THE NATURE OF SNOW

The Nature of Snow is a virtual reality experience inspired by a true story of one man's passion for the beauty and fragility of the natural world and his wonderment about the weather.

Our hero, Bentley is a climate scientist, photographer and amateur musician. He is considered by many as an oddball outsider. Despite outside forces dismissing his brilliant research in atmospheric science, he succeeds in persuing his dreams of publishing his discoveries about the natural world, clouds and the nature of snow.

Through the VR storyworld, we travel through time and scale. We see how the smallest things have a gigantic effect on the weather and our climate. You'll make pictures of snowflakes, impact the weather and change the future.

The concept is inspired by the work of Wilson A. Bentley. As one of the first cloud physicists, Bentley's study of snowflakes and clouds was in the beginning of climate science, and what we now understand about what is happening to the planet, the climate crises.

Bentley was the first person to photograph a snowflake 135 years ago, in 1885. This was the same year when the first gas powered automobile was invented. Around this time the greenhouse effect was discovered, and it was understood that Co2 could warm the atmosphere.

With Bentley, you'll photograph snowflakes and use a magic lantern to project your pictures. A weather machine invites you to adjust temperature, humidity and C02, changing the nature of the snowflakes.

Bentley's ideas will connect with the work of other climate scientists as he takes you on an adventure to discover terrains from everywhere, seen from aerial views.

OPENING SCENE

The scene opens in 2058 in a room with huge windows. Trees outside are dead from the heat, it's way too hot to be outside. Around the room, among antiques, books and future looking things, are items relating to the study of weather.

Ben is wrapped up playing piano. You've arrived for a music lesson, but it turns into something more. An antique music chart is nearby with diagrams of piano sonograms and snowflakes. The music sonograms look like snowflakes.

Ben turns on the holographic style display showing a live-feed of news from around the world. The news is on about the constant weather crises.

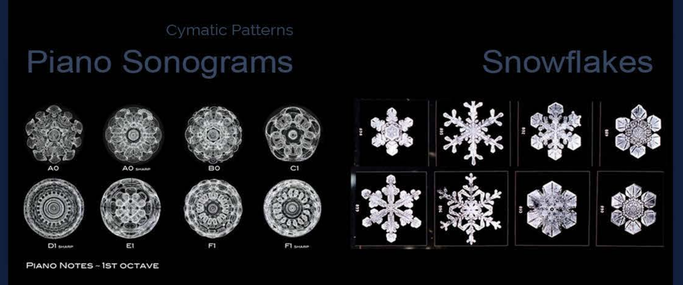
He sits on the sofa and falls asleep and goes into a dream.

Musical notes appear and float from his ear and drift towards the ceiling. As the notes float upwards, they change into sonograms of piano notes. You can touch the sonograms and they make a piano sound.

The feather from Ben's hat floats into the air as the room folds outward and becomes a starfield.

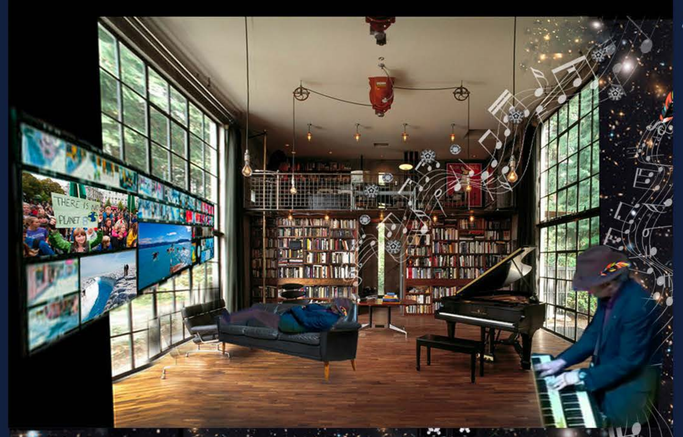
The piano note sonograms and stars become snowflakes that drift downwards into a light blue snowfield in the air. Some of the large macro snowflakes are responsive to touch.

