A HUMAN LABORATORY

Mark Kasumovic

Fig. 1 - *A human laboratory.*

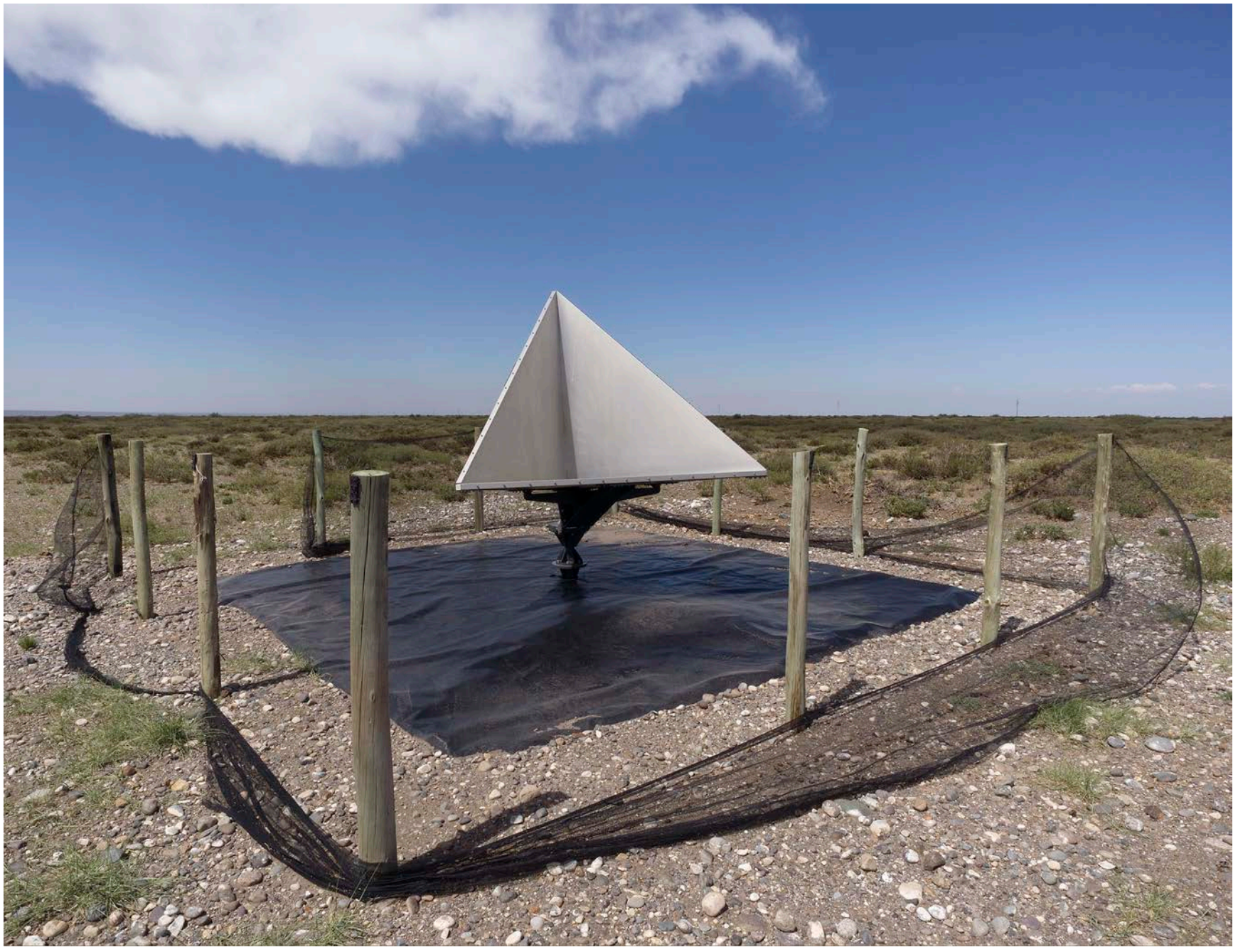


Fig. 2 - *A parade of six megaliths mark the position where Sirius, the bright 'Morning Star,' would have risen at the spring solstice. Nearby are other aligned megaliths and a stone circle, perhaps from somewhat later.*

Fig. 3 - *Someone squares the lune, a major step toward squaring the circle.*

Fig. 4 - *Evidence of astronomical calendar stones are found on the Nabta plateau, near the Sudanese border in Egypt.*[1]

1. **Foxes,** *Radio Telescope Experiment,*

A continuous record of solar and lunar eclipses is kept in Mesopotamia.

Someone conceives a mechanical model of the world, in which the Earth floats very still in the centre of the infinite.

Someone maintains that permanence is an illusion and the only possible real state is the process of becoming.

Someone says that the world consists of imperceptible individual particles, that differ only in size, shape, and position.

Someone calculates the diameter of the earth.

Someone proclaims that consciousness ends with death, and that there is no immortality of the soul.

Someone compares the moon to the earth, upholding the idea of a plurality of worlds.

Fig. 5 - *All stars must maintain a temperature of at least forty million degrees in order to maintain their fuel supply.*

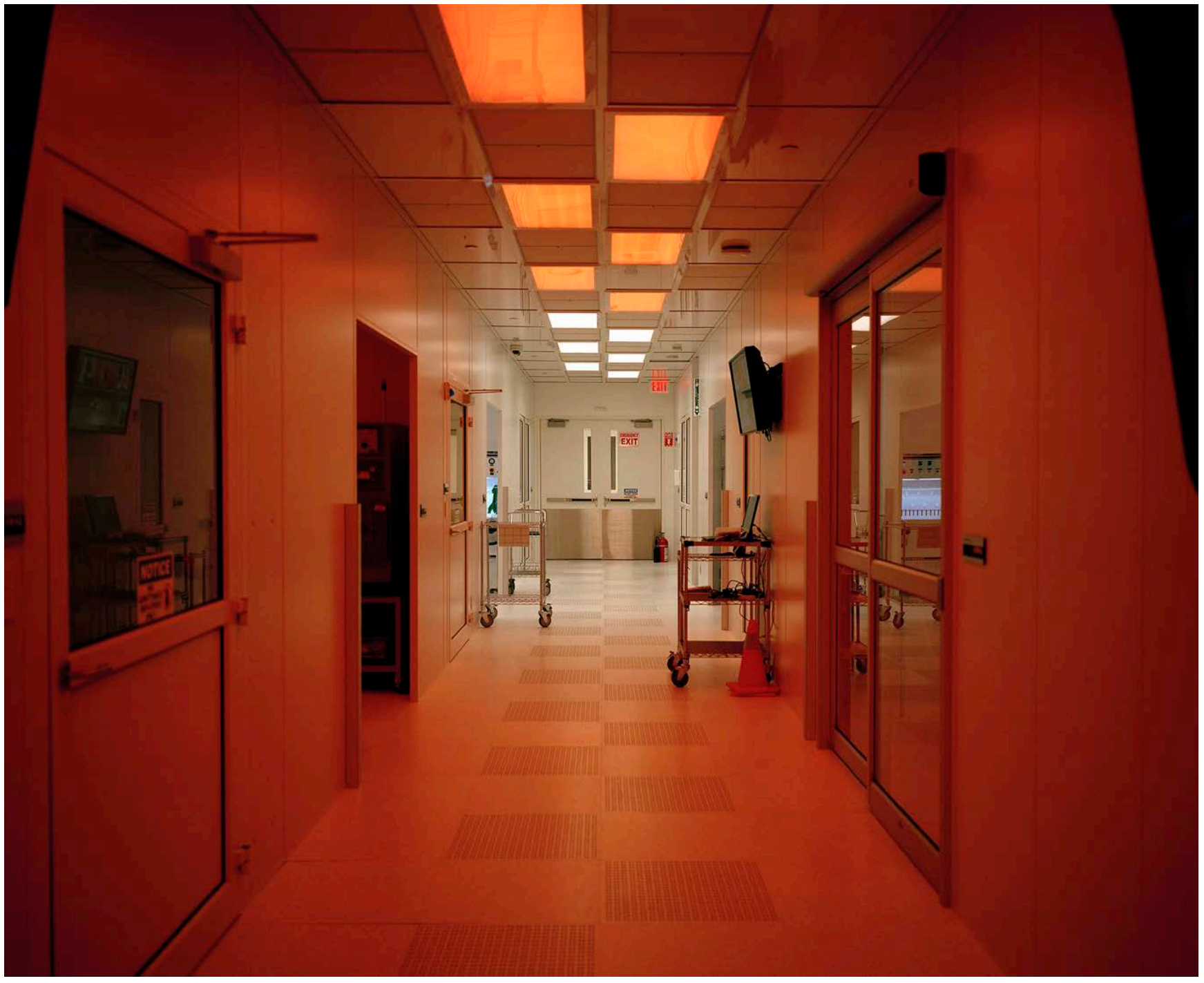


Fig. 6 - *The coincidence of mental thoughts with bodily motions is like the conformity between unconnected but synchronized clocks.*

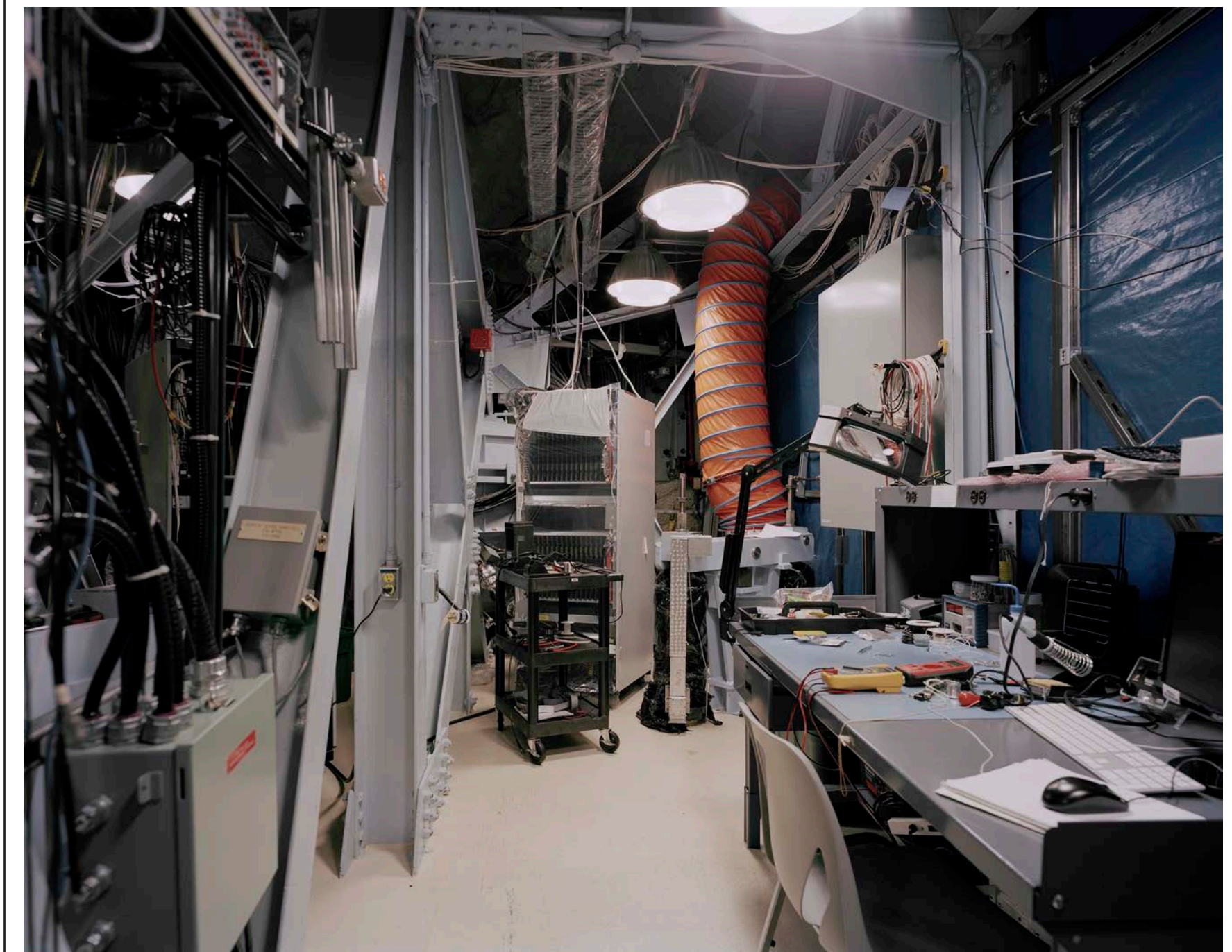


Fig. 7 - *Vision is the consequence of the formation of an image on the retina by the eye's lens.*[2]

2. **Cloistered Room**, *Dark Matter Experiment*,

The primary rainbow is produced by sun rays entering the eye at an angle of about 41 degrees.

In their mind's eye, someone sees lines of force traversing all space.

Mathematicians see centres of force attracting at a distance.

Someone invents the *opthalmoscope*, a small instrument which when pressed against the eye enables the vessels to be seen.

Someone correlates Rapid Eye Movement during sleep with when dreams are particularly vivid and emotionally charged.

What we see in the periphery, just outside the direct focus of the eye, may sometimes be a visual illusion.

Fig. 8 - *Without consciousness, 'matter' dwells in an undetermined state of probability.*

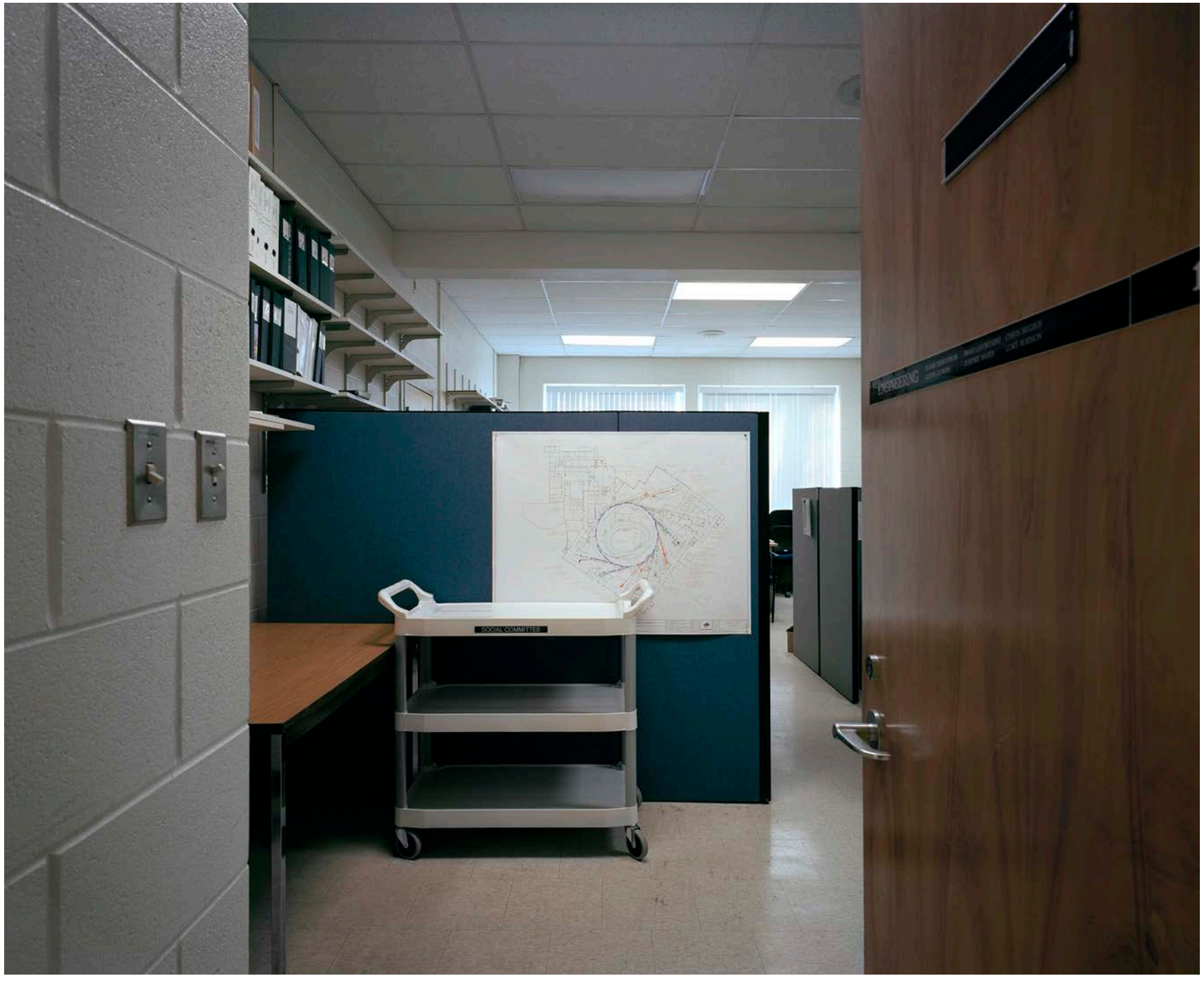


Fig. 9 - *The number of neocortical neurons limits an organism's information-processing capacity.*

