ACCIDENTAL GLASS

“ The beauty of destruction
and the life it brings in its trail
(of fire). ”

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THESIS 2022
GLASS DEPARTMENT

What you are about to read is a script for a film titled - 'Accidental Glass'. Accidental Glass is a term I came up with in order to create a link between natural glass types i.e.glass formed by lightning, meteors, asteroids or volcanos, and human impact glass created by events such as a nuclear explosion.
When we look around us, glass is there in our everyday life, appearing static and frictionless despite its ever changing molecular structure. This film is an exploration of the amorphous solid in our reality.

Through 5 characters I will take you to places of 2000°c, black sand, pine forests, volcanic landscapes and a desert wasteland of the first ground zero. Only the characters are fictional and all information about glass is real.

They all come from things I have encountered during the past 3 years of studying glass. When I began studying I had no idea what kind of impact this material would have on me.

My expectation of the working process with glass was similar to that of other earthly materials such as clay - an approach where you build up something slowly while learning the does and don'ts. Glass however is different.

The first time you pick up a blowing pipe is to practice the rolling movement you have to make a second nature -like breathing, it needs to be constant from the second you gather the hot glass. Many aspiring glassblowers talk about the stress in the beginning. The heat, the burns, the light, and the loss of control and of course the moment where you believe you got it and what you have been working on explodes right in front of your eyes and you are left with nothing but a big smile and a burning floor. It might look idyllic and beautiful in the hotshop when you watch it from the outside, but only the glassblowers know about this

heated chaos. With this film I would like to show the beauty in chaos and celebrate the destructive nature of fire.
Acknowledging the 'own will' of a matter or material is something that has introduced itself to me through glass. You could even say it has introduced itself as glass. This idea of an introducing, gives the impression of a persona. I'm not saying there is a human spirit inside of this material, what I am talking about is the meeting with something you can't control, something that requires your attention to get to know. Only after that, can it become a dance.
First time I met hot glass it took my full attention, and I knew I had to study it. I mean it looked like transparent lava. What else could I do? Simultaneously to my practice in the hotshop, I would pick out books in the school library about glass. However, in the books, the glass was tamed and nothing like how I was experiencing it., I wasn't into the idea of mastery, but more into the forces behind and within the glass. The urge for chaos and raw nature grew and slowly books of geology caught my eye. And through those I began seeing the division between natural glass and studio glass. This new vision began when I read that scientists use the description amorphous solid when trying to describe what glass is. That description made my thoughts travel and would keep me awake at night in order to get closer to an understanding of what that meant for me in the studio.
When sculpting I always aim at making solid objects look alive or impose a certain movement into them. Did this new knowledge of glass (a liquid acting like a solid) mean I didn't have to work as hard in order to preserve life when sculpting glass. This had my perception of solids upside down.

With this film I am aiming at a unity between natural and studio glass. How natural can be studied, and how studio can be taken out into the wild.

Due to the divine design of the universe, space dust makes its way to our atmosphere everyday in different sizes. It travels with great speed, reaching temperatures that often leave glass as a bi product of these events. But not all natural glass comes from outer space, some is formed here in our atmosphere and sometimes by humans too. Following my desire for fire, high voltage and great size, I will take you through the multiple worlds of accidental glass creation.

Here a short example:
al-Masjid al-Harām. Also known as the black stone of Mecca. Fallen from the sky on the day Adam fell from paradise. Now on earth purifying sins. Some scientists believe the stone comes from a meteor that landed 6000 years ago at Wabar 1100 km east of Mecca, an impactite1 or more specific an impact glass, which is glass formed before the atoms have time to arrange into a crystal lattice. Another theory is black obsidian, a type of volcanic glass formed by a lava flow in one of the Harrats (volcanic fields) found in the western Arabian Shield.

A kid and her parents in a car driving on the highway, the kid is alone on the backseat.