You are floating along, downward, down into his dream, into the winter of 1885.



timeline

2058 dreamtime 1885



SIDE NOTES

Inspired by a true story

Connection with snow and global climate, climate science

Co2 warming has been known about since 1850

EXPERIENCE BUILD

Aerial Scenes are 360 panormamic stills and video

Interior rooms are 3D 360° build, and/or 360 photogrammetry

Interactive Interface Objects - 3D build, added into VR scenes

Interactive Interface - Aerial - 3D build overlaid on 360 scenes

Data Visualizations - 2D media is viewed inside an (active panel) inside VR experience

Piano Note Sonograms and Snowflake diagram found in room on paper - and then floats into space

musical notes hologram dream

Scene moves into a starfield of Ben's dream

Sonograms floating into starfield

Weather: It's way too hot to be outside - shows trees are dead exterior scene
Ben can not go outside - plays piano, reads, watches news, sleeps

Characters: Ben (musician in the year 2058)
Viewer - Student - VR Player - YOU.
People speaking on the live news feed, about climate disaster.
Avatar Digital Friend (via media device) all social contacts are through social media only.
Wilson A. Bentley - scientist - main character - HERO
Wilson's Dad
Climate Scientist's from 1850 - 2020

Music: Ben playing piano. Sound Designed for each scene

Environ 1 Holographic Television
Antiques from 1800 - 1999
AR headset (simulated in VR to view media about climate, news, see other places, etc)
Books and tools for study of weather and atmosphere
Special air conditioner for toxic climate control
Musical instruments, digital keyboards, violin, grand piano,

Environ 2 Wilson Bentley Work Studio in Jericho Vermont in 1885 - 1931
Environ 3 Blizzard, Ice Room, Weather Machine, Flying over Terrains, Arora Borealis, Back Home.

Sonograms mix with stars and then snow crystals

Viewer finds themselves floating inside a fog bank

A 3D "Weather Sphere" appears there inside the VR scene

showing diferent effects on weather when climate changes.

Scale changes & shows sphere with weather.

Stars mix with sonograms and music notes, then become snowflakes

SNOWFLAKES

A feather quill is skywriting, and the words turn into clouds.

Floating through clouds, we see snowflakes of all sizes. An aerial view of a winter scene appears with an old farmhouse, trees and animals.

The landscape expands and scales, landing you at ground level near a window with piano music playing from inside.

WILSON BENTLEY

Inside is a chilly old workroom studio filled with stuff.

On the table is an 8x10 camera apparatus with a microscope attached to it. There are camera accessories, a metal tray and a pair of mittens. There are items in the room relating to the study of the weather and a chart with diagrams of piano notes and snowflakes.

A young man is playing an upright piano, bundled up in a coat. He then sits at a desk writing in his journal. You hear his thoughts as he writes about the wonder of clouds, snowflakes, flowers and the atmosphere.

An older man opens the door with a loud bang. The young man says,"Dad, guess what, I finally figured out how to measure the size of raindrops!" His Dad snaps back in frustration, "dreaming about the clouds again! Stop this waste of time on snowflakes, they're all the same, it's just snow! Get back on the farm and help your brother!" And stop playing that music! He leaves, slamming the door.

The young man turns his attention to the special camera, adjusting settings and says to himself, "Snowflakes, they're not all the same..."

Meet Wilson Bentley.

He notices your presence. He says, "Hey, come closer, I want to show you something. I'm making photographs of snowflakes and I've found that no two are alike."

He tells you about how snowflakes form. He says that small changes in temperature, air pressure and humidity affect the shape of the delicate snowflakes. He tells you about mysteries of the Northern Lights.

PHOTOGRAPHY

Bentley invites you to assist in making lantern slide photographs, using a feather to put snowflakes under the microscope camera.

Once you get it lined up, you hear the shutter click. You can pick up the slide and view it from all angles and see your snowflake pictures up close.

You have to work quickly or the snowflakes melt and you'll have to start over.

THE MAGIC LANTERN

While making photo slides, there is a table with a magic lantern projector on it. The lantern projects the snowflakes in front of you.

Bentley talks about inventions of the year 1885. He tells you about the carbon dioxide fizzy drinks like Dr. Pepper.

He says "A scientist has discovered that carbon dioxide makes the earth warmer. She wrote about it, it's being called a greenhouse effect."

He mentions a new gas powered buggy (the first mercedes) that has just been invented, that he's worried that the fumes and gases will affect the clouds and snow. He says "carbon dioxide is a big problem for snowflakes, it can melt the snow."