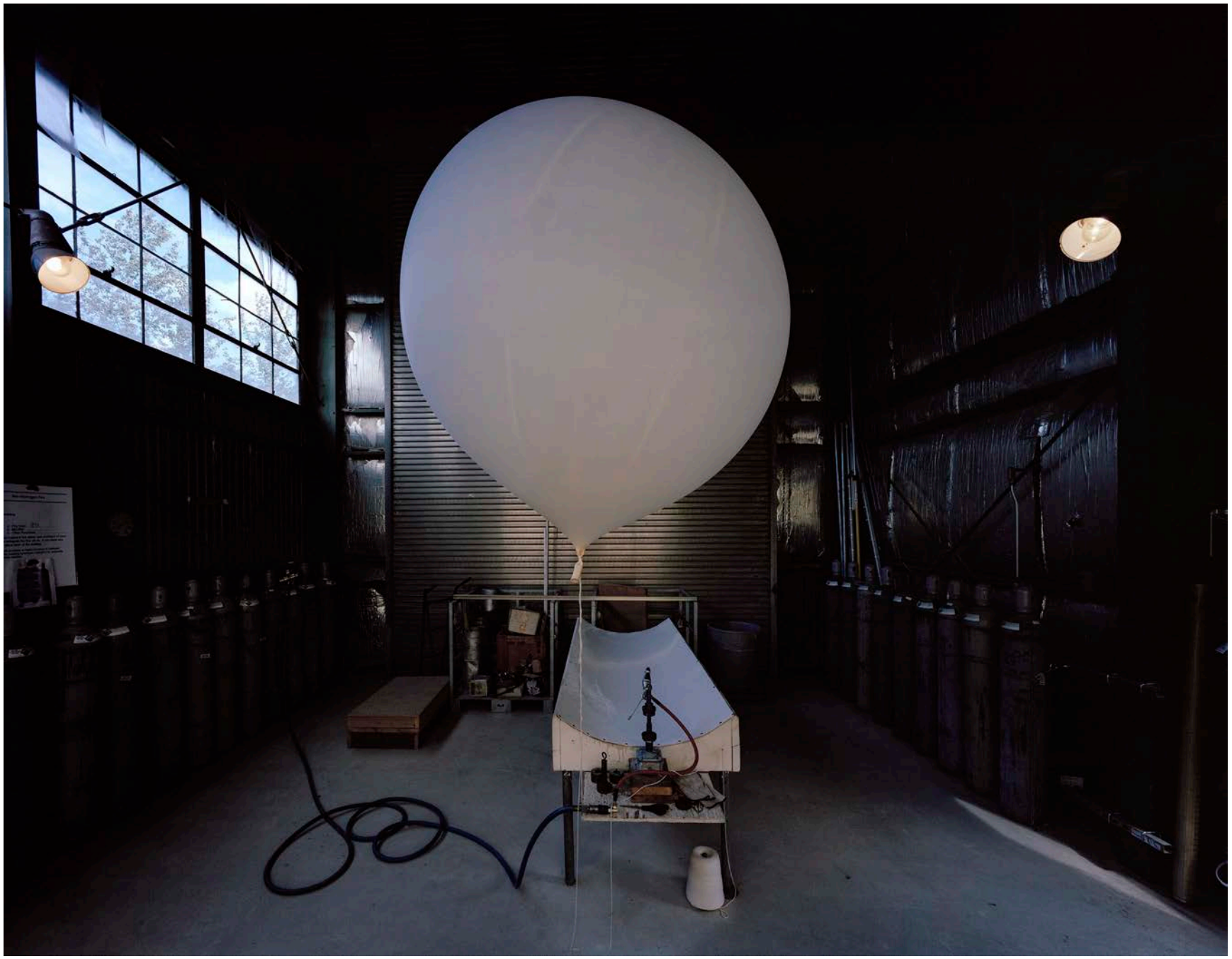


Fig. 10 - *The shape of the heaven is necessarily spherical.*[3]

3. **Balloon,** *Weather Research Laboratory,*

Someone notices the moon shines with the light of the sun.

Someone publishes a map of the known world.

Someone proclaims that the earth is at the center of the universe.

Someone discovers that the corpus striatum, now called the basal ganglia, acts as the brain's receiver for sensory data.

Someone describes nitrogen as *residual air*.

Someone publishes a book called *Evidence of Man's Place in Nature.*

Someone coins the term *biosphere* for where life can exist.

Someone invents the first steam engine, paving the way for the Industrial Revolution.

The world population reaches one billion.

Someone suggests that burning coal will enhance the *greenhouse effect*, which is beneficial for future generations.

Someone isolates ozone, naming it from the Greek word ozein, to smell.

Non-linearities in weather phenomena make them unstable when subjected to small changes in their energy cycles.

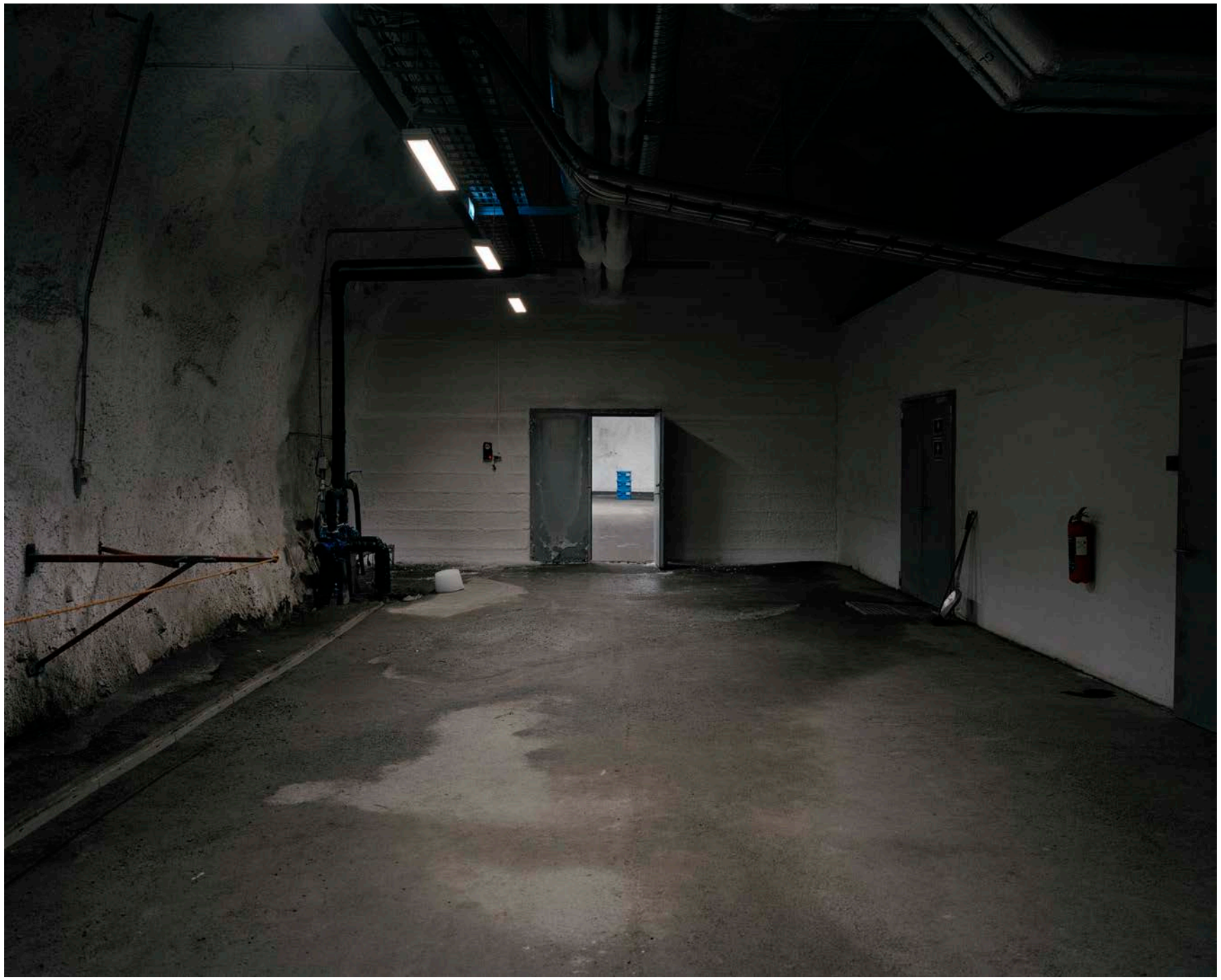
The world population reaches seven billion.

Case Study No. 1

The Svalbard Global Seed Vault

The Earth is formed out of debris around a solar protoplanetary disk.

Life in the Archean is limited to simple single-celled organisms.



Oxygen begins to persist in the atmosphere in small quantities leading to the Great Oxygenation Event.

Organisms replicate their genetic material in an efficient and reliable manner.

The sun becomes too hot for life on the surface of Earth.

Earth's oceans evaporate.

The sun casts out is outer layers, expelled by strong solar winds, and transforms into a planetary nebula.

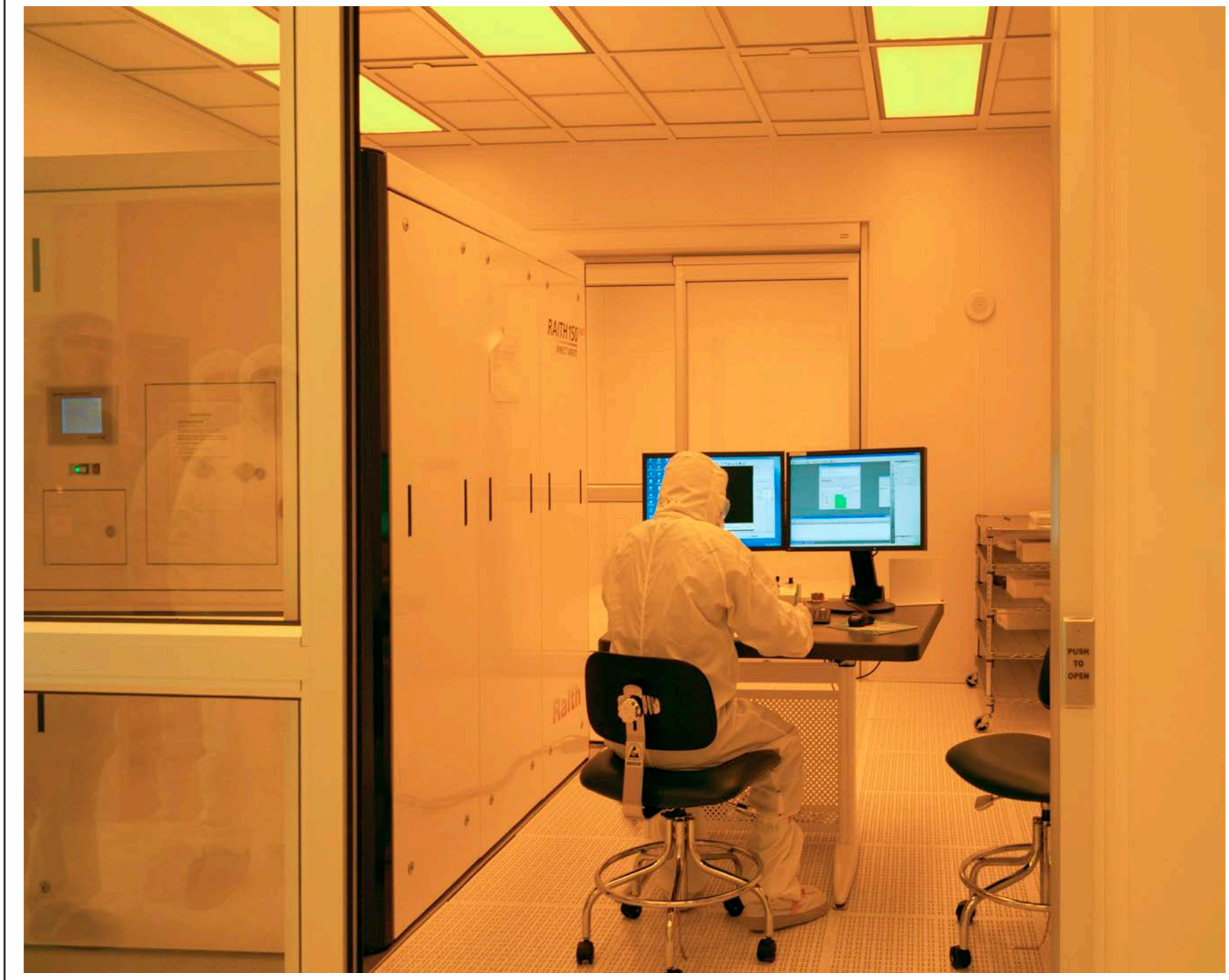


Fig. 11 - *Reality does not exist until it is measured.*[4]

4. **Reflections**, *Quantum Experiment,*

Someone is writing the first scientific history; that is, they begin by asking questions, rather than just telling what they think they know.

Atoms vibrate, hitched together in solid bodies, existing in a space which is infinite in extent and in which each star is a sun and has its own world.

Someone proclaims that universals are abstractions from particulars.

The soul is itself material and so closely associated with the body that whatever affects one affects the other.

Crossbows with sights and mechanical triggers are introduced into warfare.

The universe is predetermined and the individual soul has no immortality.

Something can be true in rational philosophy but false in religious belief.