(voiceover:)
Growing up in a time of superheros and over-natural things on television, one with a wild imagination is never bored, even when turning off the television.
I remember sitting in the backseat of my parents car driving to the city, when we got to the highway my dad asked me to roll up the window. I didn't like the idea since I was melting the roadside and fields passing by - with my laser vision.
And rolling up the window would either force me to stop or to melt through the car window. Something that isn't exactly easy to explain to a set of parents.

I love this car, behind the seats of my parents the world is mine, it is my territory and I am going places. Unlike most other cars, my seats have morphed into one, and in doing so they lost their head supports - the boundaries of turning 180. When you now turn your head 180 degrees and look through the back window the world becomes reversed and you get sucked backwards into the future. I like looking back, but after a while the past makes me sick and I have to turn to the future.

The low sun and the warm breeze rolled down our windows. I lean my head in the ankle where the window glass used to be, gazing across the roadside I let my eyes slide over the landscape. On patches of stone or soil I fixate my vision until it disappears and my iris' jumps to the next. With laser vision I melt these patches, like when you hold a loop in the right ankle. Sometimes I even pull large trails through the landscape, like the tracks of comets. glossy in its crater fire polished from the friction of the impact.
On the highway everything is emphasized by speed - also the contrast between in- and outside. The wind creates a wall where the window used to be and I practice placing my palm on its surface, it is easy to fall though it like the past sucks you in, it has already taken parts of my hair. My eyes return to the landscape and just when I am about to shoot, my dad asks me again to roll up the window. He gets cold very easily and his ears are really sensitive too. I weigh the thoughts in my head, explaining him about the laser will probably make his sense of reality fragile too, so I settle for a compromise on the behalf of both of us. I will roll up the window, but burn two small holes in the glass from which I can continue the melting of fields.

This is my earliest memory of melting glass

When I think of solid matter, my inner pictures are static forms. When thinking of liquid matter my imagination moves and flows to effortless motions.
When I combine the two states in one thought - they become a wave, a massive one, one of those that hits you like a wall in the first half of a split second. The other half swallows you in and leaves you breathless surrounded by matter.
The ocean will never get tired, its molecules will never overbend, and snap in exhaustion. But still it can provide friction to bodies external from its own and because of this never ending force and motion it will shape its surroundings.
In my imagination friction has sounds, and if you follow water bodies up north where they eventually turn to ice you can hear its song of tension release.
Throw a rounded pebble rock at it, and listen to the ecco vibrations of friction.
This pebble that over time has been grinded round smooth and tame to avoid as much friction as possible. Now it slides effortlessly over endless ice.
As effortlessly as the rest of them rolling in between and on top of each other by the warm seabanks more south. Getting wet and eventually grinding into sand. Sand imitating the liquidity of water.

PART 2:
SALI A RETIRED MATSUTAKE MUSHROOM HUNTER

This part is about getting to know the accidental, understanding its matter. Use it to hack your surroundings, but with a lightness that leaves space for knowing when to give in. What happens when you let an accident become the reason. Salis' meeting with glass transports him from a regular paying job to a magical practice relying on thunderstorms in a desert.

Scene 1: (Road through forest)

Two men in a car,
Sali and a young glassblower named Petru.
Sali is driving. He reaches for the gear stick and a scar on his wrist is exposed. He lights a cigarette.
Petru points with a hand gesture towards the scar on Salis wrist (which is resting on the gear stick) and opens the conversation with a question.

PETRU

"What happened?"

Letting go of the steering wheel Sali rolls up his sleeve to below the elbow. Hand still on the gear stick.
A cigarette is dangling from his lower lip - reflecting in his eyes. So that they in a millisecond looks like there is fire in them. There is smoke in the car.

