the generating plant,
Then it'll be quite quick
Before the lights
Start going out in cities
All over the world.
Nuclear power plants
Are unlikely to melt down.
The average reactor
Holds enough fuel
To keep running for two years.
But without humans
Consuming the power
Generated by the plant,
The reactors will automatically
Shut down into a safe mode
In as little as two days.
even wind generation
Can't last forever.
The turbines require bearings
And lubrication
Of those bearings
In order to keep operating.
If there's no one around
To maintain the turbines,
The electricity
Doesn't get produced.
as generating plants go down,
Outages on the power grid
Contribute to a cascade
Of failure worldwide.

After a few weeks,
The planet is plunged
Into a deep darkness.
It has not experienced
Since humans first huddled
Around campfires.
Perhaps, the last glow
Of artificial lights on earth
Will be seen
In the American southwest.
Here, the mighty Hoover dam
Hydropower plant
Takes little notice
Of the absence of humans.
Its source of fuel
Is virtually limitless.
at Hoover dam,
Our fuel supply
Is actually the water
In the reservoir in Lake Mead
Behind Hoover dam,
So as long as there's water
In the reservoir,
This power plant
Can keep running.
There's water in the reservoir
Keeps supplying the water
To the hydro turbine generators.
These generators
Are operating automatically
And that would continue
As long as all of the systems
Are functioning normally.
If I and my staff
Were to leave tonight
And not come back to Hoover dam,
Say just in the condition
Of the plant is in right now,
This would continue operating
Without us here.
That would still be true
After about a week,
Several weeks, several months,
Maybe even a couple of years,

Everything would still be
Running normally.
In a life after people,
It is possible that hover dam
Would be one
Of the last power plants
Still running.
as the power goes out
Around the world,
Other systems
Are quickly beginning to fail.
beneath all the major cities,
There's a complex network
Of underground tunnels,
And these are there
For drainage purposes
Or for cabling purposes,
And in the case
Of the big cities,
For transportation as well.
There are many of those
Sit below the level
Of the water table,
And in order to keep them dry,
We have to have
A system of pumps
That is switched on
When necessary
To drain the tunnels.
deep within new York
City subways,
More than 700 pumps
Constantly struggle to keep out
A flood of ground water,
An average of 13 million gallons
A day.
now, if all these people
Were not around,
There will be nobody
To switch the pumps on.
It's estimated,
That the tunnels will fill
With water in about 36 hours.
[music]

back above ground,
Food is rotting
On supermarket shelves.
Home refrigerators
Become nothing more
Than cabinets for decaying food,
But melt water
From defrosting freezers
May provide a temporary lifeline
For some of the creatures
We've left behind.
What will be the fate?
Of our family pets
Once there are no humans left
To care for them?
right from the get-go,
There's going to be a massive
Die off of dogs.
The instance that humans
Are gone,
They're not creating the debris
Or producing the food
That the dogs are living on.
He can't open cans,
He can't get
In the refrigerator.
They got to get
Out of the house.
The family dog
Has got to get out of the house
Or he's going to die there.
And once he gets out,
He's got to go
To some source of food.
The first thing that happens
Is that they all jump out
Of the windows
And they are now out there
In a new landscape.
And the first to whack at it
It is that they go back
To scavenging a whole bunch
Of dead things out there
In the world.

there are estimated to be
Four hundred million dogs
In the world
And 300 different breeds.
But very few of them are suited
To surviving in a life
After humans.
The smallest dogs
Probably won't last a week
Without us.
there's probably no niche
For the smaller dogs.
Dogs are very competitive
And when you have wolves,
They displace coyotes,
Coyotes displace foxes,
And we would assume
That hierarchy would prevail
Among domestic dogs.
in fact,
Many of the unique features
That has been bred into dogs
Over the years
Will now become major handicaps
In the fight for survival.
there are dog
For the really short legs,
I think the dogs
With the really short faces
Or long faces, I think,
That they're all doomed.
You know, they're not
Going to move well,
They're not going to be able
To search and explore.
I think that the kind of
The middle of the spectrum,
The kind of average dog,
Have the best chances in this.
I think that they will survive
In the long haul,
But it's not going to be pretty.
as the surviving dogs
Struggle to find

Their new niche,
Household pests
Are slowly beginning to notice
Our absence.
Little creatures,
Rats and house mice,
They would seem to be able
To exist without us
Are surprisingly quite dependent
On our food supplies.
rats and mice
Are usually termed
"commensally rodents," which means
That term means literally
Sharing the table.
They're very dependent
On people.
And the little house mouse
And Norway rat
Are great examples of animals?
That would do less well
In the absence of people.
in the initial weeks
After people are gone,
They will raid pantries
In homes, in grocery shelves
In stores.
After eating through
These food supplies,
They will struggle to survive
On things like cardboard, cloth,
Or glue.
I think that if a city
Was abandoned,
The rats would have to go back
To earning an honest living.
An honest living
Means to go back to the wild
And compete for resources there.
eventually, these rodents
Will abandon homes
And buildings,
Which will make them?
Easy pickings for predators.