Fig. 12 - *Being must be regarded as the ultimate abstraction that can be applied to everything that exists.*

Fig. 13 - *Like a hologram, a three-dimensional volume of space is entirely encoded onto its two-dimensional surface.*

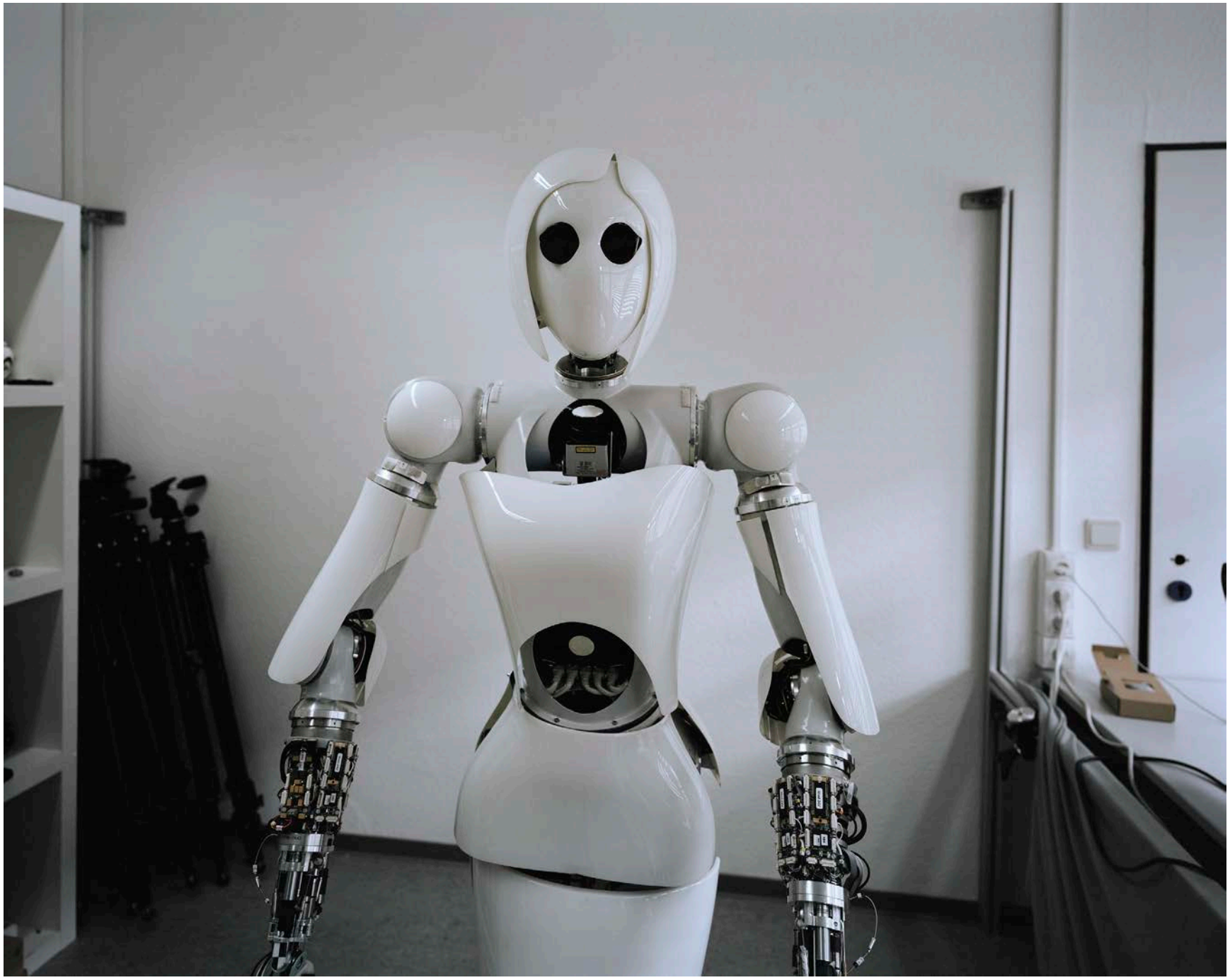


Fig. 14 - *All living things originate from eggs.*[5]

5. **Aila,** *Artificial Intelligence Experiment,*

They believe that in principle, organisms can be spontaneously generated, and that the process is the self-generation of a complicated machine.

Someone publishes Man-Computer Symbiosis.

They describe a machine that humans can relate to.

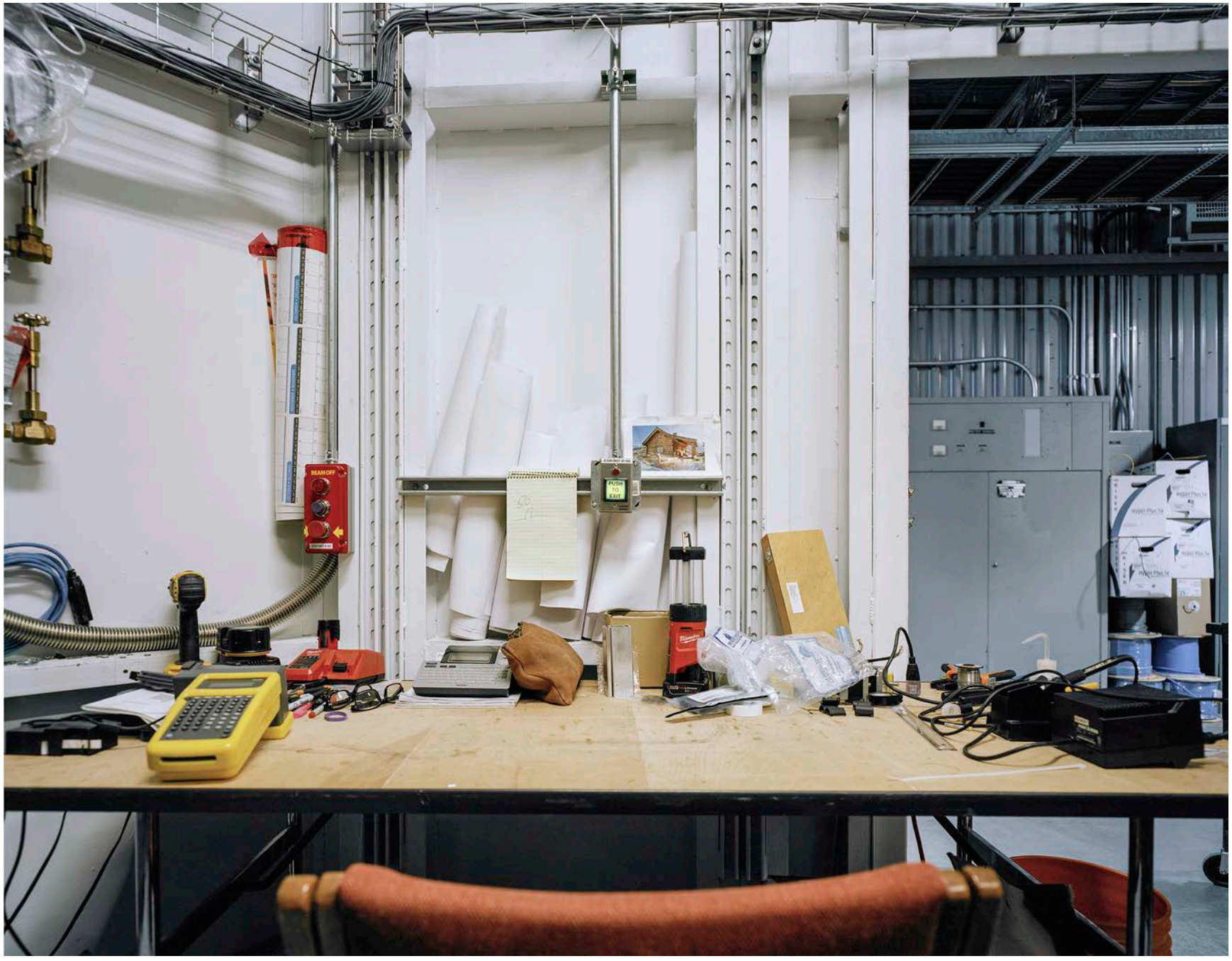


Fig. 15 - *The basic stuff of nature is water. Wherever there is life, there is moisture.*

Fig. 16 - *The elements Fire, Earth, Air and Water mix and separate under the guidance of two opposing principles: Love, which draws them together, and Strife, which drives them apart.*

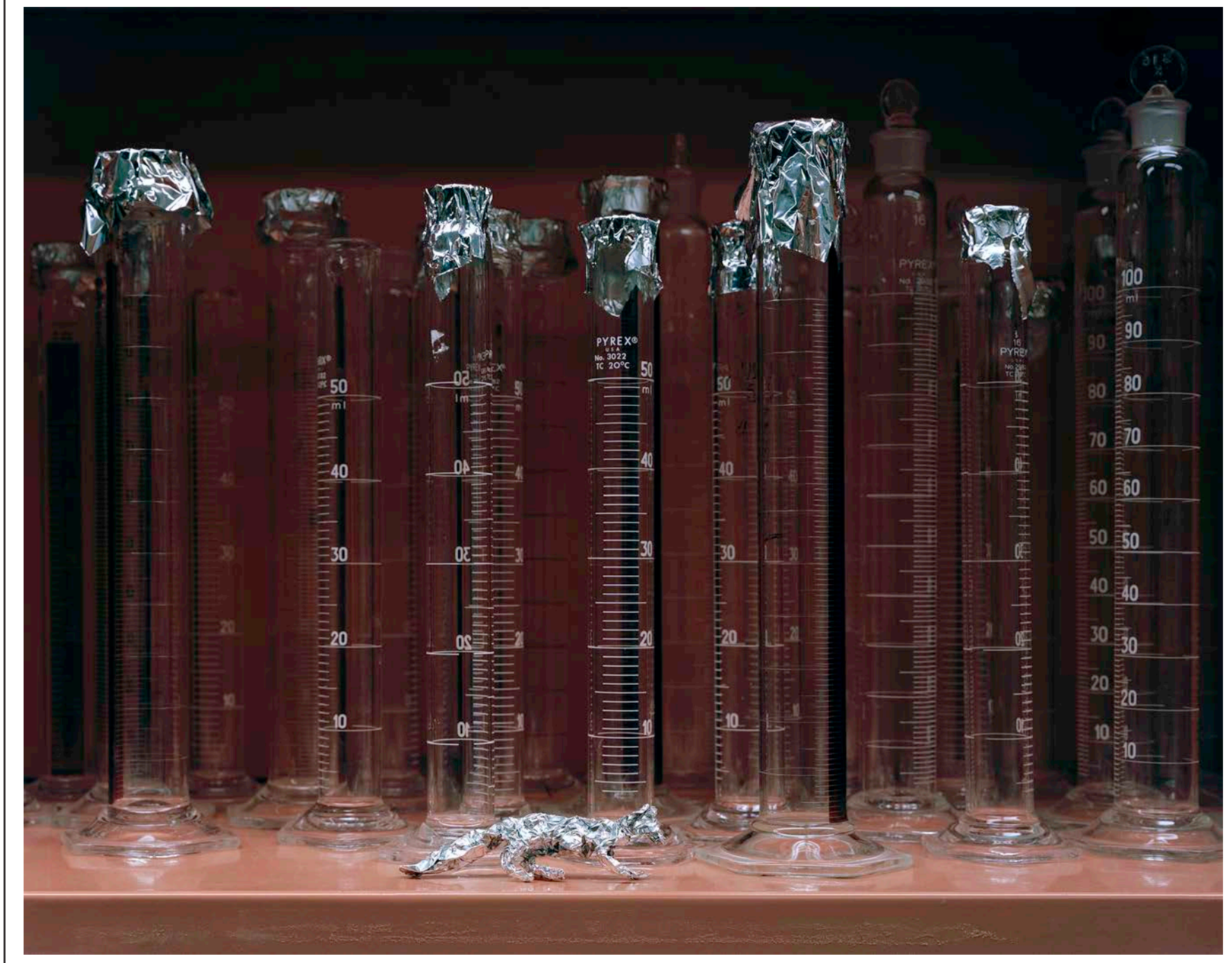


Fig. 17 - *Animals have memories, reason, and other psychological characteristics of man.*

Fig. 18 - *A male robin will be more diligent in caring for its young if the eggs its mate lays are a brighter shade of blue.*

Fig. 19 - *Certain physical systems can become entangled, meaning that their states are directly related to the state of another somewhere else.*

Fig. 20 - *There is no association of the particular present with any particular past.*

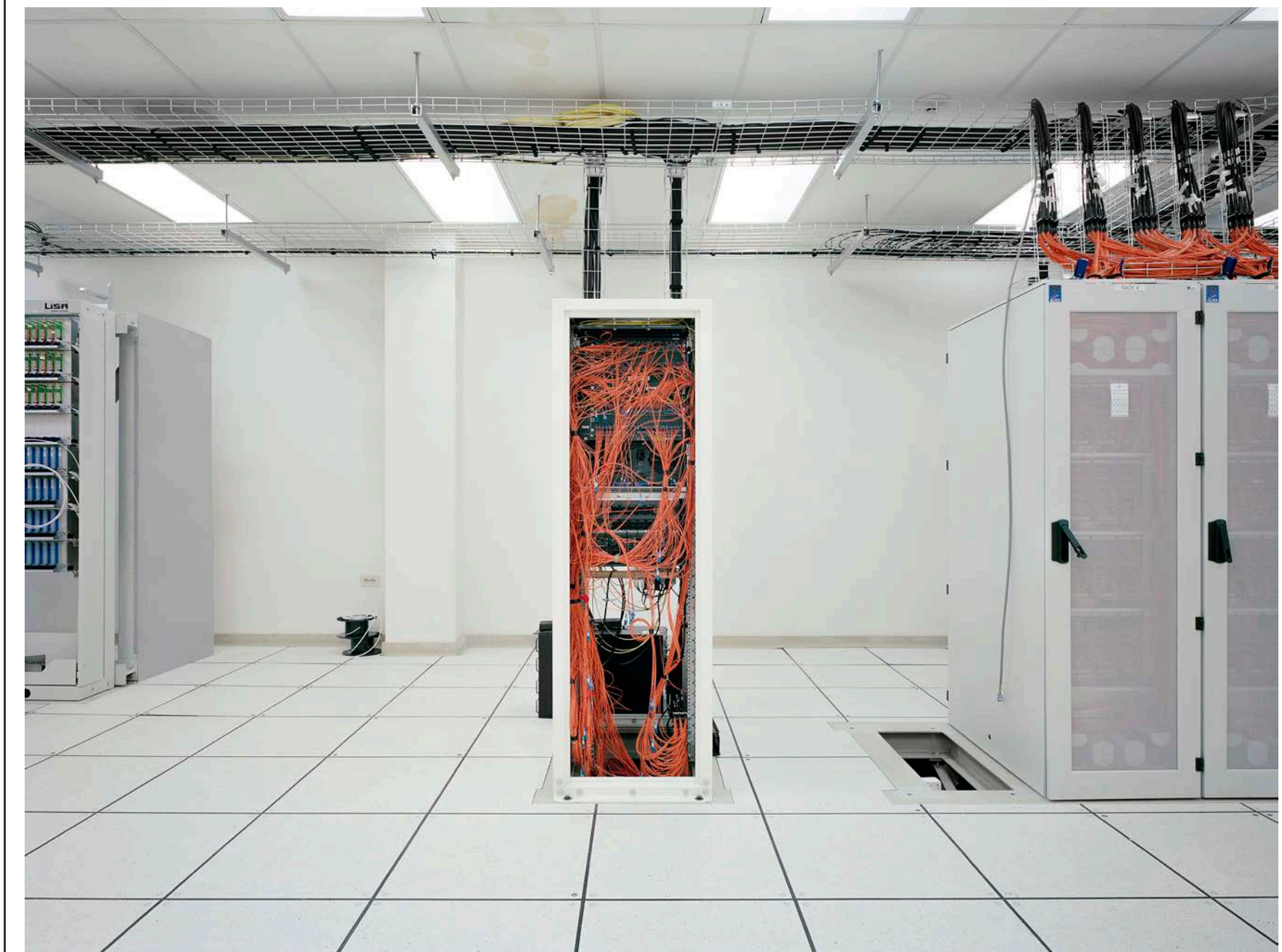


Fig. 21 - *Someone builds a clock which keeps track of calendar cycles, computing the future date of Easter by using various lengths of chain.*[6]

6. **Leak,** *Radio Telescope Experiment,*

Someone says that evolution is invoked as a universal principle, that involves progress through stages toward greater complexity.

Someone believes that the internal human environment is balanced or self-correcting, that disease states are often extreme manifestations of normal processes.

Someone publishes a paper showing that interconnections between functional sites of the brain make more complex intellectual functions possible.

Someone suggests that gene duplications promote the evolution of organisms toward greater complexity.

Someone suggests that the selective reinforcement of neural connections accounts for learning and memory.

This reinforcement causes the brain to organize itself into *cell assemblages*, the building blocks of information.

Someone proves, in theory, that a *cellular automaton* could reproduce itself provided it exceeds a certain threshold of complexity.

Someone identifies the organic molecule formaldehyde in interstellar space.

They also believe that *polyatomic molecules* are formed, perhaps, when large particles of carbon capture other atoms in interstellar dust and form more complex organic molecules.

Someone acknowledges that the border between order and chaos lies complexity, i.e. life and its constraints.