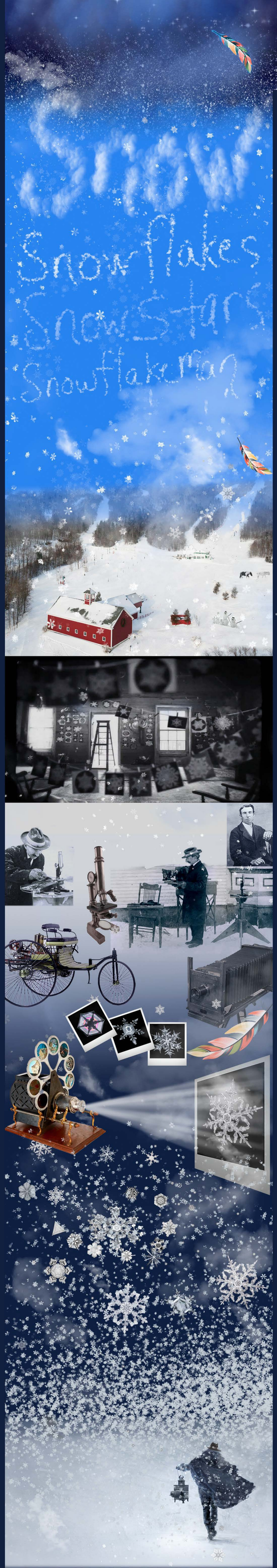
When Bentley says this, the magic lantern suddenly coughs and starts projecting large 3D snowflakes into the room from it's mouth, creating snowflakes changing scale and close up in front of you.

THE BIG SNOW

The room fills with snowflakes of many shapes and sizes. They respond, twirling, bouncing and floating off your hands. The room folds away as a snowstorm takes over the environment, the sound of the wind picks up.

Bentley waves and walks away into the snowstorm with the magic lantern and disappears into a heavy snowfall. Bentley is heard saying, "miracles of beauty are found everywhere, even in the smallest things."

As you watch this, the heavy snowfall stops, leaving you surrounded in a winter wonderland.



feather is
Skywriting cloud words

Scale changing Snowflakes are large and small, macro

Farmhouse scene is dollhouse view at first and expands upon landing.

This moves into 1:1 scale

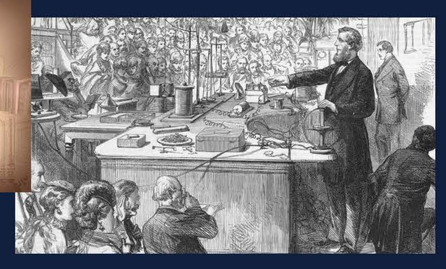
Bentley's real house in Vermont.

Sound: Wind. Snowflakes. Piano music coming from farmhouse

hearing piano and wind weather

Eunice Newton Foote - American scientist,physicist,inventor,
and women's rights campaigner from Seneca Falls, New York
The first woman climate scientist. Bentley mentions her.

In 1856, she theorized that changes in carbon dioxide in the atmosphere could affect the Earth's temperature. Her theory was dismissed



Bentley talks about this scientist

Eunice Newton Foote

Wilson A. Bentley and magical snowflakes

Wilson Bentley lived in the same farmhouse all his life in Vermont.

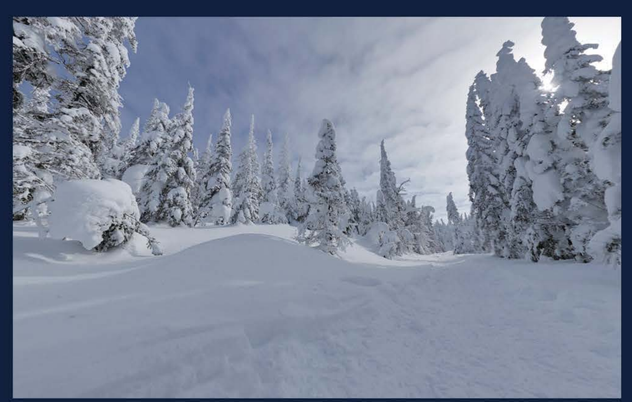
He spends 40 years photographing snowflakes & researching climate phenomena.