Although, rats and mice
Will mostly likely survive
In the future,
Their numbers
Will be greatly diminished.
After six months
Into a life after people,
Urban areas
Are already taking a turn
For the wild.
the predators would return
Very quickly in the absence
Of humans
Because we suppress them,
We create conditions
That either work against them,
Or we deliberately go out,
And remove and destroy them.
They would come back
Very quickly.
smaller predators
Like coyotes and bobcats
Always survive on the fringe
Of human populations.
They are the first to colonize
Our abandoned neighborhoods.
Larger carnivores
Will have to wait longer
For the habitat
To recover enough
To support their appetites.
But soon enough, they, too,
Will hunt in what
Were once our backyards.
]
One year into a life
After people,
Towns and cities
Are still recognizable.
But nature
Is beginning to reclaim
Her old turf.
one of the first
Great physical effects

In the absence of people
Would be the transition
Of the impervious surfaces:
The parking lots, the roads
Into places that supported
And then had an abundance
Of plant life.
any place
Where you have sunlight
That's hitting,
You're probably going to get
Some plant growth.
Little seeds
Are going to get stuck
In the cracks and so forth,
And these things
Are all going to start to creep?
Plants are wonderful that way.
They can destroy things
In matters of, you know,
A few years.
without humans
To remove them,
Weeds like dandelions
Infiltrate every crack
In the pavement.
As these weeds die,
Their remnants combine
With ever-spreading moss
And lichen
To create a layer of topsoil.
This sandy soil
Is poor in nutrients,
So only plants like clover
That can pull nitrogen
From the air
Flourish at first.
Formerly manicured yards
Morph into fields
For a white-tailed deer
Forage for food.
Wild animals have also begun
To find their way
Into abandoned cities.

Man's supposed domination
Over nature
Has proven to be quite tenuous.
The signs of our vulnerability
Have always been there.
this is an ailanthus tree.
It seems to enjoy rooting itself
In very inhospitable locations.
And it likes to attach itself
To crevices in buildings.
And when it does so,
It causes damage.
The roots expand,
And the expansive forces of that
Force out mortar
And stone and cause crumbling
Of a facade.
If you get a lot of this
On an entire building facade,
It could cause
Major, major damage.
as nature battles back,
Even manmade goliaths
Like hover dam
Aren't invincible.
To harness the power
Of this river
Took 21,000 men and five years
Of hard labor.
But one year after people,
Its 17 massive and seemingly
Indestructible generators
Are about to be brought down
By an organism
The size of a human thumbnail.
The lake above the dam
Is infested
With an invasive species
Of mollusk
Called the "quake mussel."
This stealthy invader
From Eastern Europe
Had no natural predators
In North America

Other than the humans tasked
With scraping it from the grates
And pipes it colonizes.
the mussels attach themselves
To the inside wall of pipes
And they're very prolific.
They colonize
And rapidly build up
And can grow
On top of each other,
And eventually completely block
The diameter of a pipe.
the small pipes
That brings cooling water
To hover dam's generators
Make perfect homes
For these creatures.
And with no people around
To remove them,
They spread like a cancer.
and in fact,
Those mussels could clog up
The cooling water pipes,
To the point
Where we couldn't keep
These generators cool anymore.
And it would cause
The high temperature alarm
In the automatic control system.
And that automatic
Control system
Would then start
The shutdown sequence
Of that generator.
Well, that would happen
One by one
For all of the generators
Of hover dam,
And eventually
The entire power plant
Would be shut down.
in lass Vegas,
The last glimmers
Of manmade light on earth

Relinquish the night
To its primeval blackness.
With the generators
No longer running,
No water at all
Is passing through hover dam.
And the Colorado River
Downstream begins to run dry.
On the other side of the dam,
The water has nowhere to go
And Lake Mead starts to rise.
it would just keep
Building up in Lake Mead.
And it would eventually
Gets to the point
Of spilling over
Through the spillways
On either side of the dam.
unchecked,
Nature's most powerful elements
Reclaim their supremacy
On earth.
Triggered by lightning strikes,
The wildfires
Those humans once battled
So valiantly
Now rage unchecked.
Cities and neighborhoods
Full of abandoned buildings,
Wild grasses, and debris
Is prime fuel for the flames?
Chicago burns.
San's
Stately wooden Victorians
Are now only useful as kindling.
And just as it did
In the time of the ancients,
Rome is burning again.
As structures
Burn to the ground,
Charred timbers
Release nutrients into the soil,
Providing the next wave
Of plant life,

With the nitrogen
It needs to grow
And thrive.
Five years after people,
The roads of the world
Are disappearing
Beneath a green map
That spreads
Like some relentless monster.
The advance of nature
Knows no boundaries.
The gates
Of London's Buckingham palace
Are easily breached by vines
And moss.
In Moscow, red square
Is becoming very green.
in reality,
Nature will reclaim earth
Very quickly.
These stairs were cleared
18 months ago.
If we came back
In another 18 months,
We'd have a hard time
Finding them.
If we came back in five years,
It would be almost impossible
To find.
man's mastery over nature
Has always been
Just an illusion.
When the Cambodian city
Of Angkor
And its temple complexes
Were abandoned in 15th century,
Jungle trees grew
Indiscriminately
Over its stone structures.
Entangling them in their roots.
Now, without armies of gardeners
And repairmen,
Modern cities are laid bare
To nature's revenge.

In New York's central park,
The great lawns, now untended,
Sprout with saplings.
Five years without humans
Leaves the park
Looking more like a forest.
central park will go bananas.
So all of a sudden
You'll get trees,
You'll get growth.
All the animals and plants
That is there now will go up
In population levels
And they'll start to spread out
Into the city.
the story is the same
In Washington o.k.
The great monuments
Have been swallowed by greenery.
And on what used to be
The national mall,
The sounds of the jungle
Are echoing.
zoo animals
Are really the great unknown.
Depending on whether or not
They could escape
From their confinement,
Then things change dramatically
Because you might have lions,
You might have tigers;
Both of which
Would be perfectly capable
Of surviving
In a post-human period.
They'd do better further south
Than they would do
in Washington o.k.
But these are animals
That is perfectly capable
Of figuring out how to do it
And how to survive.
zoo animals
May be the great unknown

But there are things
We can know for sure
About life 20 years
After people are gone
Because there's one spot
On the globe
Where it's already happened.
[music]
it's 20 years
Into a life after people.
Without humans
To apply fresh paint
And fill in cracks,
Even concrete buildings
Have already begun to crumble.
Lack of maintenance turns cities
Into eerie ghost towns.
Animals that have long avoided
Human population centers
Now return to make new homes
Among the decaying walls.
How do we know this?
Because there's one place
In the world
Where it's already happened.
we're standing
In the central square
Of prepay, Ukraine,
The city that was once
The most modern city
In the former Soviet Union.
For 20 years now,
This city
Has been sitting abandoned,
And it really gives you
A picture of what would happen
If people are removed
From a place
Of normal civilization.
evacuated after
The Chernobyl nuclear disaster,
Prepay went
From a city of 50,000
To ghost town overnight.