Fig. 22 - *Quantum entangled particles can exchange information instantaneously over vast cosmic distances.*

Fig. 23 - *Markov chains describe sequences of randomly linked probability variables in which the future variable is determined by the present variable, but is independent of the way in which the present variable arose from its predecessors.*

Fig. 24 - *Proto-Indian writing appears in the Indus Valley.*[7]

7. **Radio,** *Lake Experiment,*

Someone is using phonetic signs, deriving them from Egyptian hieroglyphics in the Sinai peninsula.

Someone writes using the alphabet, in thirty cuneiform signs.

Someone dissects a brain and distinguished between the cerebrum and the cerebellum.

A newspaper is circulated in Rome.

Someone compiles about six thousand folio pages in the encyclopedia of knowledge.

It contains knowledge gleaned from the translations of Greek and Arabic books on philosophy, science, and mathematics.

A rapid and sustained trans-Atlantic telegraphic cable is laid, capable of detecting small changes in voltages over a great distance.

Someone designs a microprocessor. An integrated circuit semiconductor chip which is able to receive instructions and send data.

Someone indicates that humans are probably born with two language areas, but the left area is innately able to soon dominate.

Fig. 25 - *Rapid Eye Movement during sleep is correlated to when dreams are particularly vivid and emotionally charged.*

Fig. 26 - *By agitating a bacterial culture, mating can be stopped. This permits the manipulation of only a few genes at a time.*

Fig. 27 - *Objects have a reality only in their relations. All else is imagination.*

Fig. 28 - *Being must be regarded as the ultimate abstraction that can be applied to everything that exists.*

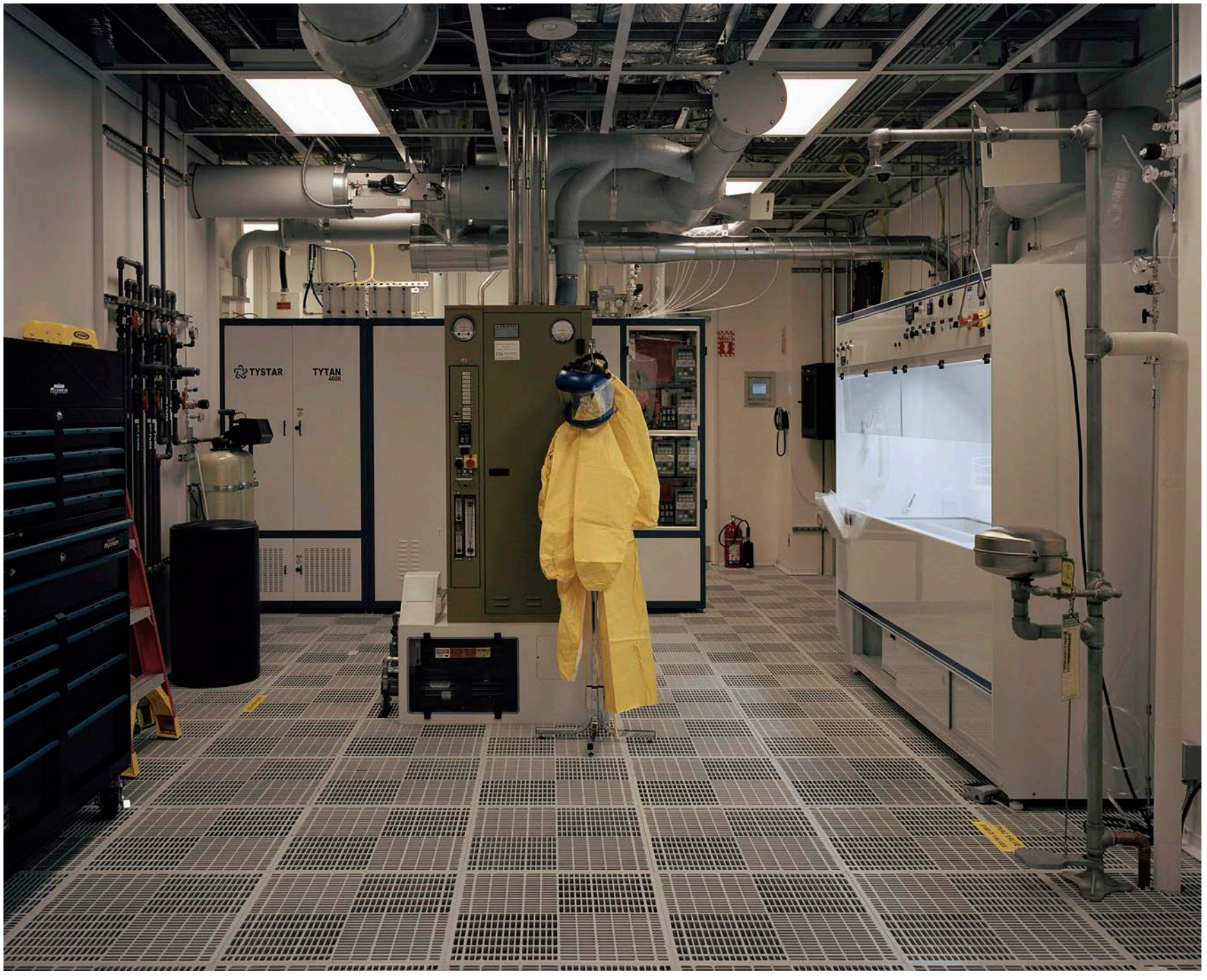


Fig. 29 - *The implication of being incomplete is the need for additional, or hidden, variables.*[8]

8. **Hazard Suit**, *Quantum Experiment*,

The *world soul* is constructed according to mathematical principles, and, therefore, these principles are already fixed within the individual.

The immune system discriminates between *self* and *nonself*.

When their colony is threatened by an intruder, workers tear their own body apart, releasing toxins that kill or hold off the enemy.

Humans and chimpanzees are the only primates known to frequently engage in warfare.

Animal species with males who compete intensively for mates might be more resilient to the effects of climate change.

Although conservation initiatives can save endangered species, sometimes chance can override such efforts.

Fig. 30 - *Gold coins are introduced in Lydia, western Anatolia, as a standard of exchange.*

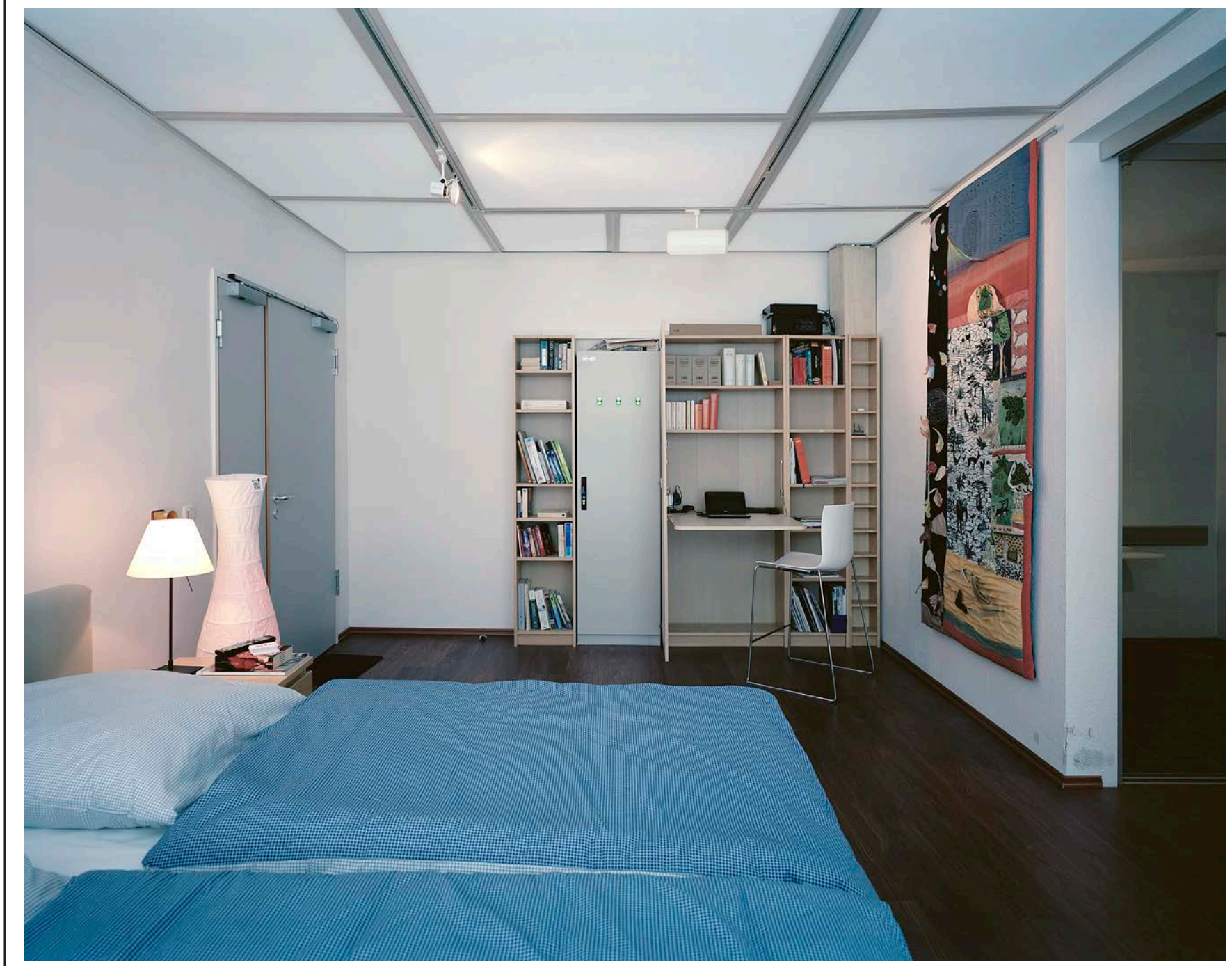


Fig. 31 - *Manipulating the pulses of electrical activity in the thalamus during deep sleep can make us remember or forget.*

Fig. 32 - *Crescent dunes and meandering rivers can 'forget' their initial shapes as they are carved and reshaped by wind and water. Some landforms, however, keep a memory of their past shape.*[9]

9. **Yellow Tape**, *Permafrost Research Experiment,*

Someone coins the term *gas* from the Greek term *chaos*.

Someone refers to carbon dioxide as *fixed air* because it could be fixed into solid matter.

Someone pokes the muddy bottom of the water at Lake Maggiore and collects the gassy bubbles floating to the surface.

They call it *inflammable air from marshlands*.

Someone refers to carbon dioxide as a chemical. They produce it by combining oxygen with carbon obtained from charred vegetables.

Someone claims that carbon and diamonds are chemically identical.

Heat is a consequence of any violent chemical change.

Someone discerns a slight increase in carbon dioxide produced by stimulated nerves.

Someone suggests that the atmosphere of Venus is mainly carbon dioxide.

In the most brilliant stars, a minute amount of carbon acts as a catalyst.

It produces the nitrogen which is essential for life.

The very same nitrogen nuclei which are now in our bodies.

Someone refers to carbon clusters as *stardust*.

Fig. 33 - *An expanding, ring-shaped cloud of atoms shares several striking features with the early universe.*

Fig. 34 - *During a critical mass experiment, a tungsten carbide brick is accidentally dropped onto a plutonium bomb core.*

Case Study No. 2

Rottnest Island Research Station

Memories are encoded onto newly produced proteins.

The brains of living organisms represent experience on many time scales.

Simultaneously recalling events occurring over years, hours, and milliseconds.

The brain inherits the variable time from the physical external world.

Disturbances called time windows compete and form a temporal hierarchy that collectively alter the state of the brain.

Beta-blockers make memories less vivid, detailed and arousing, lessoning their emotional impact.

It may be possible to develop drugs to delete memories altogether.

Risks of mental illness increase when the visual cortex struggles to communicate with brain networks responsible for focus and introspection.

It is also possible to create new memories by directly altering the cortex.

The networks of the brain consist of a universe of multi-dimensional geometrical structures and spaces.

In some networks, structures within the brain can exist with up to eleven dimensions.

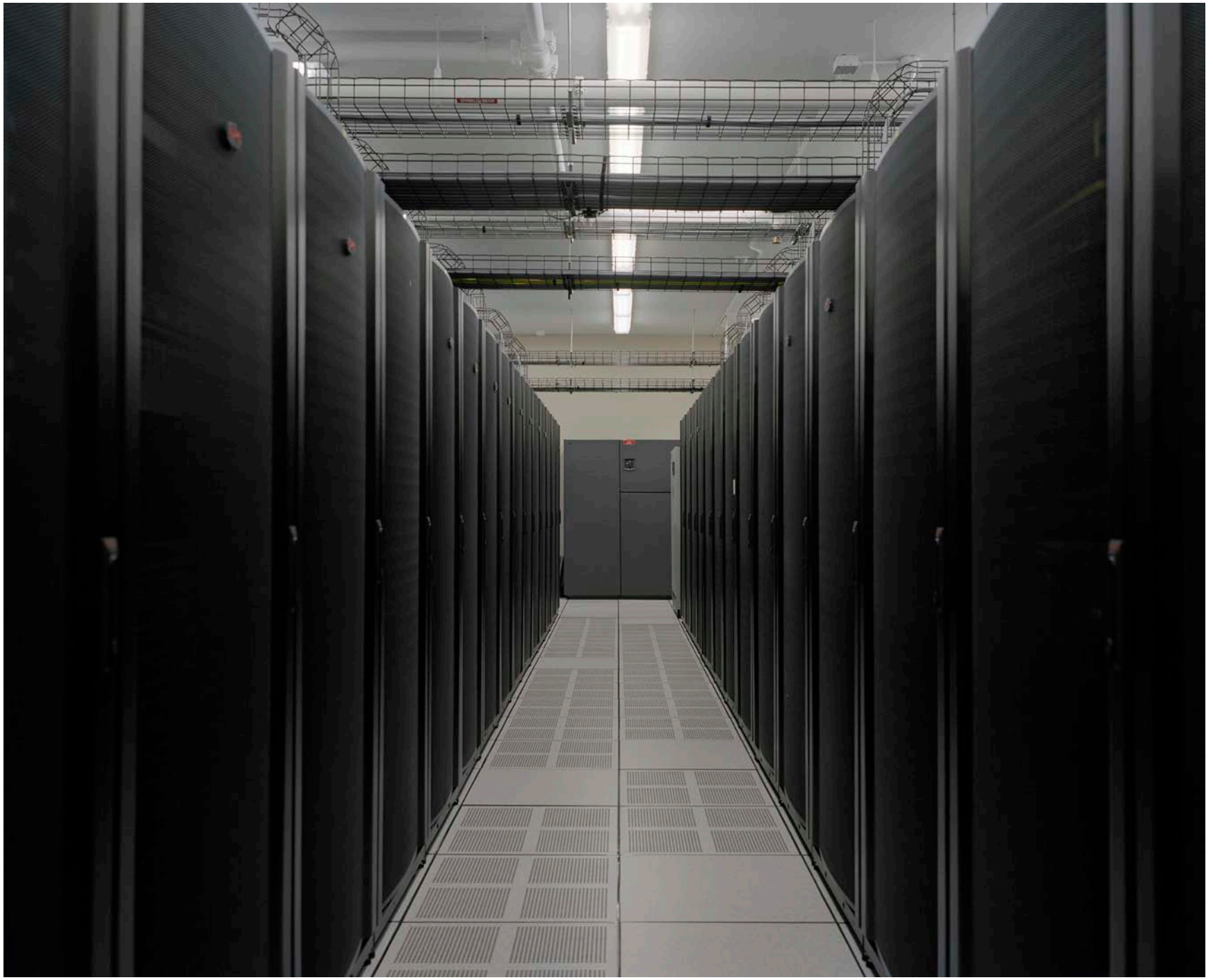


Fig. 35 - *Digital data can be encoded and stored onto DNA molecules and bacteria, which can store information millions of times more compactly than conventional archival technologies.*[10]

10. **Server Room**, *Research University,*

The group of neurons that make up the anatomical substrate of the emotions is located in the limbic system.