A hundred years later, his climate research was considered brilliant by modern scientists.

Blizzard

Bentley dies from pnemonia after walking six miles
in a blizzard snowstorm

He is heard through the experience after the blizzard



WEATHER MACHINE

The snow melts and leaves you in a small and transparent open-air room made of ice. Large snowflakes are floating close.

A Weather Machine appears on the table, with a guide chart showing shapes of snowflakes.

The Weather Machine has dials to change the air temperature, humidity and air pressure which in turn changes the shape and size and sparkle of the large snowflakes in front of you.

Bentley's voice says,"remember, when you change the dials here, it changes everything you see. It seems nobody but you is interested in the weather these days, maybe someday in a hundred years they will be. So take care and continue our journey."

The Weather Machine folds away like a swiss army knife and you hear the sound of a new environment.

On another table is a pair of ski goggles. They are like AR glasses inside the VR experience that you can use to see weather visualizations over time.

FLOATING

The transparent room begins slowly floating upwards into the sky like a hot air balloon. Standing in the room, you see artic landscapes below.

You may use the goggles to view visualizations over the landscapes, showing simple climate science principals and weather scenarios from all over the world.

You can see displays of the important Keeling Curve and Albedo Effect.

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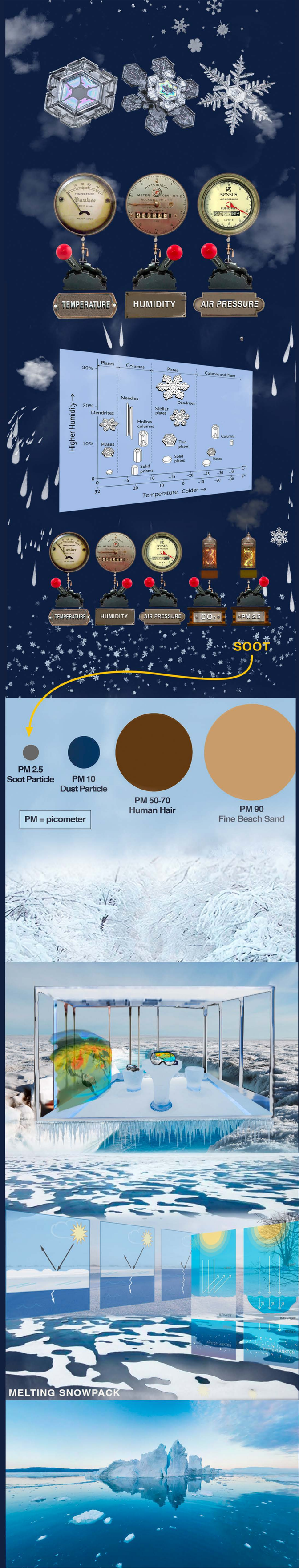
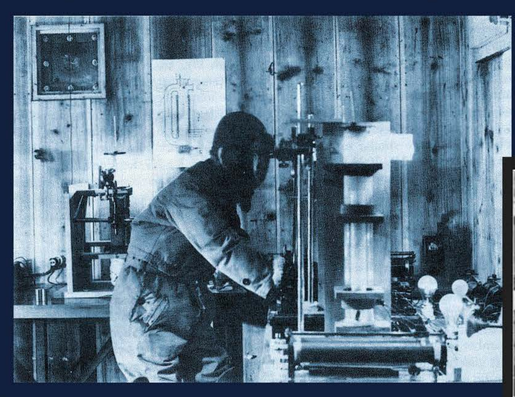


Weather Machine

Large snow crystals float above the Weather Machine. They change and melt when Viewer changes dials.

Weather Machine design change
Just a placeholder

Ukichiro Nakaya. Invented the first artificially grown snowflakes in lab - On March 12, 1936.