Dust-covered school rooms remain
As students left them
Just over 20 years ago.
Vegetation pries apart masonry
As it crawls over buildings.
An amusement park
Scheduled to open
Four days after the date
Of the accident
Remains never used.
The park's ferries wheel
Accumulates rust
Rather than riders.
The bumper cars sit in a state
Of motionless decay.
Prepay has provided an amazing
And rare opportunity
To see what happens
To a manmade city
When humans disappear.
I can see
From my Geiger counter
That it's really quite safe
To be here,
Radiation levels
Were not very high.
But you can see
That we've really hit
A point of no return
In recapturing these facilities.
We're in what was
The cultural center
Of the city of prepay.
And indeed, this was a place
Where friends gathered,
Where there would be
Celebrations,
There would be balls,
There would be music,
There would be dancing,
There would be performing
On the stage here behind me.
But after 20 years,
The forces of nature

Have started to decay
This facility.
this concrete soviet facade
May look imposing
But it's no match
For the frigid Ukrainian winters.
As the temperature drops
Below freezing,
Water that has accumulated
In cracks, expands,
Exerting bursting pressure
That pulls apart
The masonry.
As vegetation grows unchecked,
The roots spread
Through foundations and stairs.
These roots suck in moisture
That makes them expand and grow.
Like miniature hydraulic jacks,
Over time,
They slowly push apart
The concrete.
this is only 20 years.
Can you imagine?
What this facility
Will look like after 200 years?
after the accident,
Scientists expected the worst
For the wildlife in the region.
Most of the trees
In a 1 1/2 square mile area
Around the nuclear plant
Were killed off by radiation.
Many animals died.
But incredibly, the effect
Of the absence of humans
For 20 years has outweighed
The initial damage
Caused by the nuclear nightmare.
this is the red forest,
An area
That was horribly impacted
By radioactivity
Due to the Chernobyl explosion.

And the trees that you see
Around me were killed
By the radioactivity.
The original amounts
Of radioactivity were sufficient
To kill all of the wildlife
In the region as well.
But now we see resurgence
Of the wildlife.
As an example of how wildlife
Has prospered here,
We see, here, we have an antler
From a red deer and, obviously,
A fairly large
And healthy red deer.
Red deer are hardly found
In any other areas
In this region
And the Chernobyl zone
Is the only place
That you'll find populations
Of red deer.
We also find Russian wild boars
That the populations in the zone
Are 10 to 15 times higher
Than they are outside
Of the zone.
[speaking Russian]
we're now at the kindergarten
Of Karachi village, not far
From the Chernobyl station.
Children were living here
While their parents worked.
But after that night
In April 1986,
They never returned.
We are in what was formerly
A bedroom in this kindergarten
Where children used to sleep
And rest.
Now, there's
Certain emptiness here.
All these windows are broken.
But the room continues

To live on.
Birds fly in here
And sit on these bars.
We even found evidence
That an owl comes here.
An owl, it regurgitates food,
Fur, bones, and feathers.
Evidently, it likes to sit here
On this window pane.
So this room continues
To maintain life.
Even trees which had proven
Especially vulnerable
To radioactive fallout.
Are finding new homes
In the evacuation zone.
I'm sitting
In the pipit soccer stadium
Where, 20 years ago,
Hundreds of people would come
And cheer
On their favorite team.
You can imagine the laughter
Of the sounds
Of the crowds here.
The activity on the field
Which, 20 years later,
Is barely discernable.
The soccer field now is going
Through succession
As you would expect in returning
To what it was originally
Hundreds of years ago
Which was a mixed?
Deciduous forest.
I grew up in a town
About like this
And I used to enjoy
Riding bumper cars like these
About a half a world away.
And it seems pretty sad
When you look now
And you see what's become
Of this beautiful city

Of pipit and that people
Will never live here again.
But there's another side
To this story,
A very encouraging side;
One that says that life
Is much more resilient
Than what we thought possible.
That in the absence of man,
That life will continue
And that life will thrive
And that the legacy of life
Will always be here,
Because we are a part of life.
Even if we disappear,
Our legacy of life
Will continue.

[music]

Through decaying neighborhoods
In search of their next meal.
In some of the great cities
Of the world,
Solid ground is getting harder
To find.
In the time of humans,
London was protected
From tidal surges
By 10 retractable steel gates
That could be raised
During storms to seal off
The Thames River
From the North Sea.
Without humans
To operate the barrier,
London is defenseless.
Another low-lying city,
Amsterdam,
Meets the same watery fate.
In a New York City high rise,
Some windows have already
Cracked and slipped loose
From their frames and many more
Are on the verge of destruction.
After a quarter century

Of exposure to moisture
And heat without maintenance,
The normally flexible window
Sealant has become rigid,
Locking this window
To its frame.
As the metal frame expands
And contracts with changes
In temperature,
It induces stresses
On the glass.
It cracks and plummets
To the sidewalk below.
after a few of the windows
Fall out of a building
Like this,
Then the wind pressure effect
Changes dramatically.
As well as external pressure
Coming on to the building,
You also get suction.
And that aggravates the problem
So more of the panels
Are likely to fall out.
through these gaping holes,
The building fills
With windswept debris.
A summer storm rolls in.
On top of the structure,
The copper-lightning deterrent
System that once protected
Thousands of office workers
Is now corroded and useless.
A lightning bolt turns the tower
Into a raging inferno.
The gutted building makes
The perfect home
For a surprising survivor.
Although pigeons once relied
On the handouts of humans,
They have done just fine
In 25 years without us.
pigeons are survivors.
They can live in the wild;