Someone adds a fourth domain, bacteria, to the taxonomy of the living world.

Someone says that the nervous system is an array of feedback loops in active communication with the environment, and that through feedback, a mechanism can embody purpose.

The brain functions like a simulator, giving to thought its power to predict events and to anticipate their sequence in time.

The brain can be modelled as a network of logical operators.

Someone refers to memory as the result of functional transformations, or plastic changes, in neurons.

Human consciousness is non-algorithmic, and thus is not capable of being modeled by a conventional Turing machine.

Fig. 36 - *There are two incompatible views, inside and outside, of black-hole formation.*

Fig. 37 - *For an observer outside of a black-hole, its collapse takes almost forever.*

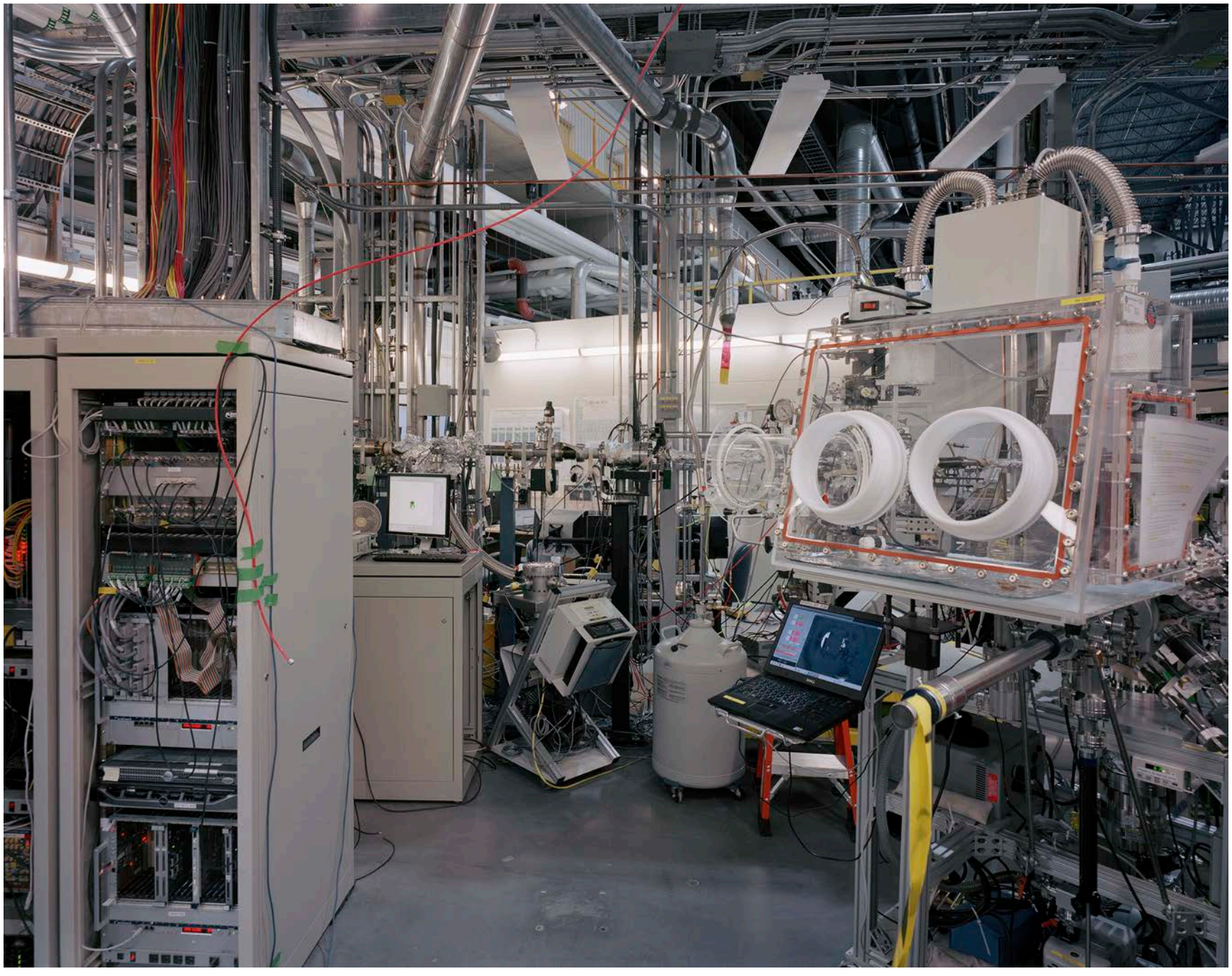


Fig. 38 - *Once information passes into protein, it cannot get out again.*

Fig. 39 - *There is a theoretical possibility that the speed of light is not fixed.*

Fig. 40 - *Unlike the Milky Way, which forms a relatively tidy disk, bubbles and jets of gas shoot off from NGC 6240, extending more than 30,000 light years into space, resembling a butterfly in flight.*[11]

11. **Watering Can**, *Climate Change Experiment,*

Someone publishes recommendations as to the medicinal use of specific plant extracts.

Someone performs the first formal biological experiment from which they conclude that plants absorb nourishment from the air.

The term *seed of disease* is introduced in reference to the bubonic plague.

Someone reports the existence of sex in flowering plants.

Two scientists declare themselves in favor of a common origin for both plants and animals.

From a biological perspective, sex is merely the union of two cells.

Someone suggests that all organisms are fundamentally bisexual, and implies that adolescence is as much a time of sexual repression as of sexual flowering.

Self-fertilizing plants guarentee reproduction but, over time, this leads to reduced diversity and the accumulation of harmful mutations.

Sometimes, large particles of carbon capture other atoms in interstellar dust and form more complex organic molecules.

For the first time, astronomers witness the birth of a colossal cluster of galaxies.

Over time, the cluster will assemble into one of the most massive structures in the universe.

Fig. 41 - *'Schismogenesis' refers to the escalating cycles in living systems that oscillate uncontrollably.*

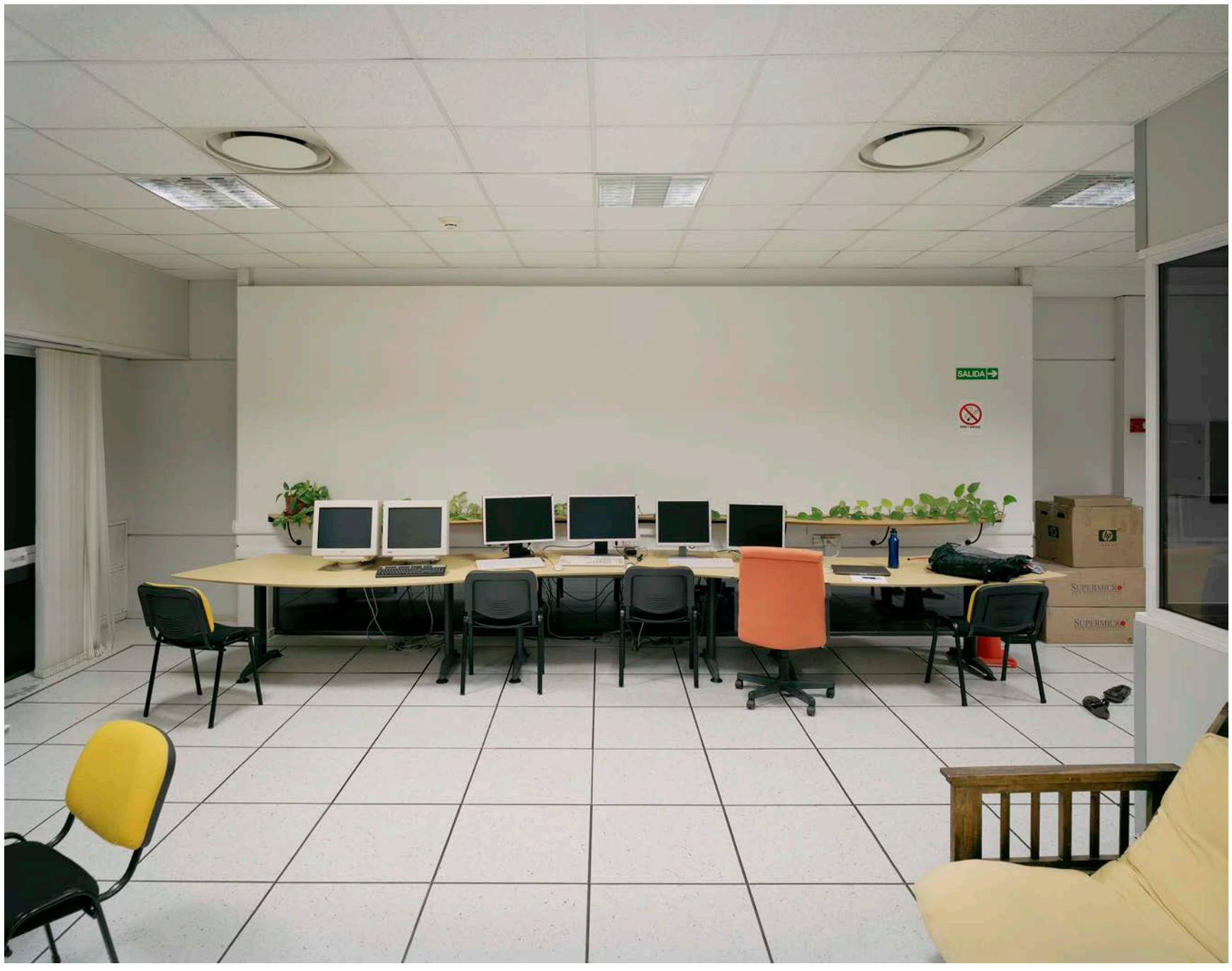


Fig. 42 - *Supernovas are violent events.*

Fig. 43 - *Someone discovers Egyptian sailboat drawings, showing a mast with a single broad square sail hung from it.*[12]

12. **Ladders**, *Wind Modelling Experiment,*

The universe comes into being through the working of natural laws in the combining of atoms, such as the force of wind, which is the result of the impact of innumerable atoms.

Someone carves the first woodwind instrument from the thighbone of a bear.

Bone is a natural choice for a flute because after the marrow is extracted, the length of the bone is hollow.

Someone designs a windmill, with vertical sails made of bundles of reeds attached to a central vertical shaft by horizontal struts.

Someone sails around the Cape of Good Hope.

Someone designs an anemometer to measure the force of the wind.

Clearing tropical rainforests distort earth's wind and water systems.

This triggers major shifts in rainfall and increased temperatures worldwide.

A hurricane causes three times as many heart attacks in New Orleans, nearly a decade after the major storm event.

Winds of over 2km/second have been discovered flowing around a planet outside of the Earth's solar system.

In the brackish groundwater and sands nearly 60 miles away, radioactive cesium is retained and slowly released into the ocean.

Nilch'i represents not only a god, or holy person, but also a means of communication, the act of breathing, and the soul.

Fig. 44 - *Where the visual image is perceived is where it actually is. There is nothing outside of perception.*

Fig. 45 - *The illusion of an external world comes from language.*

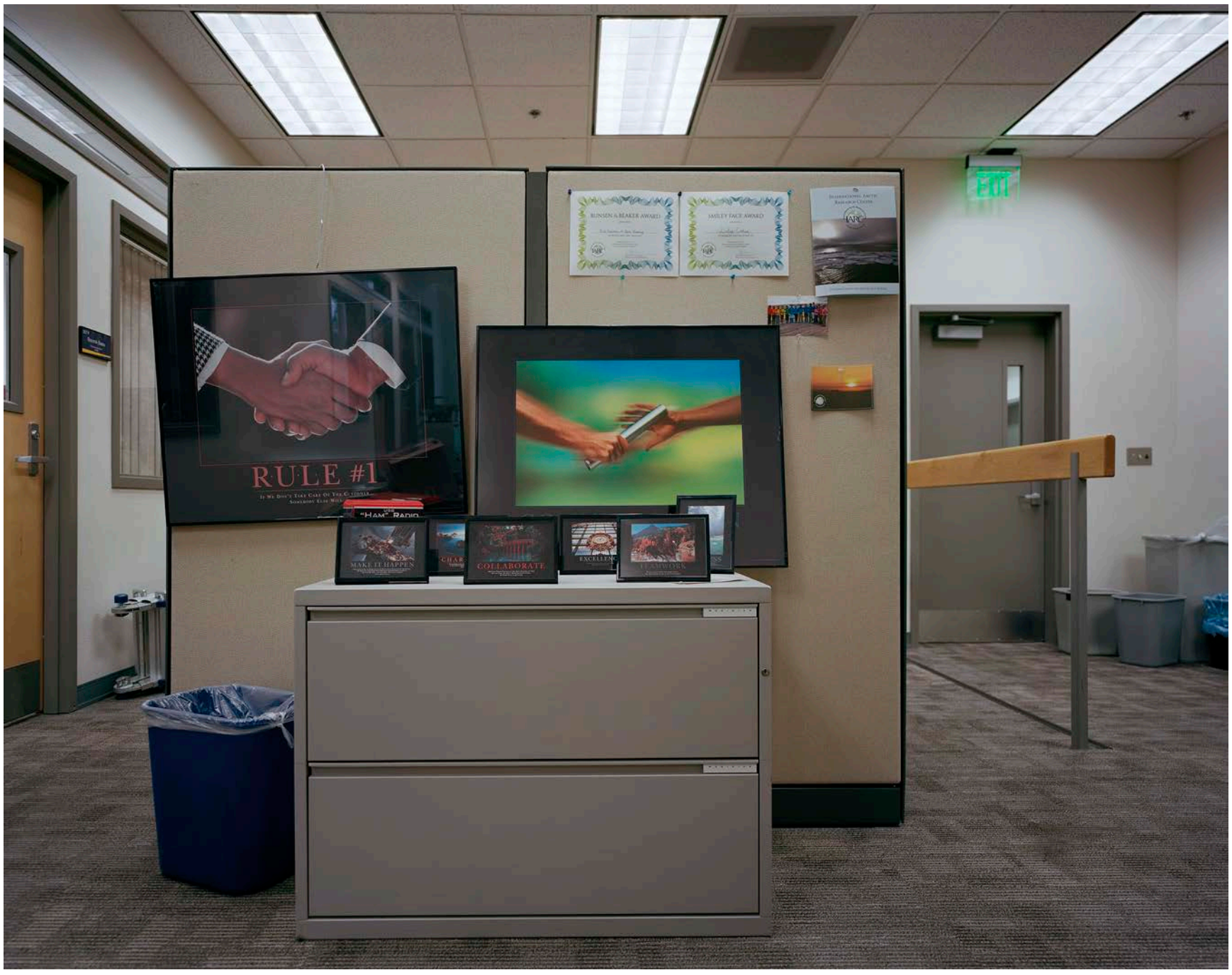


Fig. 46 - *The psychotherapeutic practice of hypnotism is referred to as 'animal magnetism' and is conceived to be an actual fluid. It has had some success with psychosomatic illnesses.*[13]

13. **Rules,** *Arctic Research Experiment,*

Make it happen.

Communicate.

Collaborate.

Excellence.

Character.

Teamwork.

Success.

Fig. 47 - *Multicellular organisms depend on a constant flow of information between cells, coordinating their activities in order to proliferate and differentiate.*

Fig. 48 - *The tiny worm Caenorhabditis Elegans' neural network is transferred to a computer, creating a virtual copy of the worm which behaves in exactly the same way to external stimuli.*

Fig. 49 - *The physics involved with stirring a liquid operate the same way as the mathematical functions that secure digital information.*[14]

14. **Phosphates**, *Lake Experiment,*

When gunpowder is mixed with water, it dries in grains which burn faster and are more powerful.

Someone synthesizes water by exploding hydrogen in oxygen.

Someone refers to the sea as a vast chemical laboratory.

Someone bombards a mixture of ammonia, water vapor, hydrogen, and methane with an electrical discharge to simulate lightning.

Someone produces the nucleotide adenine by concentrating solutions of ammonium cyanide in water.