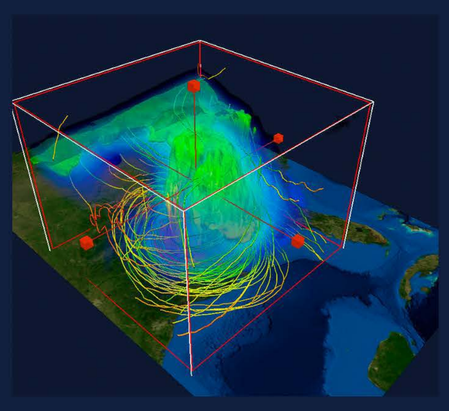
Ukichiro Nakaya

Ukichiro made this diagram - 1938

Weather Machine

PROOF

Particulate Matter 2.5



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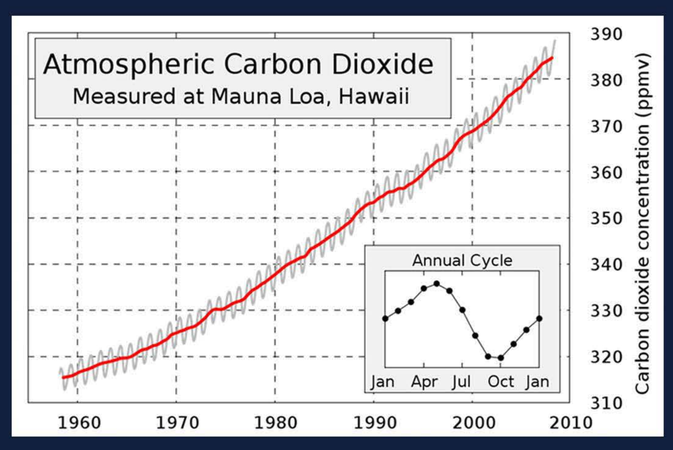
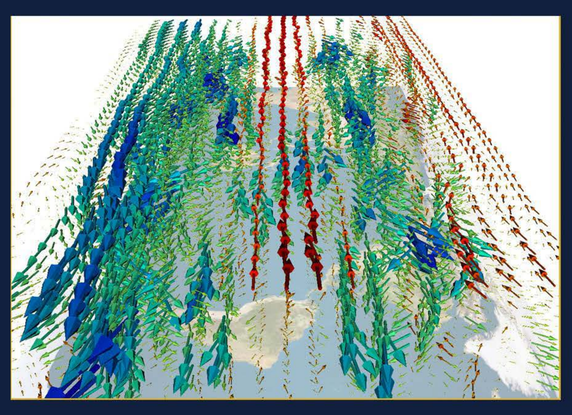
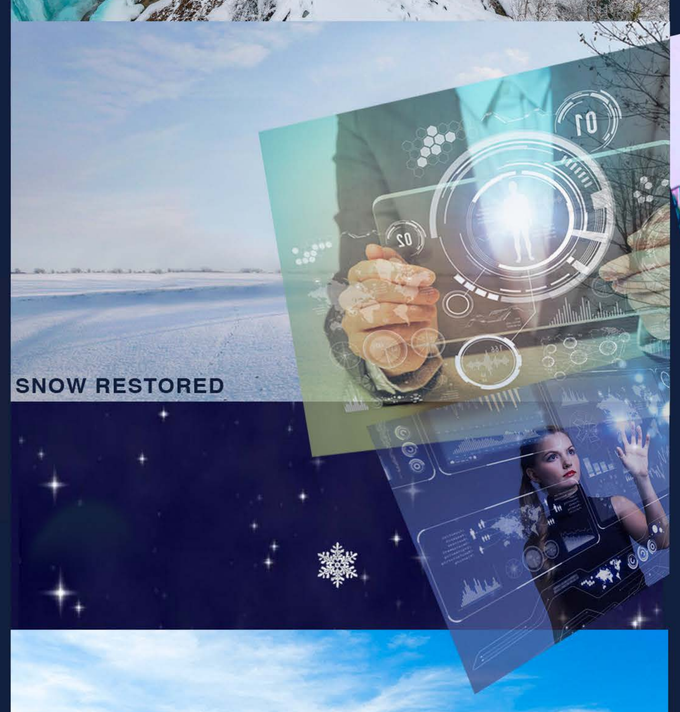