(Dialog:)

SALI

"It's from a thunderstorm. I was in a red pine forest back home. Those forests don't have significant guidelines for direction, so we use the coastline as a navigator.
And being in a forest only consisting of very tall and straight trees when a thunderstorm is on the rise, kinda wanna make you navigate out of there and into a car with rubber wheels lifting you from the wet soil.
Also I had a metal pole in my hand, a tool I didn't feel like dropping, just because of fear".

The car bumps
Ashes fall onto his collar. and he turns off the bud in a bright semi transparent glass, resting in the cup holder.
Petru is (in the passenger seat) doing a cutout in white paper with a small pair of scissors.

PETRU

"So this was when you were hunting matsutake ?"

SALI

"Yes. The last day at work"

"So I made it to the coastline where it was already getting darker. The heavy clouds made the waters look black with bright drawings from the remaining light gathering on the waves' breaking points.

It was very alive, and the contrast made the pine forest seem dead or in slumber.
Sheltering under the pines I watched the sky open, water making the dark cliffs under me look like black rubber.
Maybe that was why I subconsciously felt safe, somehow I did not question the position I had placed myself in, humans are funny that way.
In retrospect I can't imagine myself to be that ignorant.
But there I was on my last day of work, pines behind me and an open sky shooting thunder and lightning down over the open sea, in front of me.
Something about the sea makes you gain perspective, I like to think it is the

far distance that allows your mind to move further, than the few meters between the trees -that gives a very dense feeling, when you are looking for the horizon.

SALI

Have you ever experienced a thunderstorm?"

Petru - is cutting paper while looking down on it.

PETRU

No, I don't think so

Car slows down.

SALI

"It is truly beautiful, -so much power."

(Voiceover:) (Trinity site)

SALI

"The work of a matsutake mushroom hunter has emerged as a bi product of much bigger industries where land is disrupted, cultivated and used in monoculture with fast growth, poured with chemicals to speed up the process. With time these stretches of land are worn out, tired and nothing much can grow there, except (in some cases) the red pines. Tall straight stemmed pointy tree, an inhibitor that often comes with a small extravagant companion, the matsutake mushroom. Which to

humans, especially the Japanese, are of high value. And therefore it gets transported and sold, in many cases far from where it sprouted up through the soil. When eaten, people describe emotions and notions such as taken back to childhood, the essence of nature, truth, autumn and grounding effects.
Matsutake spreads throughout these forests with underground fractal-formed mycelium, bursting into meatful brown fruit bodies, silently receiving our interpretations.
Matsutake cannot be cultivated, so it is up to the hunters to find them in the wild and put them on the market. Most matsutake hunters get into this field of work sort of accidentally, by for example losing a stable job. Arriving in a new country where as a foreigner, it can be hard to come about work, or as a rumor of a seasonal, self employed lucrative job in the forests.
For me it was a combination of two arriving in Wasington and hearing a promising rumor about valuables hiding underground, in the forest. The forest which then became my home and workplace for many years, all the way until the day I told you about earlier.

(Tenerife)
It is actually funny how much matsutake hunting and fulgurite have in common, I mean the links are striking. The underground fractals shapes, strong vertical forces, valuable objects coming to life in places exposed to big impacts, the notions of spiritual or sensational interpretation upon these findings. And last but definitely not least the accidental aspect.
For me it was the perfect timing, my hands and back were tired, and my

feet had begun dragging in the wet soil. And when the lightning struck I had no idea my subconscious mind had been dreaming of open and dry land..”

PETRU

“Is this why you are here now?”

SALI

“Yes, the high desert land forms the perfect stage. Here the weather brings thunderstorms, with its seasonal lightning dancers.
My attempt will be to capture these forces in sculptures.
Build massive metal towers, with sharp points guiding the lightning down into the sand below, where I will bury copper wire structures, the copper will then lead the high voltage into the shapes I desire, melt the sand around it into glass, - becoming fulgurite. Desert glass and sculptures in one incredible performing moment. I will lean back in my car, rest my head, look up and watch the whole show”.