They do live in the wild still.
And in a period
Where there were no people
But there still were edifices
And artifacts, our buildings,
They would do very well
Because they would adopt these
As kind of
Artificial cliff faces,
Which is what they really are?
Adapted to.
like the pigeon,
The disappearance of humans
Forced a change in the habits
Of the lowly cockroach.
think of the poor cockroach
After they gorge
Upon our surplus
When we're gone,
They'll mourn us.
They'll be sorry.
but the morning won't last
For long.
While cockroaches thrived
On our scraps,
They can also eat bookbinding's,
And cardboard,
And any rotting organic matter
Including dead leaves and roots.
While food isn't a problem,
Roaches also need warmth;
The kind that humans
Had always supplied
Through artificial heat.
Cockroaches started
As a tropical species
And some experts say
They couldn't survive the winter
In colder cities.
But it's hard to bet
Against a creature that has seen
The dinosaurs come and go.
cockroaches are
Extremely adaptable.

They've been around
For 300 million years.
If I have to bet,
I'd put my money on them
Being able to survive
In one form or another.
the first winter
After humans did witness
The die-off of some cockroaches,
But many more moved underground
To find warmth until
Milder temperatures returned.
In an abandoned downtown
Devoid of insecticides,
Overrun by vegetation
And with a rising water table,
This former pest is now enjoying
A golden age.
Cockroaches were only a nuisance
To humans,
But wolves were a terror.
So man hunted them mercilessly.
When the first European settlers
Arrived in what is now
The United States,
It's believed nearly half
A million wolves roamed
The country side.
By the 20th century,
These predators
Were nearly extinct
In the lower 48 states.
Now, with no humans left
To battle them,
Wolf populations multiply
By as much six times each year.
Within 25 years
Of our disappearance,
There could easily be half
A million of them roaming
The united states again.
This amazing comeback
Has been seen
On a small scale before.

In 1995, biologists released
A few dozen wolves
Within the boundaries
Of yellow stone national park;
A place
Where they would be protected
From persecution by humans.
Within a decade,
A few dozen had multiplied
Into 1,500
And the wolves
Quickly spread out
From their release point
To occupy territory
Throughout the states
Of Wyoming, Montana, and Idaho.
it would be fast
If you can start
With just a few dozen wolves
And in the course of one decade,
Have a population of 1,500
And you could have
A geographic expansion
Where they filled up a big chunk
Of a three-state area.
And these are
Big western states.
Yeah, when the conditions
Are right,
They can re-colonize
Pretty rapidly.
Could we see them in Manhattan?
Or Chicago?
As soon as the deer get there,
The wolves will be right
Behind them.
animals haven't
Just been hunted by humans;
They've also been hemmed in.
There are roughly three million
Miles of paved road
In the united states alone.
And it's no coincidence
That many of them cut

Right through the paths
Animals use to get from place
To place.
the things that make
A landscape good
For animal movement
Also make it easy to engineer
A road in that location.
So, we've cut off pretty much
All major migrations
In North America.
asphalt and automobiles
Wreaked particular havoc
On the grizzly bear.
Their habitat
Was so carved up by roads
That they're confined
To isolated pockets,
Cutting them off
From food sources
And potential mates.
In a life after humans,
Roads are no longer barriers
For the grizzly.
Instead they are pathways;
Trails that lead them back
Into the heart
Of their former range.
forty years after people.
While cities of steel
And concrete
Are still standing tall,
The suburbs are under attack.
Roughly 90 percent of all homes
In the United States
Have wood frames.
While some have burned,
Others are now being devoured.
Without paint and preservatives,
The lumber of homes
Is defenseless against termites.
Termites feast on cellulose,
The basic building block
Of wood.

And their appetites
Are relentless.
Some colonies can eat
As much as 1,000 pounds of wood
Per year.
In this destructive advance,
The termites
Aren't working alone.
the process we know
As rotting will occur
When the wood gets exposed
To the elements.
And this rotting, actually,
Is a more complicated process.
It's a process by which microbes
Attack the wood
And release carbon dioxide
And methane to the atmosphere.
If humans were to leave,
It'd be a matter of decades
Before most structures
That had significant
Wood components
Would start to decay.
faced with
A two pronged attack
From termites and rot,
The beams that hold up the roof
Give way.
And the boundary
Between inside and out,
That had once been so important
To the humans
Who called this building home?
Is forever erased.
other substances
Like this mortar and rock
Are going to last longer
Than several decades,
But they'll still crumble
After natural, chemical,
And physical weathering
Processes,
And eventually these walls

Will fall down as well,
And there'll be no remnants.
now, nature will act quickly
To swallow up these ruins.
This crumbling house
In Baltimore's druid hill park
Was once home to the caretaker?
Of the city zoo.
it looks like this building
Has been abandoned
For more than a hundred years.
But in reality,
People have been living here
Up till 40 years ago.
It's amazing how quickly
The vegetation has reclaimed
The area.
The vines have started to climb
Up the walls.
The trees are growing
Into the structure,
And they're both physically
Pulling the structure apart,
And chemically dissolving it.
structures built entirely
Of stone or masonry
Will far outlive
Anything made of wood.
Exactly how fast
They will crumble depends
On their environment.
the coast of Maine, really,
Isn't very kind to buildings.
Structures out here
Don't so much decay
When you live them alone;
They melt.
these structures
On black island, Maine
Used to be part
Of granite quarry whose stone
Was used to build and decorate
Cities like Boston, New York,
And Philadelphia.