Someone determines that air, like water, propagates audible ultrasound in a nonlinear way.

When compared to an ordinary liquid, water displays a vast array of unusual anomalies.

An eel-like robot developed by engineers and marine biologists swims silently in salt water without an electric motor.

Fig. 50 - *Using the gene editing tool CRISPR-Cas9, they disrupted DISC1, modeling the mutation seen in studies of individuals suffering from schizophrenia.*

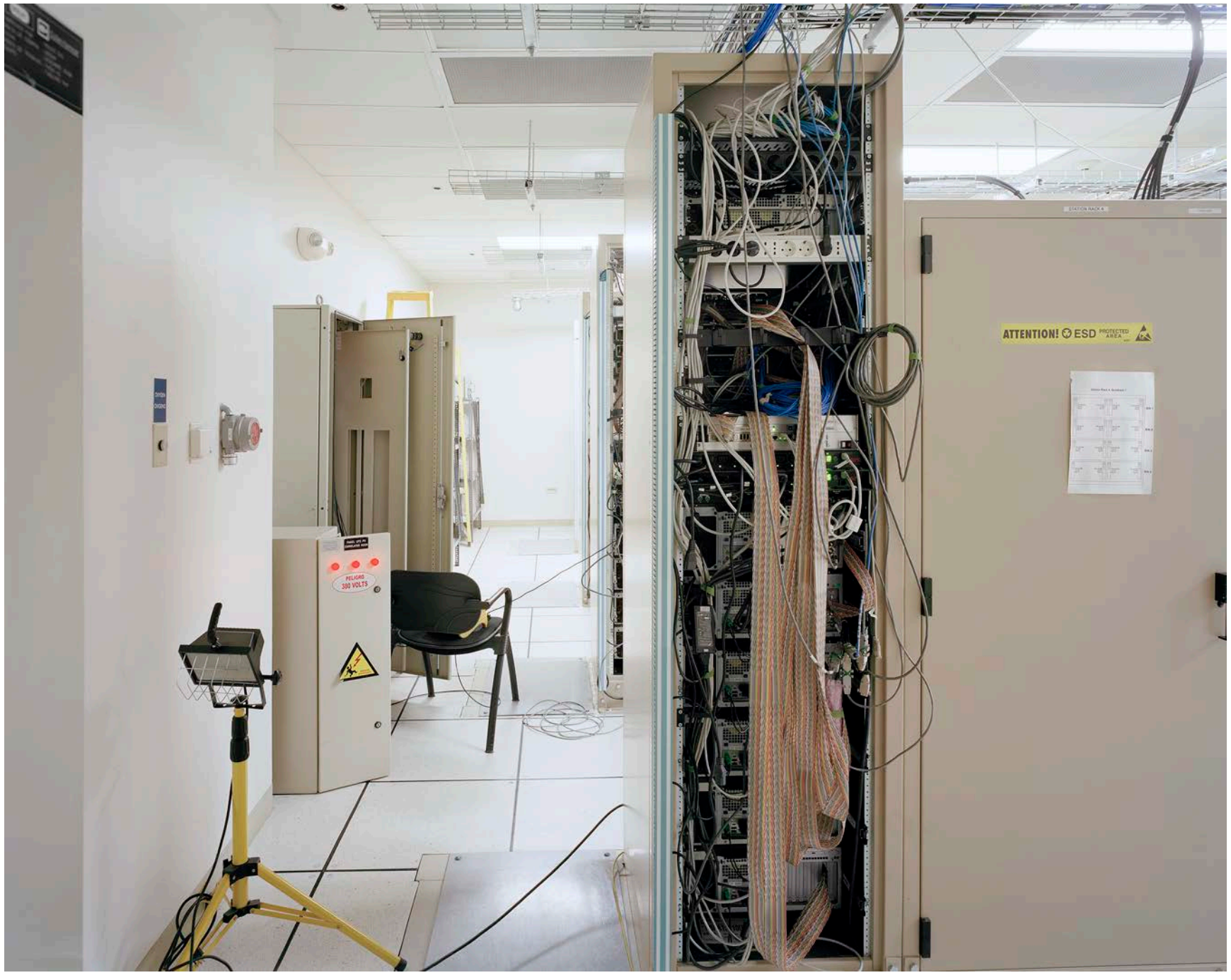


Fig. 51 - *An explosion is caused by the failure of an O-ring seal in the joint between the two lower segments of the right-hand solid-rocket booster.*

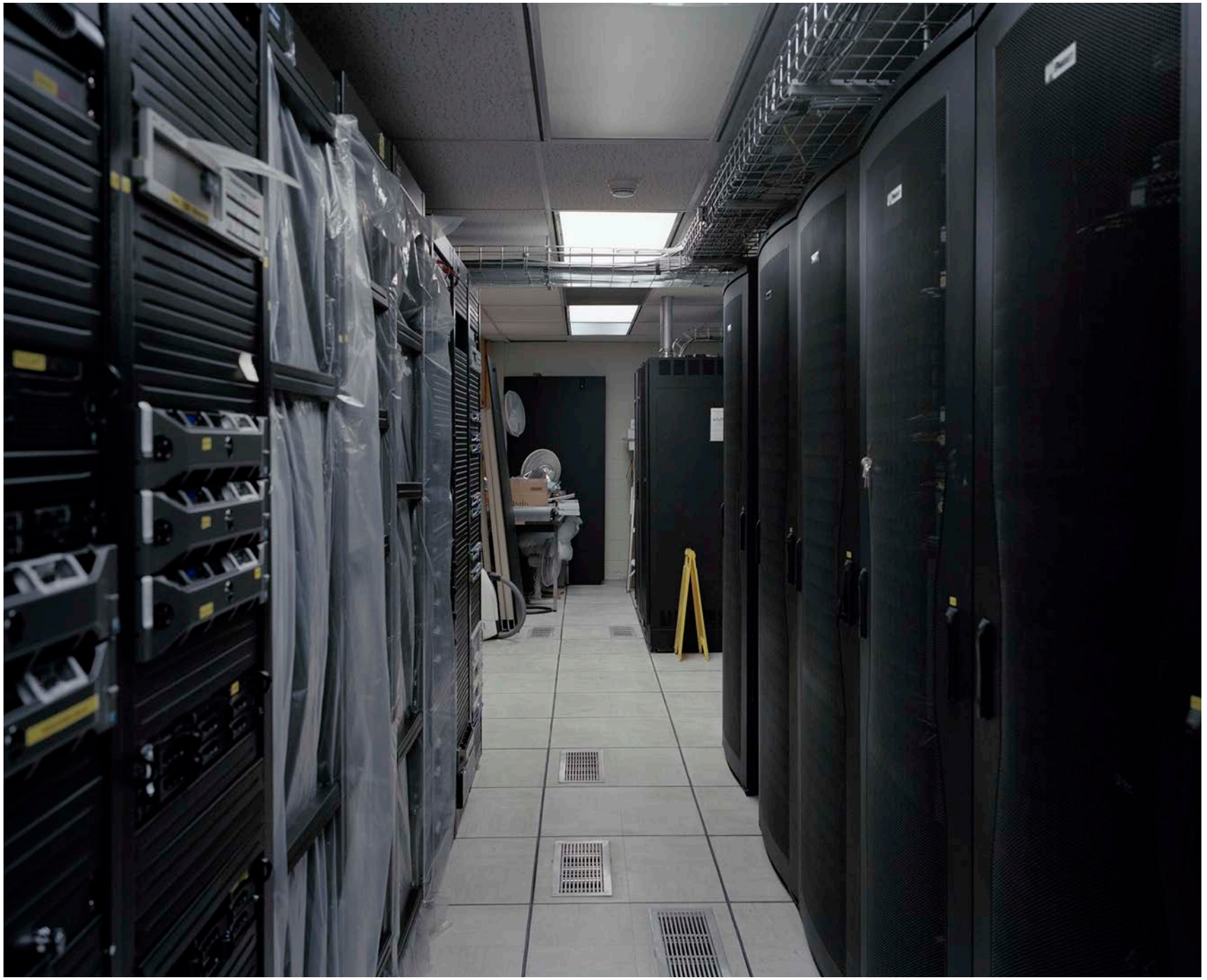


Fig. 52 - *There was a sudden proliferation of walled communities*.[15]

15. **Upgrades**, *Research University Server Room,*

Computers require:
Magnesium,
Radium,
Barium,
Niobium,
Osmium,
Cobalt,
Manganese,
Titanium,
Hafnium,
Tungsten,
Germanium,
Gold,
Silver,
Copper,
Mercury,
Bismuth,
Silicon,
Gallium,
Zinc,
Iron,
Sulfur,
Phosphorus,
Cadmium,
Palladium,
Tantalum,
Platinum,
Aluminum,
Carbon,
Lead,
Nickel, Boron,
Chromium,
Potassium,
Francium,
Cesium,
Sodium,
Lithium,
Calcium,
Nitrogen,
Tin,
Arsenic,
Neodymium,
Selenium,
and Oxygen.

Fig. 53 - *Our human macro-scale understanding of distance, and time itself, may be illusory.*

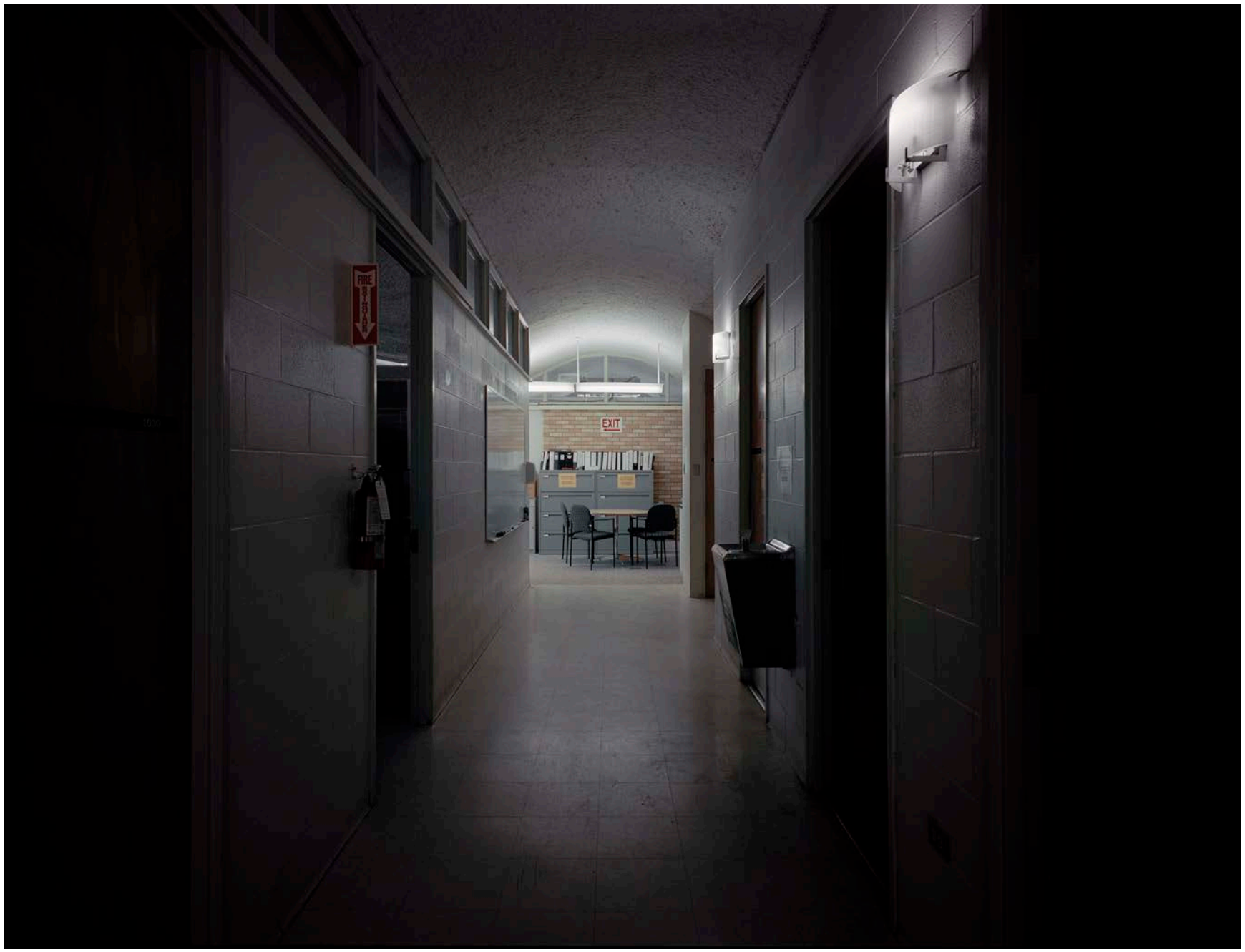


Fig. 54 - *A retinal burn, caused by a Nd:YAG range finder, results in nearly complete vision loss.*

Fig. 55 - *Twentieth century programmers allot just two digits to register years within software, failing to anticipate the turn of the century.*

Fig. 56 - *Cells have evolved a way to transmit multiple messages through a single pathway by encoding the messages rhythmically over time.*

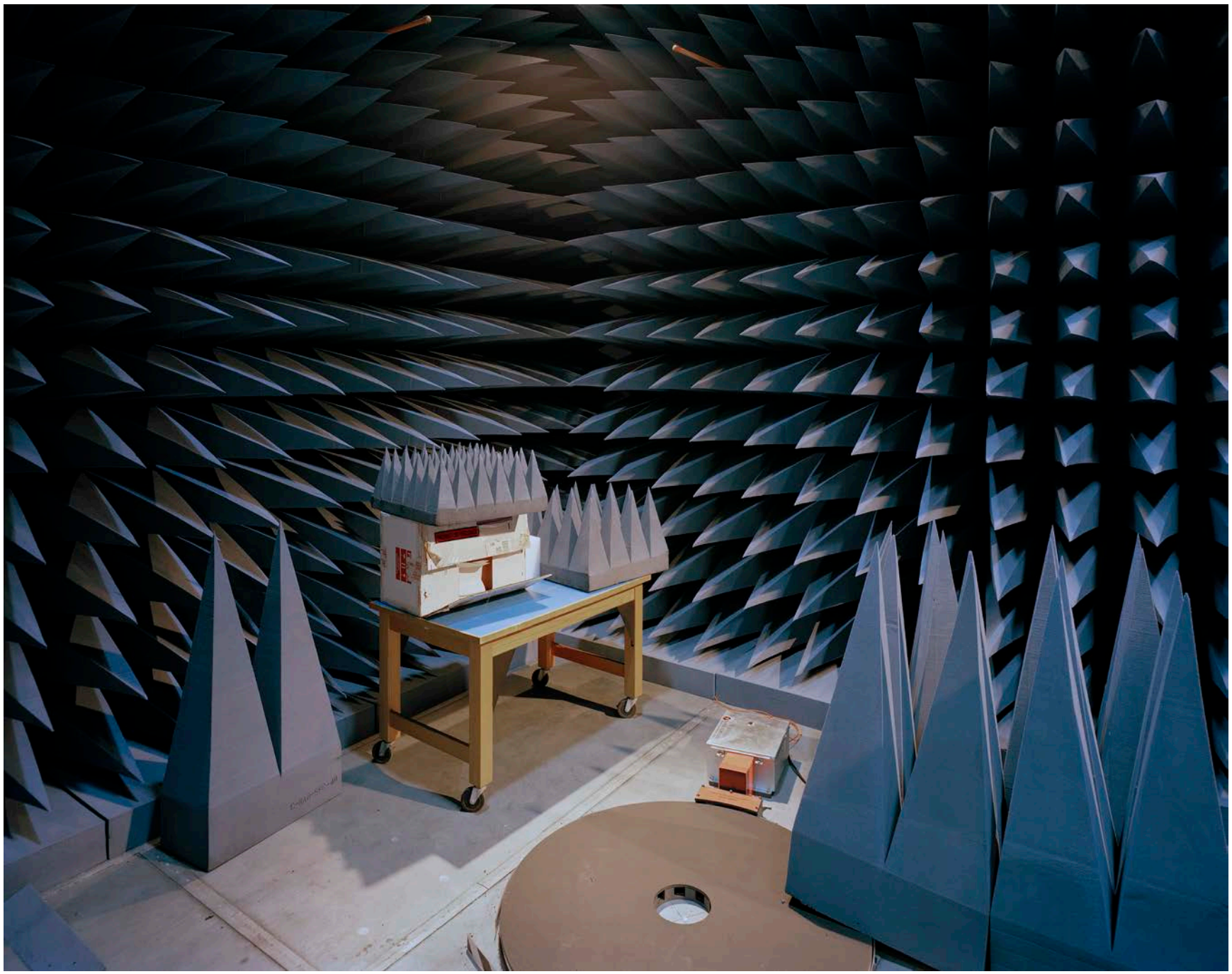


Fig. 57 - *When red blood cells are hit with laser light, they produce high frequency sound waves that contain a great deal of information.*[16]

16. **Corner,** *Antennae Research Experiment,*

Someone places a needle parallel to a wire conducting electric current.