(In a house)

Sali is sitting drawing at a table, somewhere behind him is an open window. The sun is rising outside.

This part evolves around volcanic - and studio glass. Drawing a link between the two -through feminime liquidity and the uncontrollable.
I find that something uncontrollable can turn feminine though dance, to be light and fluent in rough surroundings, -makes the subject appear strong, fragile, a step ahead and transparent at the same time.
In the uncontrollable also lies the unknown - here I am referring to the unknown of glass. Still to this day scientists can not agree on what glass exactly is.
So far the closest we get is this definition: Glass is a liquid that acts like a solid. This is due to the structural change glass goes through when it is heated up. The molecular structure becomes unrepeatable, opposite to other materials that are high on silica -which usually holds a crystallizing molecular structure.
To carry these molecules of unknown liquidity, I have made three characters:
A young glassblower, a glass moth and a dancer.
The glassblower has one blind eye, a symbol for fire's destructive nature. Because looking into the furnace for too long is like staring at the sun, but with destruction you are always offered something either in the chaos of it or afterwards. In his case he is offered a new perspective towards elements and how we sense them. Parallel to his elemental understanding, is the musicality of hot glass - not soundvise, but through the rhythmic movements and the skilled glassblower always being on step ahead, similar to a choreographie in a dance show. The magic of this part is emphasized when the glass moth balances effortlessly on one single finger tip - appearing almost as an optical illusion.

Scene 1:

(Black sand beach)

Man swimming (crawl) in the ocean.
He stops swimming and the water reflects in his eyes.

There he is
standing with water to the waist, in his hand is a wooden cane

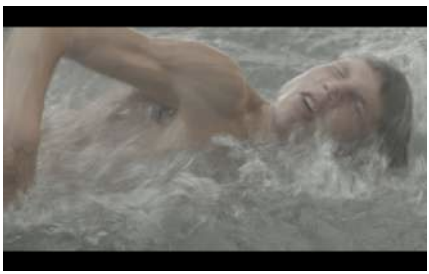
He begins to roll the cane on the water surface, like you roll a glass blowing pipe on the bench

He walks up on land still with the cane in his hand.

When his feet are above water, he begins to drag deep lines and shapes in the black sand.

(Glass studio, hotshop)
With two hands he digs a hole in black sand. Forming a volcanic looking edge around the hole.

He gathers glass from the furnace
Brings the pipe to the sand hole and uses it as a blow mold.


The glass begins to rise and become a hollow oval bubble. That he then pulls out of the black sand while turning it the second it is free from the sand. And walks to the bench, he sits down and places the pipe in front of him, meanwhile the turning is constant.
With the jacks he creates the neck of the vase.
He begins to spin the glass faster on the bench.

(black sand beach)

Glass moth spinning (seen from above).

Woman in white costume, dancing with the moth on black sand.
She is over the black sans with the moth balancing on her head.

(Glass studio, hotshop)

The glass piece is going into the furnace.

(Volcanic mountain)

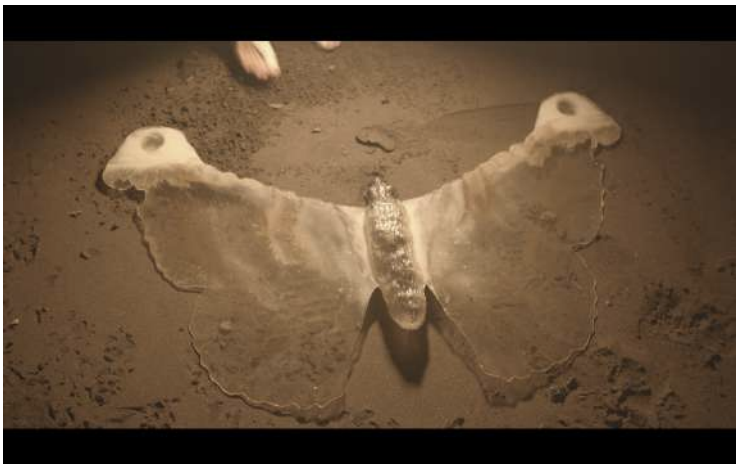
volcanic magma bubbling.