It was abandoned around 1920.
here, the buildings
Have all vanished
Within the space
Of 80 and 90 years.
There's almost nothing left.
in the right conditions
And with human maintenance,
Stone construction can last
For thousands of years.
In some places in Europe,
Ancient roman aqueducts
Are still in use.
But without maintenance,
Stone can fall victim
To a very stealthy enemy.
one of the great enemies
Of stone are actually salts
And salt crystals.
Even thousands of years ago,
People notice the effect
That salts had on deteriorating
The ancient pyramids.
there are many ways
Salts infiltrate stone buildings

And monuments:

Polluted air, seawater,
And even bird droppings.
soluble salts dissolve
In water,
And as the water evaporates,
It will rise up inside
Of porous building materials;
Things like brick and stone
And even concrete.
And what happen are the salts
Will continue to grow
Inside the pores of the stone
Until they come up
Against the side of the wall,
And they'll actually push
The stone apart.
what we're seeing

In this time-lapse video
Really shows the rapid decay
Of the stone in response
To this deterioration by salts.
In this experiment,
It took about three weeks to go
From this piece of stone
To this piece of stone,
Which is completely deteriorated?
By sodium sulfate
Crystallization.
three weeks in this
Accelerated aging chamber
Are equivalent to a few years
In the harshest of environments,
Or a few decades in a more
Benign desert climate.
if we could see
Microscopically what's going on?
Inside the pyramids,
This is what
Would be taking place.
You can actually see the salts
Deteriorate the stone.
although not immune to decay,
The pyramids have survived
For nearly 5,000 years
Because of their sheer volume
And their hot,
Dry desert environment.
Too massive to be destroyed
By either man or nature,
The pyramids of Giza
Were the only one
Of the seven wonders
Of the ancient world to survive
Into the modern era.
Many ancient monuments
Have survived only
Because of human maintenance
Throughout the centuries.
The sphinx was uncovered
And restored for the first time
Back in 1400 back.

Modern experts who have studied
The sphinx, predict
That without human intervention,
Deterioration from salts
And wind erosion could render it
A pile of dust
Within 500 to 1,000 years.
The largest concrete structures
Like Hoover dam, will last
Even longer than that.
Hoover is so thick
That over 70 years
After it was constructed
The concrete deep inside
Was still curing.
But of the 15 tallest dams
In the United States,
Only 10 are concrete.
The others are made of compacted
Rock or earth,
Like northern California's
Trinity dam.
If there were humans around,
This leak in the dam would get
An emergency fix.
But those days are long gone.
Some of these dams
Are absolutely enormous.
And if they fail,
As they will in time,
Then the surge of water
That falls in behind them
And cascades
Down a valley below
Would have a huge force,
Big enough to sweep away
Everything on its path.
Fifty years after humans,
The strain of neglect
Is beginning to show
On even the best design
Of manmade structures.
Everything that man designs
Carries within it, the seeds

Of its own destruction;
That includes bridges
And buildings.
The Brooklyn Bridge,
One of the most famous bridges
In the world for over 125 years.
The reason
Those bridges last so long
Is because engineers
Look after them.
They inspect them regularly,
They maintain them,
They paint them,
They replace pieces that need
To be replaced.
Without people,
Without engineers,
The deterioration process
Will accelerate dramatically.
the most vulnerable parts
Of a suspension bridge
Are the steel vertical hanger
Cables.
these have been tested
In the laboratory,
Unfortunately not on the bridge,
But what you see
Is a classic kind of a failure?
That occurs in these wires.
These are the individual wires,
All right?
That's an individual wire.
That probably has
A tensile strength
That's maybe 200,000 pounds
Per square inch.
That's a very high strength
Steel.
as strong as they are,
These cables have a fatal flaw:
It's the stuff they're made of.
steel is a mineral
That comes from the earth
That's mostly iron,

So it's probably
95, 98 percent iron.
exposed to moisture
In the environment,
Iron will start to revert
Back to the minerals
It came from.
Ashes to ashes, dust to dust.
it's going to go back home.
It came from the earth
As iron oxide of some form,
And it's going to go back.
this is the process we know
As corrosion,
And you see it wherever steel
Is exposed to moisture.
the enemy of steel
Is corrosion.
The problem
Is keeping the water out.
Part of that is maintenance.
If you don't maintain them,
You will get corrosion.
completed in 1883,
The Brooklyn bridge cost
\$15 million to build.
Over the last two decades,
\$3 billion have been spent
Maintaining it
And the other bridges
Over the east river.
In the time of humans,
The Brooklyn Bridge
Was continually maintained
And fully repainted,
Roughly, every dozen years.
While across the country
In San Francisco,
The golden gate bridge
Was protected at all times
By a vigilant brigade
Of 17 iron workers
And 38 painters.
what do they do all the time?