Someone speculates that electromagnetic phenomena might be situated in the aether.

Someone proposes a theory of *charged particles*, in which a body carries a charge if it has an excess of positive or negative particles.

Meaning is the joint product, of all the evidence that is available to people, who in their daily life, try to communicate.

Someone speculates that the Universe is locally fluctuating and unstable.

As information is processed and moves farther along a network, it becomes harder to extract frequency, but easier to extract higher-level information, such as words.

Fig. 58 - *Reason rather than observation is at the center of scientific effort.*

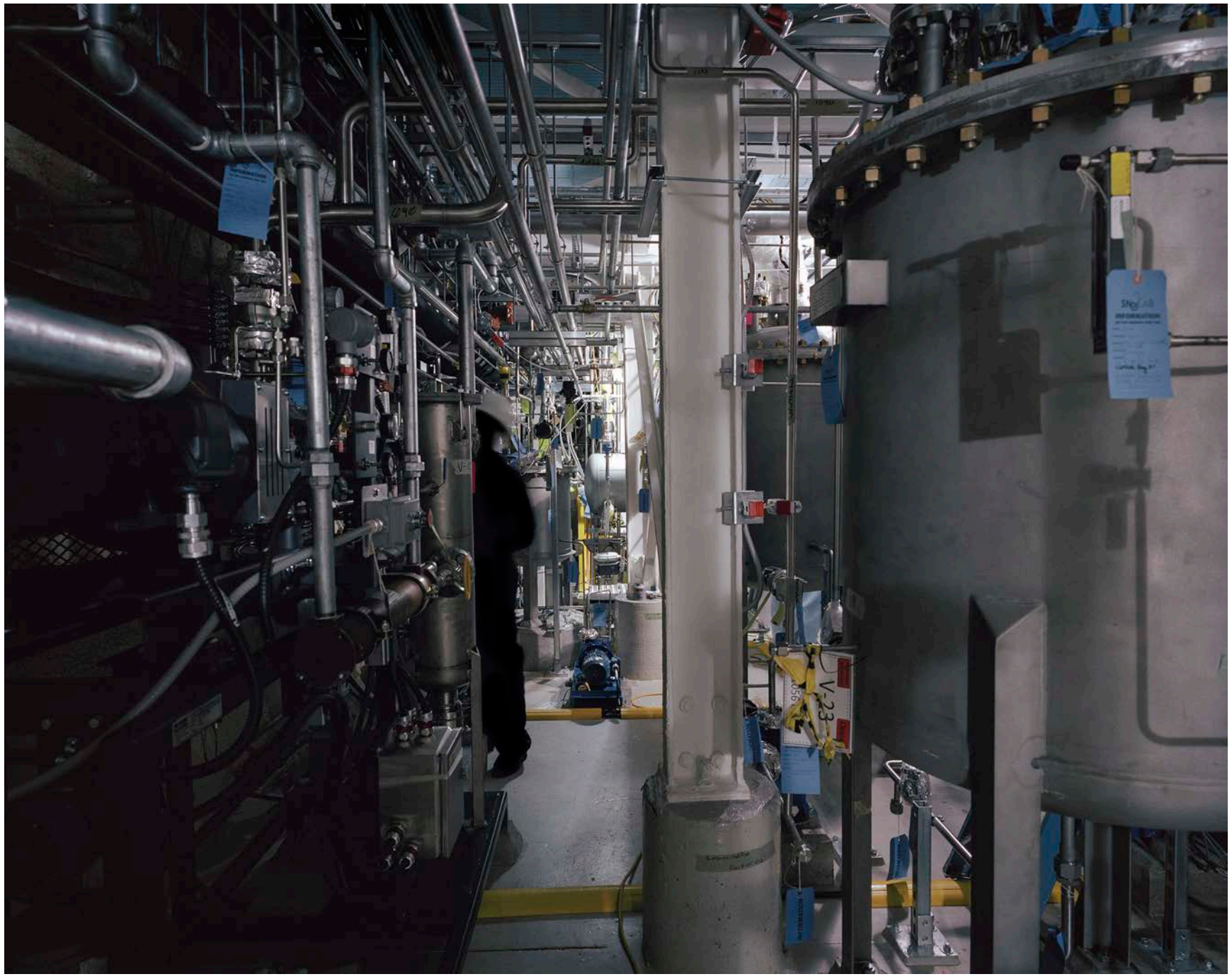


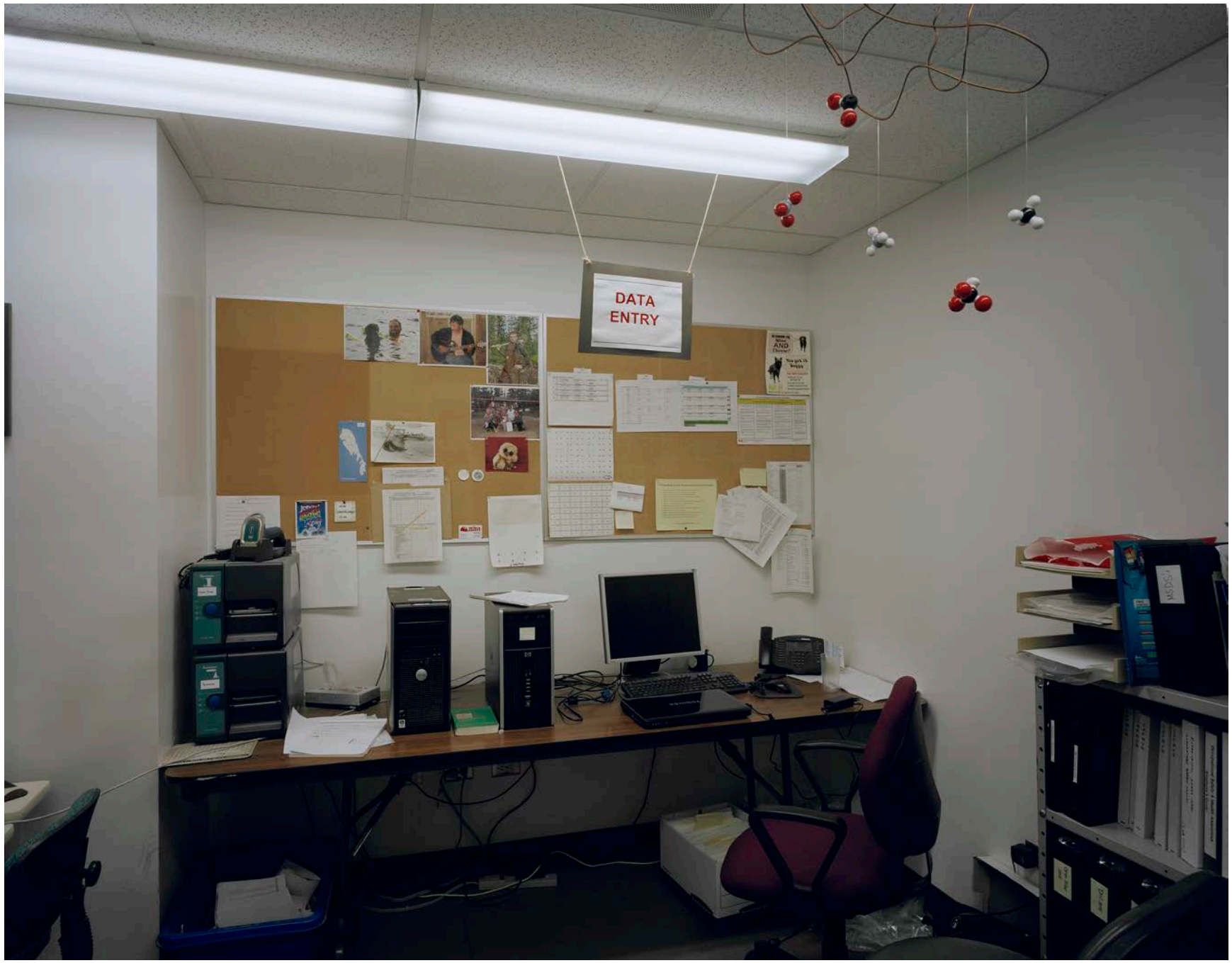
Fig. 59 - *NGC 1052-DF2, due to its complete absence of dark matter, suggests that there may be more than one way to form a galaxy.*

Case Study No. 3

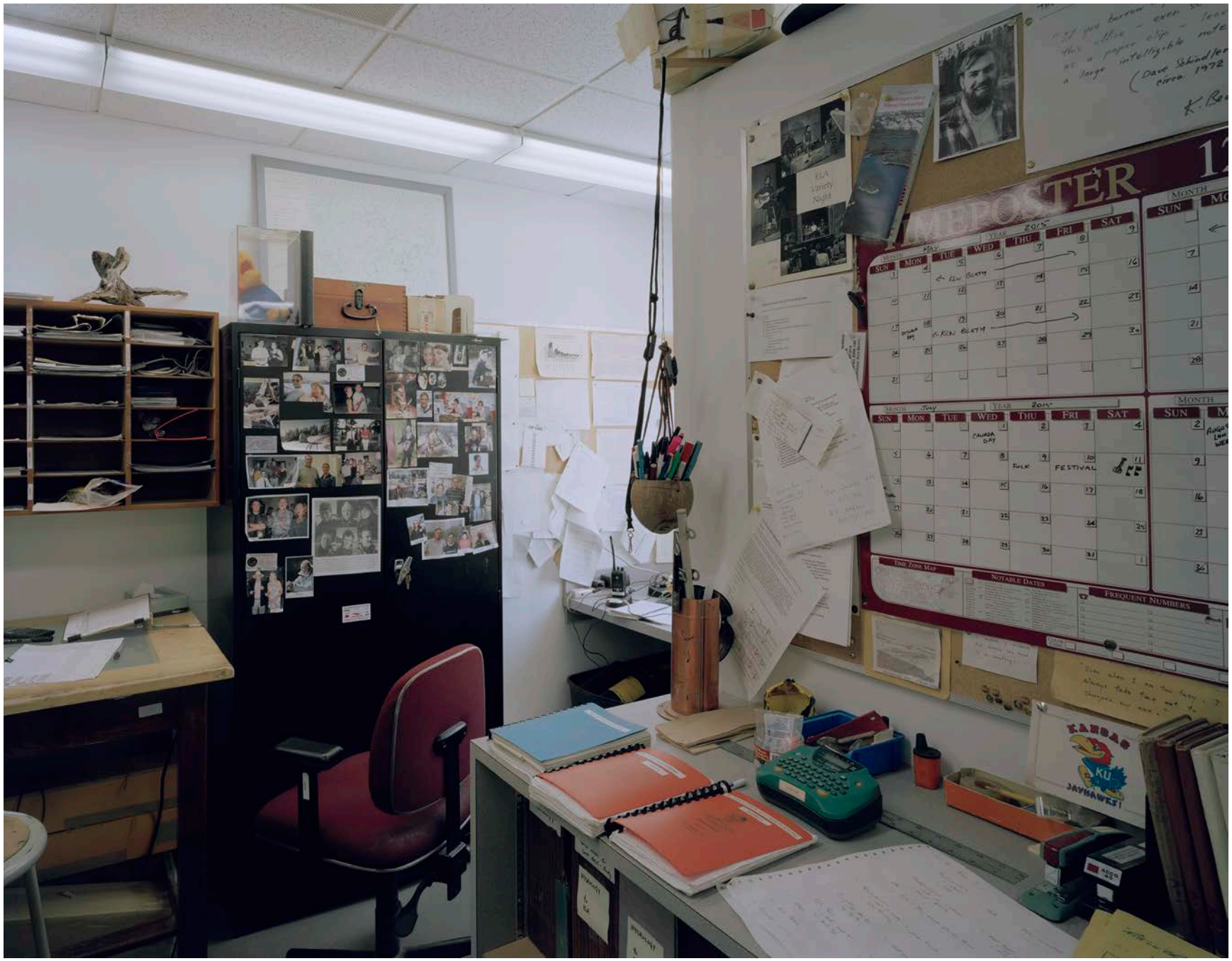
The Experimental Lakes Area

Some ancient sightings of gods and spirits, especially in temple worship, are conjured by means of camera obscura projections.

The camera obsucra is a natural phenomenon that occurs when an image from a small hole forms on a screen within a darkened room.



The image it produces is reversed and inverted.



When placed in a bottle, chalk and silver nitrate in nitric acid darkens when it is exposed to light.

The eye works much like the camera obscura, with an opening, a lens, and a surface where an image is formed.

When the soul wishes to see, it sends forth psychic pneuma through the optic nerves to the eye, which emerge through the pupil, mingling with external light.

Having diffused over the surface of the object, it returns to the soul carrying the visual impression.

Someone produces a negative image with paper and silver chloride, but cannot adequately 'fix' it into the future.

The image continues to darken when it is viewed in the light.

Someone discovers a non-seeing area in the eye corresponding to the head of the optic nerve.

Bitumen of Judea, a black viscous mixture of asphalt, brightens when exposed to light.

It can be carefully applied to metal and glass, and placed in front of an engraving.

The image it finally produces is eventually destroyed.

Fig. 60 - *There is an inseparable link between electricity and cerebral function.*[17]

17. **Robot Suit,** *Space Exploration Experiment,*

Any stimulation of the optic nerve results in a sensation of light.

Nerve cells consist of two parts.

Psychosis is experienced as an intrusion of a *thou* on the *I*.

The semicircular canals of the inner ear regulate the awareness of your position in space.

Someone invents the telephone.

Someone sends long wave wireless telegraphic signals over a distance of more than a mile.

The junction between the neurons is called a *synapse*.

Someone detects a slight increases in carbon dioxide production by stimulated nerves.

Sleep is not just the absence of being awake, but is a vital instinctual and biological process.

Someone, while investigating the atmospheric static interfering with radio communications, establishes that the radio source he has been hearing since the previous year, comes from outside the solar system.

Wormholes, or *handles*, are continuous lines of force that exit and re-enter the observer's world.