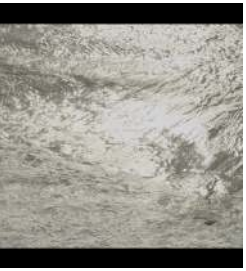
(black sand beach)

Man washing a piece of white silk in the ocean
He is twirling it in the water

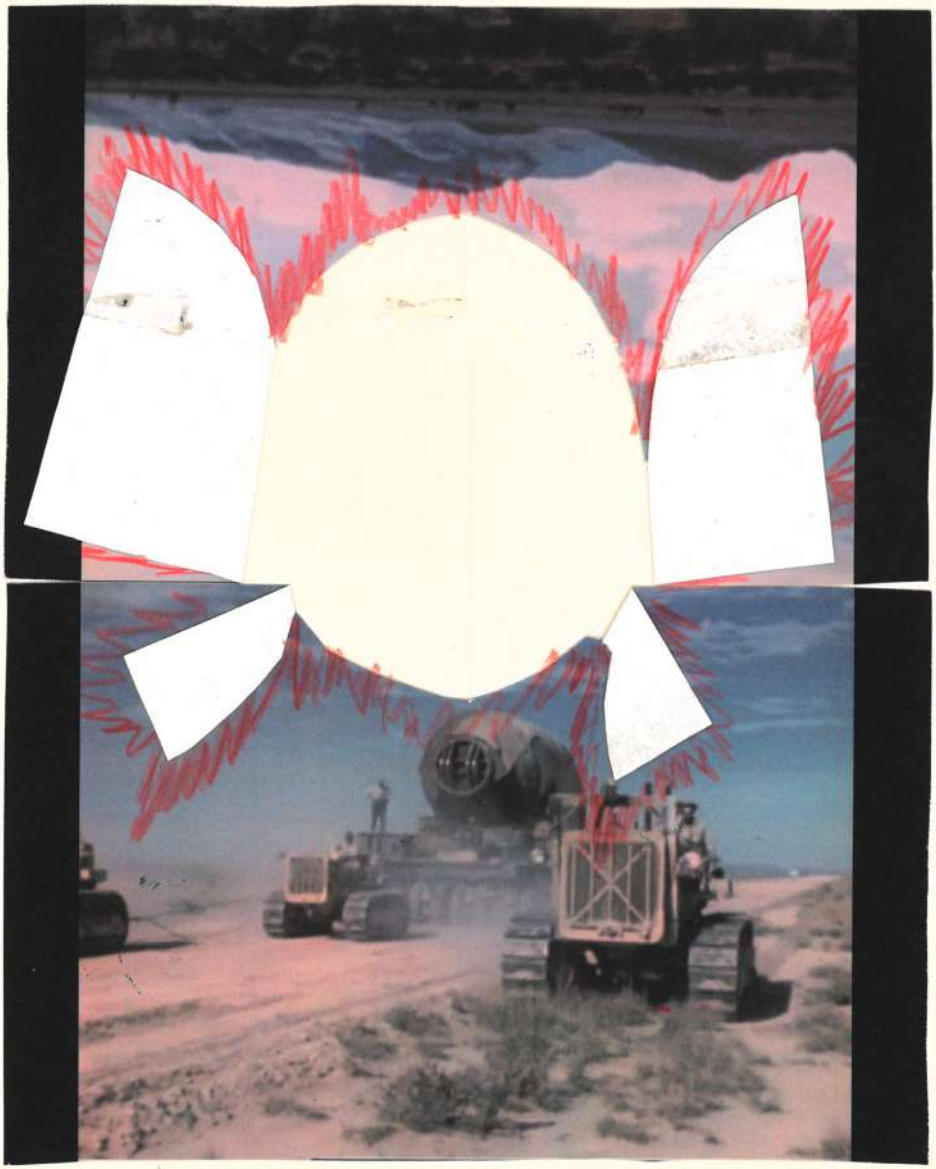
He pulls it out of the water, twists any excess water out of it, while he walks to hang it between two poles.