They will tell you, "We paint
This bridge continuously."
What happens when that stops?
I can tell you what happens
When that stops.
The cables begin to rust,
The paint peels off,
The wires begin to break,
And they'll come to a point
When the bridge
Is going to come down.
seventy-five years
After people.
Most of the 600 million cars
That once traveled the roads
Of the world
Are now just rusted remnants
Of the human past.
abandoned cars will behave
Differently depending
On the environment
That they're in.
A car left in the Mojave Desert,
For example,
Is going to last a long time.
A car abandoned
In my native Scotland
Is going to have
A very different fate.
Any cars
In a coastal environment
With salt in the atmosphere,
They might not last
More than 20, 30 years.
tires deflate
Within a few years,
Although the rubber
And synthetics they're made of
Will remain intact
For centuries.
Paint deteriorates quickly.
And once it flakes away,
Rust corrodes the car's body
At a rate of 5,000ths

Of an inch per year.
Seventy-five years after humans,
Most cars,
Even in the most forgiving
Of environments,
Will be reduced to skeletons.
After a century, the family car
Is a barely recognizable heap
Of metal.
It's now 100 years into a life
After people.
The Brooklyn Bridge,
Which had stood?
For over 125 years with people,
Can't survive even a century
Without them.
As the cables fail,
The deck and railings begin
To warp and sway.
The deck pulls free,
And the roadway spills
Into the east river.
as an engineer,
It's very sad to contemplate
That this beautiful iconic
Structure has got an end
To its life.
But without maintenance,
An end to its life
It certainly has.
how exactly do bridges fail?
Once corrosion starts,
The wires begin to crack.
and the wire
Doesn't have to have
A very big crack
Before it breaks.
Maybe a third
Of the way through.
You may wonder what happens
When they fail.
How do they fail?
Do they just break?
And what do they do?

And the answer
Is they tend to shred and fail,
With individual strands
Starting to fail
And then, kind of, cascading,
And a whole series of wires
Then begin to break.
a suspension bridge
Like the golden gate can survive
The weakening of one
Of its vertical cables.
But once two or three
Start to go,
The whole bridge is in jeopardy.
Twisted steel crashes
Into the waters below.
it's going to be gone.
Two hundred years?
I doubt it will last 200 years.
The bridge is going to be
In the drink.
[music]
if some
Of our largest structures
Have already failed
After 100 years,
Can there be any hope
That our civilization
Will leave a permanent mark
After we're gone?
What will remain of the records?
Of our history and culture
A hundred years after people?
our vaults contain
Our most precious materials,
And their biggest enemies
Are temperature and humidity.
As long
As their long-term storage
Is kept at these
Very controlled settings,
We feel assured
That the materials
Will be lasting a long time.

stored

Under ideal conditions,
Paper and film both have
An estimated shelf life
Of 200 to 300 years.

But expose them to the rigors
Of an uncontrolled environment
And that lifespan is cut
At least in half.

if all the power went off,
Probably within a week,
We'd see very big spikes
In the temperature and humidity.

in this hostile environment,
Cellulose acetate,
The most common material
Used for films and photographs
Throughout the 20th century
Begins to bubble and warp.

All of that culture and history,
From the landings on d-day
To Hollywood films
And even your cherished
Home movies and photographs,
Won't last a century
Without the care of humans.

so, those precious images,
Given time,
Are going to end up like this.

All of these are examples
Of various stages in the decay
Of cellulose acetate-based film
Exposed to very high amounts
Of humidity.

Essentially,
These materials are finished.

in libraries,
The great repositories
Of our collective knowledge,
The damage comes
From microscopic invaders.

Although we can't see them,
Mold spores
Are on all the surfaces

Around us, lying dormant,
Biding their time
For the right conditions
To strike.
High humidity
Creates the right conditions.
and so,
The situation is set up
For the mold to really boom.
some books and documents
Will avoid this fate.
The Dead Sea scrolls
Survived 2,000 years in caves
In the Judean desert,
Owing their longevity
To the arid climate
And lack of damaging sunlight.
But these are rare exceptions.
so without
Human intervention,
A book like this might last,
At best, another hundred years.

[music]

even our digital media
Won't last forever.
Estimates for the lifespan
Of cads and DVDs range
From a few decades
To a few centuries
Under ideal conditions.

we know
About the ancient Egyptians
Because what they left behind
Was engraved in stones.

[music]

Our form of capturing knowledge,
Information, our history,
Our advancement is typically
Either in a computerized form,
In a cod, or in a printed paper
Like this.

What we have here is something
That will degrade over time.
It will not last

For thousands of years
Like what
The ancient Egyptians
Left behind.
it seems pretty ironic
That with all of our advances,
We still have not come up
With anything as durable
As clay tablets and stone tools.

[music]

150 years after humans,
The subways
That had started to flood
In the first 36 hours
Are now flowing
Subterranean streams.
The beams and archways
That holds up the roofs
Of these tunnels
Are on the verge of collapse.
now, these tunnels
Are not far below street level.
These columns are supporting
Not just the roof of the tunnel,
But the street above.
And in time that these tunnels
Are inundated,
Flooded with water,
Corrosion will start
To take hold and we'll start
To see collapses.
the tunnels echo
With the sound
Of cracking steel and cement
As the streets above
Are sucked into the underground.

[music]

Above ground, life in the city
Is once again bustling.
Vines have grown up the sides
Of abandoned skyscrapers,
Adapting to feed off rainwater
That pools in crevices
And on ledges.

these vines all start up.
And the vines
Have little branches.
It'd be nice
If they produce a fruit
Or something that was edible.
You got to have a plant
With some fruit or, you know,
Some source of energy
For animals.
And then you would get
This vertical ecosystem
Out there, and you would get
Birds nesting in there.
You get things
Hunting in through there.
You could have snakes there.
You could have
All kinds of things.
as insects
And smaller animals
Get established,
Cats move in.
and there's some
Interesting examples of that
Around the world.
If you go to the coliseum--
You just look in it--
It's just loaded with cats.
And the old tombs
And old catacombs and so on
Get loaded with cats
That uses this as a living space
From which, then,
They radiate out during the day.
these felines
Are the descendants
Of our former house cats.
Immediately after people
Were gone, they replaced
Their human-supplied diets
With field mice and small birds.
Hunting out in the open
Was hard work.