The Keeling Curve

Charles Keeling, 1958





RESTORATION

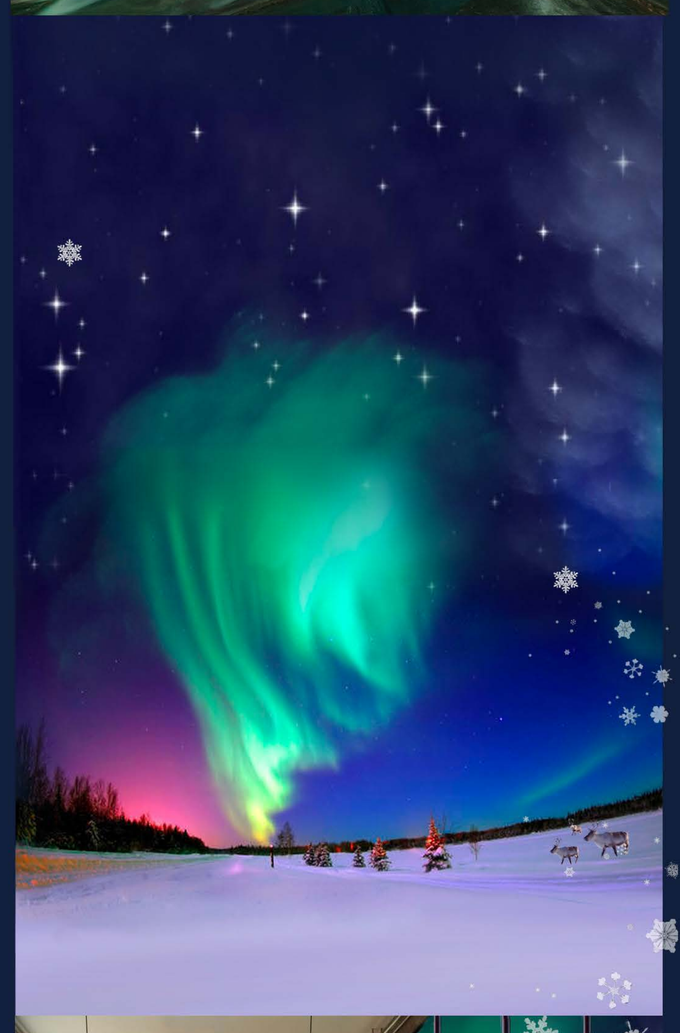
An interactive screen surface shows simple climate data projections. It also shows past climate levels from the year 1885, this is an ideal restoration level.

Information Cascade - DataStorm goes here

Massive Climate Data - temperature curves, CO2 measurements, satellite images, storm systems - hyperspeed - flashing in a data storm

Climate scientists are using the surfaces (like iPads) and they leave them for you to use.

As a restoration happens, landscapes below you have windfarms and arrays of solar panels, rooftops have gardens and trees everywhere. You are able to see how groups of people all over the world are improving the climate and restoring earth.



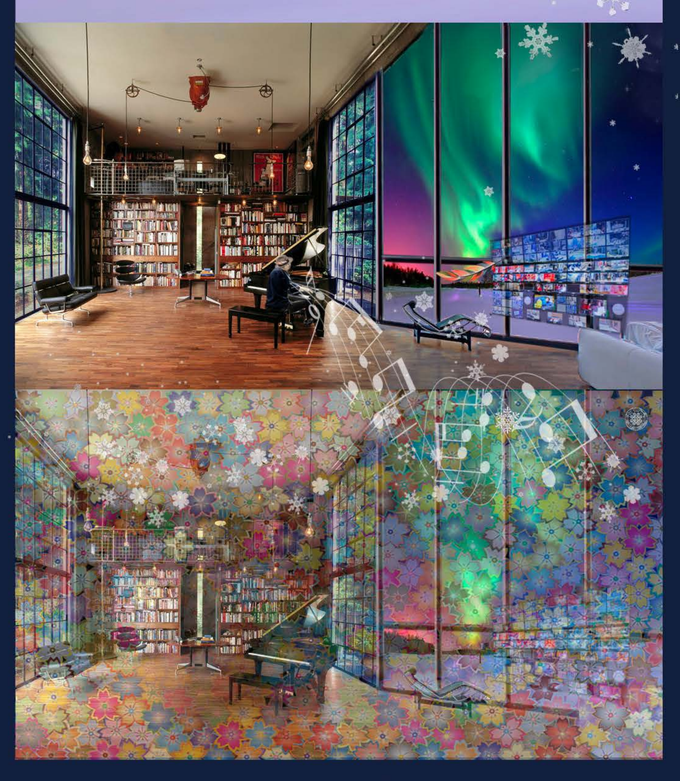
TWILIGHT

As evening falls, an aerial view of a pristine evening snow landscape appears. The room slowly lands on the ground and melts, leaving you there standing in the snow.