The fabric hangs to dry in the wind and sun.





Flare for finding in my beliefs comes from the joy of creating or seeing a potential. With curious eyes and sharpened senses the focus of the finder is directed to where they believe things are to be found.
The feeling of finding is often strongest when the found objects are something decided by humans to be of value. Some finders even describe a stressed feeling right after a big finding (big in terms of value), a sort of scare of losing it or the possibility for it to not have been found at that moment, by exactly them. After this feeling comes the joy, the joy that it did happen. And that its possession and possibilities are now theirs.
In the history of humans many tools have been dedicated to the act of finding. Sticks, nets, hooks, magnets, detectors, blacklight lamps the list is endless. But before any tool is the flare, the sensing of a presence or simply luck.
I find it deeply interesting when bi products of natural events become targets for finders, to state few examples:
Fulgurite and other types of natural glass, space dust and amber. Equally interesting is it, when human pollution or disruption creates unexpected and valuable bi products, such as matsutake mushrooms or atomic glass like trinitite.



Part 4 will be the part in which glass from the past, gets woven into present time with the goal of being relevant. The way I wish to do that is by examining the way we look back on prehistoric and ancient glass, how we read it and transform that knowledge into use regarding future glass. The matter of storing, physical as well as the spiritual loading of (glass) vessels.
For this I have chosen to let the last scene take place in an archeological laboratory in the middle of a big city. This laboratory is quite unique. With a big panorama window facing the street, the archeological artifacts are exposed to present life. Right there in the middle of traffic, dog walks, bike rides and coffee.
In the laboratory are two women, one with gray hair and a white kittel - representing authority and knowledge of the past. The other is a younger woman with ebony hair and curious eyes. Her ability to sense something that is tangible to everyone has brought her here. Trying to understand our time and impact through one material, the one material with the ability to bind far more elements from the periodic table than any other existing material.
Besides the archeological laboratory I will also take you to the first atom explosion in history. Glass appeared as a bi product of this explosion, and therefore became the first major example of human impact accidental glass.

SCENE 1:
Glass flower spinning while being on fire.

SCENE 2:
Uranium glass chunk in a female hand - turning it over to examine all sides.

(voiceover:) (Archeological lab cph)
“I heard they are now struggling on how to put away radioactive trash, from atomic explosions in Finland.”

“This trash will last longer than us, longer than any artifact we have ever dug up from the ground.”

SCENE 3:
Shelves and fridges with glass doors, - filled with labeled containers, jars etc. (in the archaeological laboratory)
(voiceover continuous:)

“Thinking of the Egyptians and the effort they put in warnings and extensive locking systems. Warnings for the afterlife. Emphasizing the danger and importance in not opening these graves, chambers and containers. One could get concerned.
So how will we stop the future archeologists from digging up our radioactive trash? We have no idea what their world will look like, how they will perceive the past and how they will listen to us and our warnings.”

SCENE 4:
Found footage from the Trinity site. Desert landscape and bomb build up.

(voiceover continuous:)

“Based on existing knowledge, they are now debating and considering not digging it down deep underground. It seems like a valid argument

that that will most likely just make our afterlife more curious. And it will take hundreds of thousand years for the waste to be safe/stable.