But up here,
The pickings are easy.
Now, they live
Their whole lives
High above the city,
Finding all that they need
To survive without
ever having
To touch the ground.
They are the kings
Of the new high altitude
Food chain,
With million-dollar views
Of a bizarrely
Altered cityscape.
I could picture new York city
With all the buildings
Covered with vines, you know?
Hawks sailing around.
It'd be lovely.
It would be absolutely lovely.
[music]
for cats,
Life in this new environment
Could eventually lead
To some strange adaptations.
I suppose, if you wanted
To be really imaginative
About it, you could say that,
Eventually, they could be
Like flying squirrels and so on.
They could glide from places.
The possibility is always there
For some imaginative responses
To this unusual environment.
while some cats
Have made a great leap forward,
Many dogs have reverted
To the ways of their ancestors.
Some that have interbred
With wolves now fall in packs
To bring down larger prey.
[music]
I think our dogs,

As placid as they may seem
When they're in our homes
Lying on the living room floor,
Still posses the instinct
To survive,
Enough that they would be able
To do whatever it took
In bringing down prey
In order to live.

[music]

150 years after people,
The oceans are teeming
With life.
The creatures of the sea
Have welcomed
The disappearance of mankind.
historically,
We've treated the oceans
In two strange ways
At the same time:
A pantry and a toilet.
And over time,
Our ability to damage the ocean
Has grown and grown and grown.
with humans no longer fishing
And polluting the sea,
The path was cleared
For this astonishing recovery.
It has happened before.
During World War II,
Allied fishing trawlers
Avoided the north Atlantic,
And populations of fish there
Skyrocketed.
in here, the basic biology
Of these kinds of animals
Is working in our favor
Because animals
Like this sunfish
Can produce millions
Of offspring in a year,
Much more
Than an equivalent-sized
Terrestrial animal like a cow.

And because of that
Prodigious potential
To reproduce,
The oceans could come back
Pretty quickly
If the human population
Were suddenly to disappear.
research has shown
That in the 18th century,
Before the havoc
Caused by humans,
The oceans were capable
Of sustaining
Massive amounts of life.
so many whales
That they stink up the air;
So many tunas
That they froth the ocean;
So many turtles
That you could walk
Across the sea on their backs.
So, if people were to vanish
Off the face of the earth,
Then that's the kind of ocean
It could be.
[music]
seagulls are also
Flourishing, but it has been
A treacherous flight.
The abundance of food
From humans
Had allowed gull populations
To explode beyond what nature
Could normally support.
we humans
Are pretty messy species.
And for a very long time,
We had open landfill dumps
Where, as far
As we were concerned,
All the stuff
That wasn't fit to eat
Was just thrown out.
But from the gulls'

Point of view,
This was an amazing
Free lunch counter.
So, you had a lot of birds
That probably
Wouldn't have made it through
Their first winter
If they've had to feed
For themselves.
Suddenly, they had
All these free food
Available to them.
An immediate consequence
Of a world without people
Would be some very hungry gulls
Who would be very voraciously?
Looking for other things to eat.
after an initial die-off,
The remaining gulls
Took advantage
Of the recovering oceans,
Where plentiful schools of fish
Erased any memories
Of the human-manufactured feasts
They used to enjoy.
Two hundred years after people,
From New York to Chicago,
Seattle and Paris,
Our iron and steel icons
Are on the verge of collapse.
While it has outlived
Our great suspension bridges,
The Eiffel tower
Is not invincible.
In the time of humans,
Its iron superstructure
Was painted
Once every seven years
To protect it from corrosion.
In both age and structure,
The Eiffel tower
Has a lot in common
With the 300-foot high
Kinsman railroad viaduct

In Pennsylvania.
was a bridge
That was wrought iron
Originally.
It was reconstructed
About the turn of the century
In steel.
And what happens here of course
Is that unless it's maintained,
Corrosion occurs.
And what happens
With the corrosion?
The connection points freeze up.
They are not allowed to move.
And here are some pieces
From that viaduct.
You can see
That there's corrosion
All over the place.
That's no longer steel.
a structure
With frozen connection points
Can't absorb the stress
Of high winds.
eventually,
In this strong wind storm,
It literally fell over.
Section by section,
Piece by piece,
It fell over into the valley
Where it had spanned the valley
For over a hundred years.
Just not maintained.
You can think of many structures
That is coming
From that same era
Like the Eiffel tower,
Its iconic structure.
That doesn't shield it
From the fact that's it
In a corrosive environment.
And so in time
If you do not do anything
For that structure,

It will fail.
And it will come down.
the time between one
And 300 years after people
Will likely be the era?
Of the great collapses
Worldwide.
In Seattle,
The iconic space needle
Was designed to sway
One inch for every 10 miles
Per hour of wind,
But with its steel
Weakened by corrosion,
It takes little more
Than a strong breeze
For the symbol
Of the 1962 world's fair
To crash down from the skyline.
When humans disappeared,
Sea levels were already
On the rise.
In Manhattan,
Over the centuries,
Saturated soil
Around the empire state
Building's foundation pilings
Have allowed the building
To lean.
once a building strays
From the vertical,
Then gravity forces
Are also acting
Against the structure,
Increasing the stresses
At the base of the building,
Now we're unlikely to see
A skyscraper fall
Like a tree in the forest.
Once it does start to incline,
Gravitational force will cause
The top of the building
To collapse downward
On top of itself.

decay has also overtaken
The city of Chicago,
The birthplace
Of the skyscraper.
The sears tower,
The tallest man-made structure
In North America,
Has reached
The end of its reign.
The first 500 years
After people has been an era
Of decay and destruction.
Our concrete structures
Have lasted the longest.
The ancient Romans
Invented the first form
Of concrete.
And some of their structures
Remained intact
For over 2,000 years.
But modern concrete
Isn't nearly as durable.
It has higher water content
And is more loosely packed,
Which leads to more?
Air pockets and cracks.
Modern concrete structures
Have another fatal flaw.
below the surface
Of reinforced
Concrete structures,
There is a mesh
Of steel reinforcing bars
And they don't corrode
Because the concrete maintains
An alkaline environment
Around them.
Now, when that alkalinity
Breaks down,
As it will in time,
Then the steel
Will start to corrode.
as the steel rebar rusts,
It expands to three times