The Aurora Borealis materializes in the sky, sounds of nature abound. Snowflakes are floating and respond sonically to touch.

The scene begins to fade into darkness.

Faraway sounds begins to drift in and out like an old radio station, sounds like a news channel...



DREAM AWAKE

The dream wakes up in the original room but it's a happier room with the evening winter scene out the windows illuminated by the aurora.

Ben wakes up slowly and the TV is still on. The weather report says the climate is restored, even to levels from the 1800's. The live feed is still filled with news of the weather, but it's all good news. All the countries of the world worked together for all these years.

The weatherman mentions the great Snowflake Man, Wilson Bentley. He knew about everything all along. How he cared for all the wonders of nature, and saw how small things, even snowflakes, can effect us all.

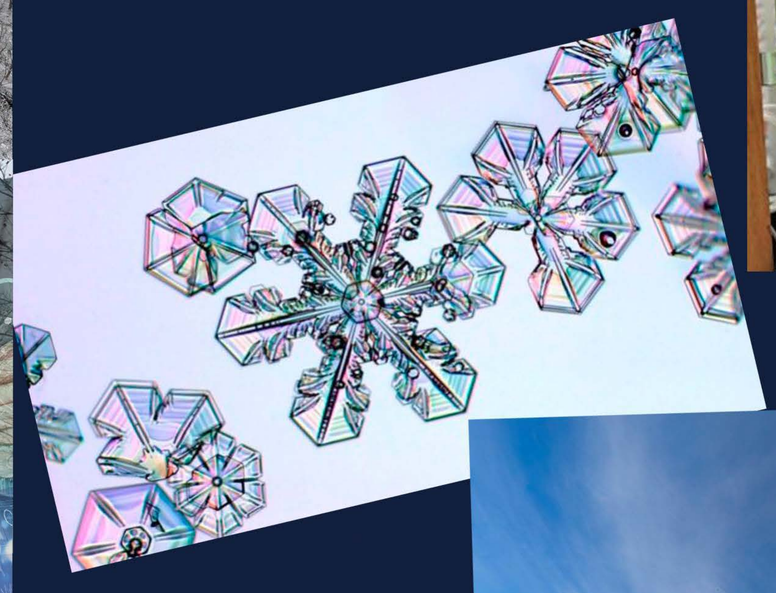
Ben leaps up so excited and says "I just had the most amazing dream about Grandpa Bentley!" He opens the windows and leans out breathes deeply in the fresh air, then pops the feather back into his hat and returns to the piano with joy.

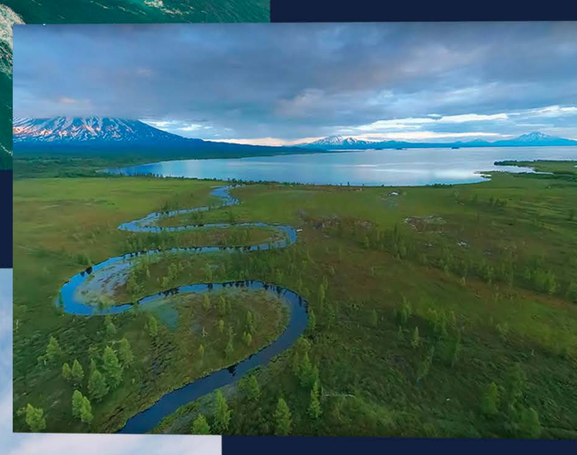
The sun rises, it's springtime outside. An array of flowers pass through the open windows into the room.