I can't help but imagine these chambers filled with fluorescent green liquid, highly radioactive, and containing almost every element from the periodic table.
This had my fantasy going wild and I had to know more. What I found out is quite incredible. To store nuclear waste is quite a task, it takes up a lot of space and to find a material to contain it in, is a world of its own. Finding something that can last thousands of years deep underground, something with a slow or predictable corrosion that won't deteriorate easily by its surroundings. But also something that reacts well with the many components of the waste, here I am referring to the 'almost everything in the periodic table'. A possible answer and the best one so far has been found to be glass. The type of glass is still to be agreed on, some say borosilicate glass, some boroaluminosilicate and others International Simple Glass (ISG) which funny enough is nothing but simple, and if you wonder what I mean by that, here is its chemical composition:"

(written on screen:)
(mol%): 60.2SiO_2, 16.0B_2O_3, 12.6Na_2O, 3.8Al_2O_3, 5.7CaO, and 1.7ZrO_2

"To put that in contrast, more regular glass have these components:"
(written on screen:)
SiO, $CaCO_3$ and Na_2CO_3


SCENE 5:
Trinity tower assembly
(voice over continuous:)
“The process of storing nuclear waste in glass is to first turn the waste into a powder, then the powder is mixed into the glass, during the melting process. When melted together and hot enough, it is poured into block shaped molds and slowly cooled down”.



SCENE 6:
Glass bottle laying in sandy landscape. glimpsing in the sun.

(voice over continuous:)
“I find it quite incredible how glass can connect well with this amount of elements, I wonder what role silicon (SiO) plays in this, being the second most abundant element on earth and something around 27 % of earth’s crust.

I will leave the wondering for now. And go under the crust, where

prehistoric glass vessels show us that thousands of years in soil or deep sea don't matter much for its deterioration."

SCENE 7:

Wooden floor passing by (like when you look down while walking)

(voiceover continuous:)

(Rijksmuseum)

"There are plenty of examples of glass pieces from 3.500 BC still holding ornaments and color. Even though glass can seem fragile, a solid block of it is quite hard to break. And when all the elements are bound to the material there is also no leakage if it does break. That doesn't mean it has completely sealed in the radioactive matter, it still needs to go somewhere closed off to the public, for a good couple of hundreds of thousands of years".

SCENE 8:
Woman walking through a museum, looking at ancient glass objects in cabinets.

(Voiceover continuous:)
"What will it be like when someone finds one of these massive chambers filled with glass blocks and warnings? Will Indiana Jones be a space cowboy?"

SCENE 9: (Mexico city)
Inside a Mcdonald's in Mexico city.
(Text on screen:)

STORED AT PLAIN SITE

(Voice over:)
"The first ever nuclear weapon was assembled in the McDonald family's ranch house, in New Mexico, Close to Los Alamos.
In 1942 the US military took over the ranch house, and used the area as a bombing and gunnery range. In 1945 it was decided to be a nuclear test site.

A roll of plastic was carried in while two men were carefully cleaning the master bedroom, wiping every surface with damp cloths, so no dust from the surrounding dessert would interfere with the core assembly.
Pieces of plastic were cut from the role, and glued over windows and walls of the bedroom where the assembly was taking place."

SCENE 10:
Found footage from Trinity site (Assembly and construction work).






(Voiceover:)

(Trinity site, New Mexico)
"The hemispheres of plutonium were carried in . The two men carrying it were Brig. Gen. Thomas Farrell, and deputy Maj. Farrell later said, "I

recall that I asked them if I was going to sign for it before I shouldn't take it and handle it. So I took this heavy ball in my hand and I felt it growing warm, I got a certain sense of its hidden power. It wasn't a cold piece of metal, but it was really a piece of metal that seemed to be working on the inside. Then maybe for the first time I began to believe some of the fantastic tales the scientists had told about this nuclear power.