Its original volume
Creating an outward pressure
That causes the concrete
To crumble.
in very broad terms,
After 50 years
We'd start to see
Surface cracking on concrete.
After a hundred years,
Flaking of the concrete surface.
After maybe 500 years,
Most reinforced
Concrete structures
Will be gone.
we look at these images
Of our fallen civilization,
It helps us to identify
With the past,
With the Greeks and the Romans,
With the crumbled
Mud brick cities of urn.
Each of us knows
That our bodies
Are going to fall apart;
Why not our cities too?
a thousand years ago,
6 1/2 billion people
Called this planet home.
At the early 21st century,
More than half of them
Lived in cities.
Now those cities
Are unrecognizable.
after maybe a thousand years
Or so, the scene behind me
Would be very, very different.
There'll be very little evidence
Of buildings,
Very little evidence
Of the activities of man.
What we would see
Would be a jungle of vegetation.
the future of cities
In a life after people

Can be best imagined
By looking to the past.
this is minute street
In Greenwich Village.
Most new Yorkers might come here
And wonder why it curves
Like this.
It curves
Because once upon a time
There was a stream here,
And then a brook.
There were more than 40 streams
On Manhattan island.
All flowing down
And carrying the rainwater
Down to the sea.
So what happens today?
The rain falls, the snow melts,
But it flows
Right along the street
And down into that storm drain
There.
If there weren't people here
Anymore, there'll be no one here
To maintain the sidewalks
And maintain the streets.
They'd start to crumble up.
They'd start to break apart.
Trees would come back,
Vegetation would come back,
And eventually
The hydrological cycle
Would reestablish itself.
And who knows,
Maybe Minute Street
Might once again
Become minute brook.
using historic maps
And computer modeling,
Scientists
With the Manhattan project
Are rediscovering
What Manhattan Island
Looked like when explorer

Henry Hudson first sailed
Around its shores in 1609.
here we are in Foley square,
The administrative center
Of New York City
And location to the famous
Courthouses you see on TV.
This place hasn't always had
Such colossal buildings
And stony streets.
Once upon a time, 400 years ago,
The collect pond was here,
The freshwater source
For New York City.
Right behind me,
There was a stream that drained
Down to the Hudson River shore,
Another stream
To the east river.
And there was
This beautiful pond
That was nestled
In an amphitheater of hills.
So what would happen?
If all the people
Were to disappear?
The buildings,
They would tumble down.
The soil would start to reform.
Trees would start to grow
Out of them.
They would become the new hills,
The new amphitheater
Around this place.
Nature would reestablish itself
And slowly bring this place
Back into the green heart
Of what it means to be here
On planet earth.
new York city,
Like the rest of the planet,
Has changed radically.
The transformation
Is most shocking in Times Square?

As the once beating
Heart of the city is silenced
By nature's onslaught.
It's 10,000 years after people.
Could it be possible?
After only 10 millennia
That humanity has vanished
Without a trace?
Human scientists once predicted
That our history and culture
Would live on through our radio
And television broadcasts,
Which carry on?
Through the universe
Toward the infinite,
Perhaps to be tuned in
By an intelligent species
On a distant planet.
some people think
That there's an expanding shell
Of radio and television
From earth, expanding outward
Alerting the universe,
"here we are
And this is our culture."
Unfortunately,
Recent calculations
By of all people, the seta,
Search for extraterrestrial
Intelligence group,
Has shown that all
Of this dissipates
Within one and two light-years
Into noise.
if this is true,
Our signals won't even make it
Out to the newest star
Beyond the sun.
So what will remain 10,000 years?
After people to tell the story
Of the once great civilizations
That walked the earth?
Iron corrodes,
Concrete crumbles,

Wood and paper decay.
Still, some of what man
Built on earth remains.
The most colossal
Of our stone structures
Like the Great Wall of China
Have aged like mountains,
Subject to erosion,
But at such slow time scales,
They will still be recognizable
In some form for eons.
The great pyramid at Giza
Is so massive that it lasts
Long enough to be swallowed up
By the desert sands.
The hover dam
Built to be as tough
As the canyon walls around it
Is one of the last?
Man-made structures
Still standing.
But now thousands of years
In the future,
Earth is about to be visited
By the last
Of the great collapses.
it's the environment
That eventually wins.
Earthquakes, sandstorms, rain.
But there are a few exceptions.
I would have to say
That mounts Rushmore,
Carved out of solid granite
In an ecologically stable place,
The only enemy it has
Are wind-driven pellets of rain?
I think that mount Rushmore
May be around
A hundred thousand years,
Possibly 200.
Possibly even in time
To be looked at in awe
By the earliest
Of our replacements.

and who or what might
Those replacements are?
Perhaps chimpanzees
Might somehow make the leap.
but we have to consider this:
Some scientists believe
That it's easy for nature
To bring animals
Up to a clever level
Where they might use tools,
They might become masters
Of their environment.
But the leap to being able
To stare at the sky
And imagine a cosmos,
To be able
To contemplate yourself,
To be able to contemplate
Your own role in the earth,
This may be a leap
That was a sheer accident
For humanity.
In which case,
You're not talking
About a complete recovery.
You're talking about a planet
That may continue,
But nobody to talk about it,
Nobody to think about it.
if earth's
4 1/2 billion years of existence
Were condensed into 24 hours,
The passage of 10,000 years
Would be a fraction of a second.
Man's time on the planet so far
Would be
About half a minute long.
So, like an abandoned village
On a global scale,
The earth will move on
Without us.
There was life
before people.
There will be life

after people.