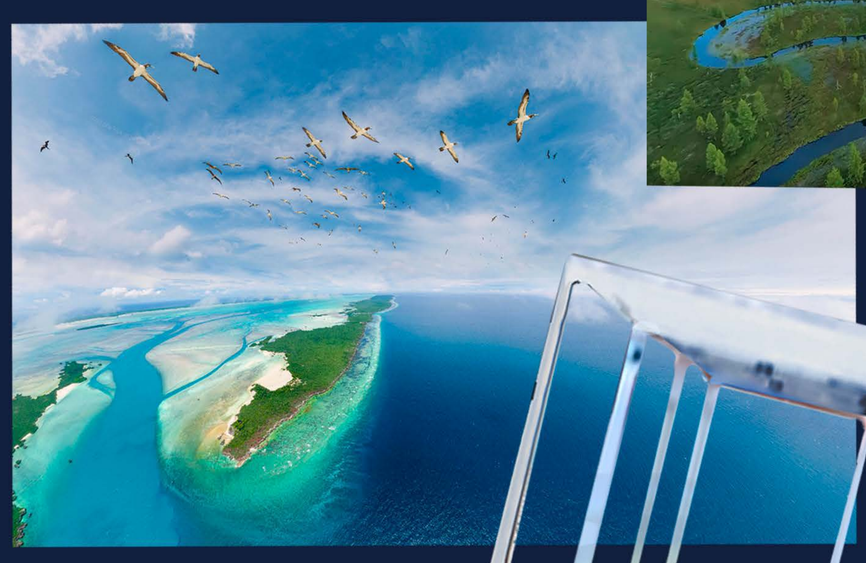
The scene fades as the view fills with wildflowers.

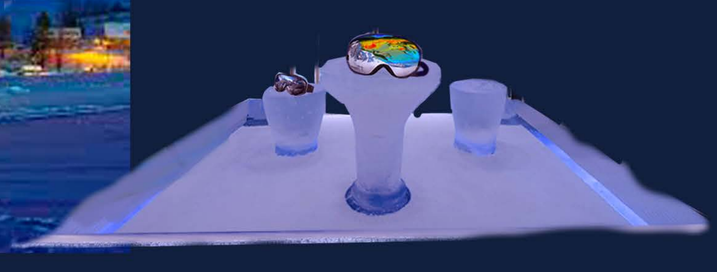
Dr. Kenneth G. Libbrecht

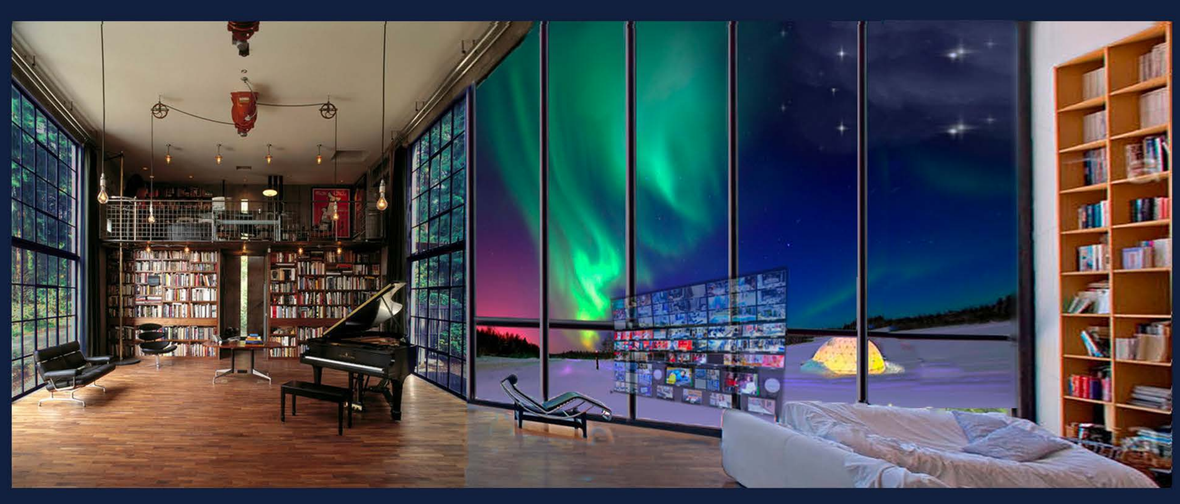
Professor of Physics, CalTech











All scenes are made in 3D and/or 360 photogrametry and/or 360 aerials.

Wilson Bentley references, permission granted by Jericho Historical Society. Jericho, Vermont.

Micro-photographs of snow crystals, use granted by Don Komarechka.

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RESOURCES:

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