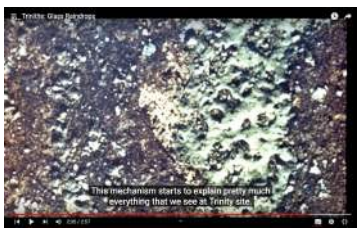
While scientists were working on the bomb core at the ranch house soldiers from the base camp were bringing equipment, building the needed constructions and patrolling. The initial idea for the patrolling of the area was by horse, but the distances were too great and they then decided for jeeps and trucks. The horses remained in the camp and during the work breaks the soldiers would play polo. Eventually Capt Bush, basecamp commander, bought them real polo equipment instead of brooms and a soccer ball.

On the days when the heat would get too intense, they would use the water reservoir as a swimming pool. In the night the soldiers with more outdoor experience were out hunting deer and pronghorn. The meat was then cooked in the mess hall.
Some of the soldiers were from cities and unfamiliar with being outdoors a lot. Davis said he went to relieve a guard at the Mockingbird Gap post and the soldier told Davis he was surprised by the number of "crawdads" in the area considering it was so dry. Davis gave the young man a quick lesson on scorpions and warned him not to touch them.

On July 13, the plutonium core was fully assembled and carried out to the tower at ground zero where it was inserted into the device. Once the assembly was complete many of the men took a welcome relief and went swimming in the water tank east of the McDonald ranch house".

SCENE 11:
Found footage of nuclear explosions.

SCENE 12:
Smoking holes and holes on fire. The holes are carved in earth's crust, -sand and soil.



(Voiceover:)
"During the explosion, sand would get sucked up into the core of the fireball, where the heat would turn it into liquids, then gasses and back to liquids. Then gravity would bring down as rain of glass. Some of it would cool down in the air and remain intact on the ground.
While bigger quantities would still be liquid when hitting the ground and

flow out into puddles, that would get a smooth fire polished surface from the heat hovering above.
When the site had cooled green-yellow glass would be spread all over".

SCENE 13:
Found footage from ground zero after the explosion. Green glass surface all over the site like a creme brulee.

SCENE 14: (Hotshop, Netherlands)
Clear glass chunks

SCENE 15: (Archeological lab, Cph)
At the laboratory. Tools, metal tables, dusty objects in clear containers. Labels, brushes, steel fridges and hands in white gloves.

The following conversation begins when the piece is picked up by a hand wearing white gloves. The two characters in the scene are quite anonymous, b (the oldest) is wearing a white lab coat.

a - 28 million years old?
b - yes.
b - from outer space. The ancient Egyptians found a massive piece in the desert..
a - desert glass?
b - yes, Libyan desert glass .
And they learned to carve in it
a - what did they use the carved pieces for?
b - multiple purposes. Mainly ritualistic.
They believed the messages or prayers loaded into these objects could travel with the speed of meteors. That the power which they came down with, could transport them back up again.
…..
One of these pieces became Tutankhamun's burial chest piece. a sarab.

exactly the same color as this piece ……such a bright yellow -green. They are very likely carved from the same asteroid.
a - The same colors as the trinity pieces ?
b - yes, similar.
a - is desert glass dangerous?
b - no, not radioactive like the trinitite.

Through the process of writing this script I began seeing glass as magical - but what is magic ?

When I ask my friends what they think magic is they usually begin talking about the unknown or something rather mystical. So can something so present in our everyday life (like glass) be magic?
I would argue that the magic is in the ankle in which we look upon something.
Take the sun for example, there is not really anything magical about it up there on a hot summers day. You barely can look at it, but when it goes down you can, the sun doesn't weaken over the span of a day, only change is in the ankle in which we look at it. With its new position lower on the sky, you are looking through more layers of our atmosphere, when looking at it. These atmospheric layers dim and bend the light, and can even do it to the extend where the sun beams become optical illusions. Like on the north pole, where you can experience the sun dancing on the horizon - in multiples.

For me, glass is multiples.

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https://www.glassonweb.com/articles

furnaces (float and rollout glass mainly) :
zhttps://www.lehigh.edu/imi/teched/GlassProcess/Lectures/Lecture03_
Hubert_industglassmeltfurnaces.pdf