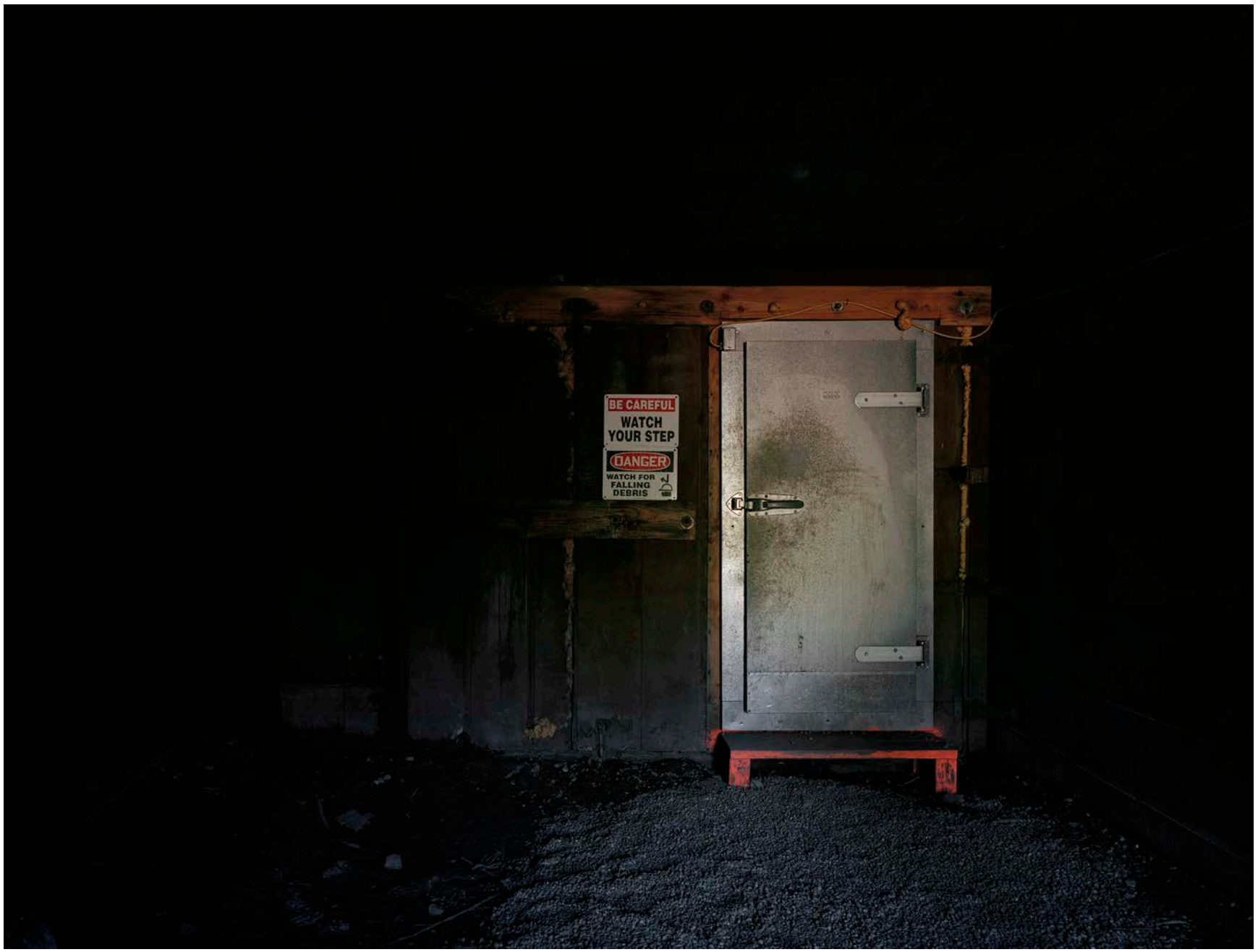


Fig. 61 - *Though most physicists try to sidestep the issue, there is a link between the conscious choice of experiment and the outcome of the experiment.*

Fig. 62 - *The speed of nerve conduction is slower than current electricity..*

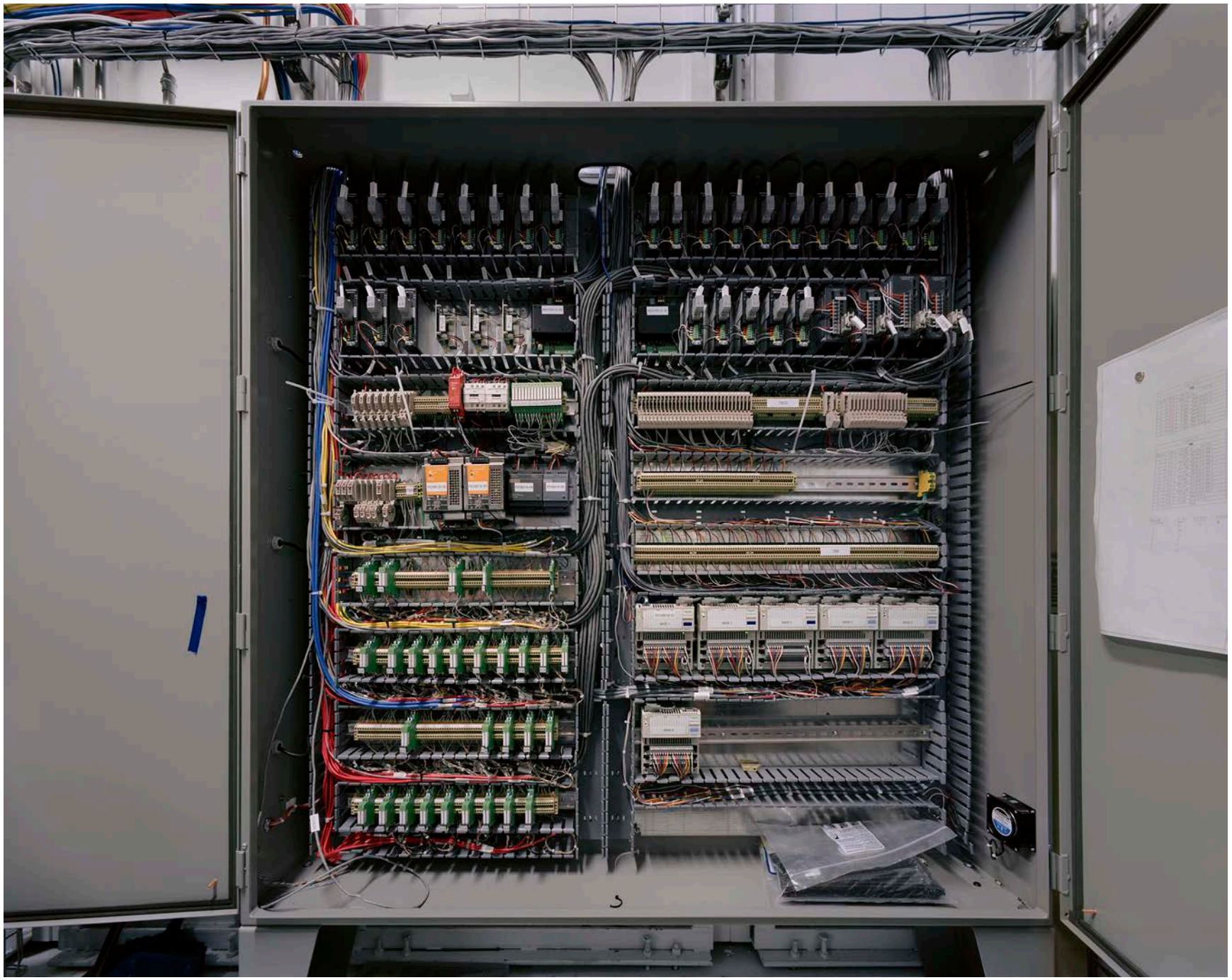


Fig. 63 - *Stress amongst young bees can cause the colony to collapse prematurely.*

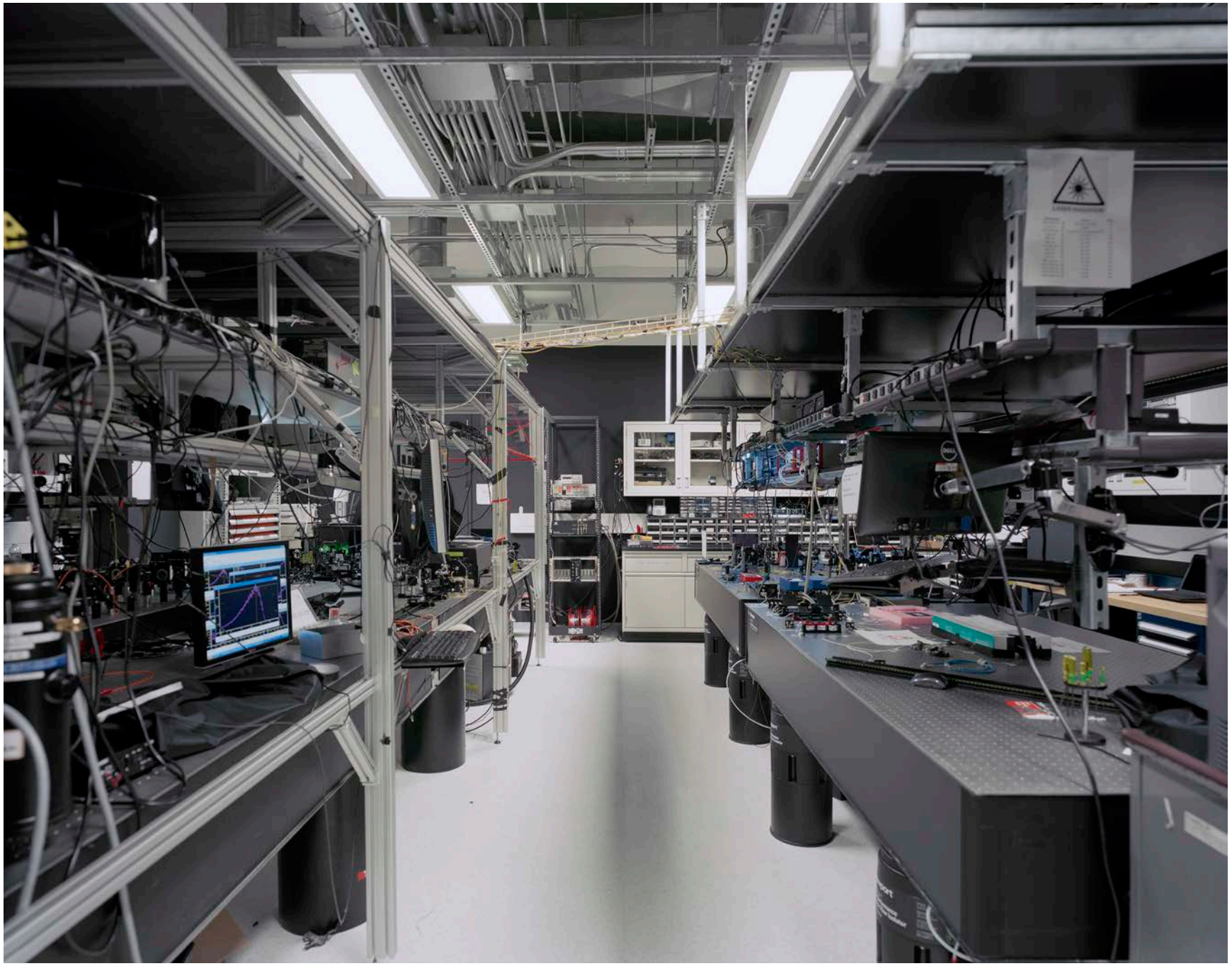


Fig. 64 - *Lasers can be used to arrange and merge artificial cells, paving the way for networks of artificial cells acting as tissues.*

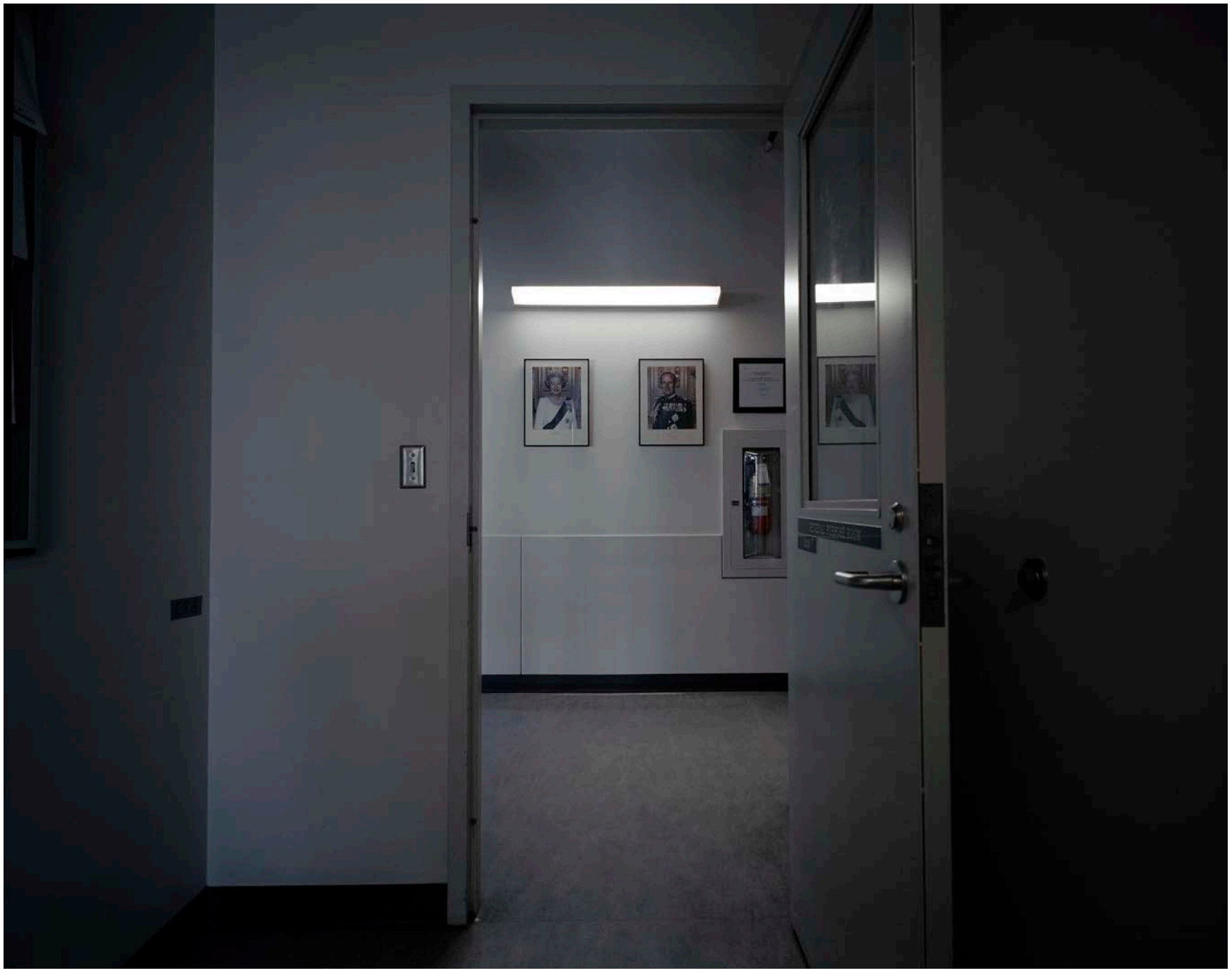


Fig. 65 - *Biologists prove that species are disappearing faster than at any time since the dinosaurs' demise.*

Fig. 66 - *One team works on the spacecraft using standard U.S. measurements, while the other team uses the metric system.*

Fig. 67 - *All 'matter' is one; observable complexities are the result of successive levels of complexity of particulate arrangements.*[18]

18. Vault #3, *Seed Storage Experiment,*

The intoxicating effect of leaven on cereal dough and of *warm places* on sweet fruits is noticed.

Someone uses a wooden plow.

Someone grows cotton in India.

Breeders notice that a mare crossed with a donkey yields a mule, whereas a stallion crossed with a donkey yields a hinny, which has shorter ears and stronger legs.

Someone publishes recommendations as to the medicinal use of plant extracts.

Someone classifies plants with seeds according to the number, position, and shape of the parts of their fruit.

Fermentation is a process in which whole bodies are separated into their smallest indivisible parts, followed by a reunion of these atoms to form new bodies.

Someone describes, empirically, 18,000 species of plants.

Someone produces the first artificial hybrid plant.

Someone draws attention to the idea that species are mutable.

Someone says that living agents are at the root of infectious disease.

Someone isolates morphine from the poppy plant.

Someone describes the origin of all living things as a process of gradual development from matter.

Someone finds that cocaine, an alkaloid in coca, is effective against fatigue.

Someone produces a blood deficiency disease in guinea pigs by depriving them of leafy vegetables.

Someone expresses concern about global warming as a result of burning fossil fuels.

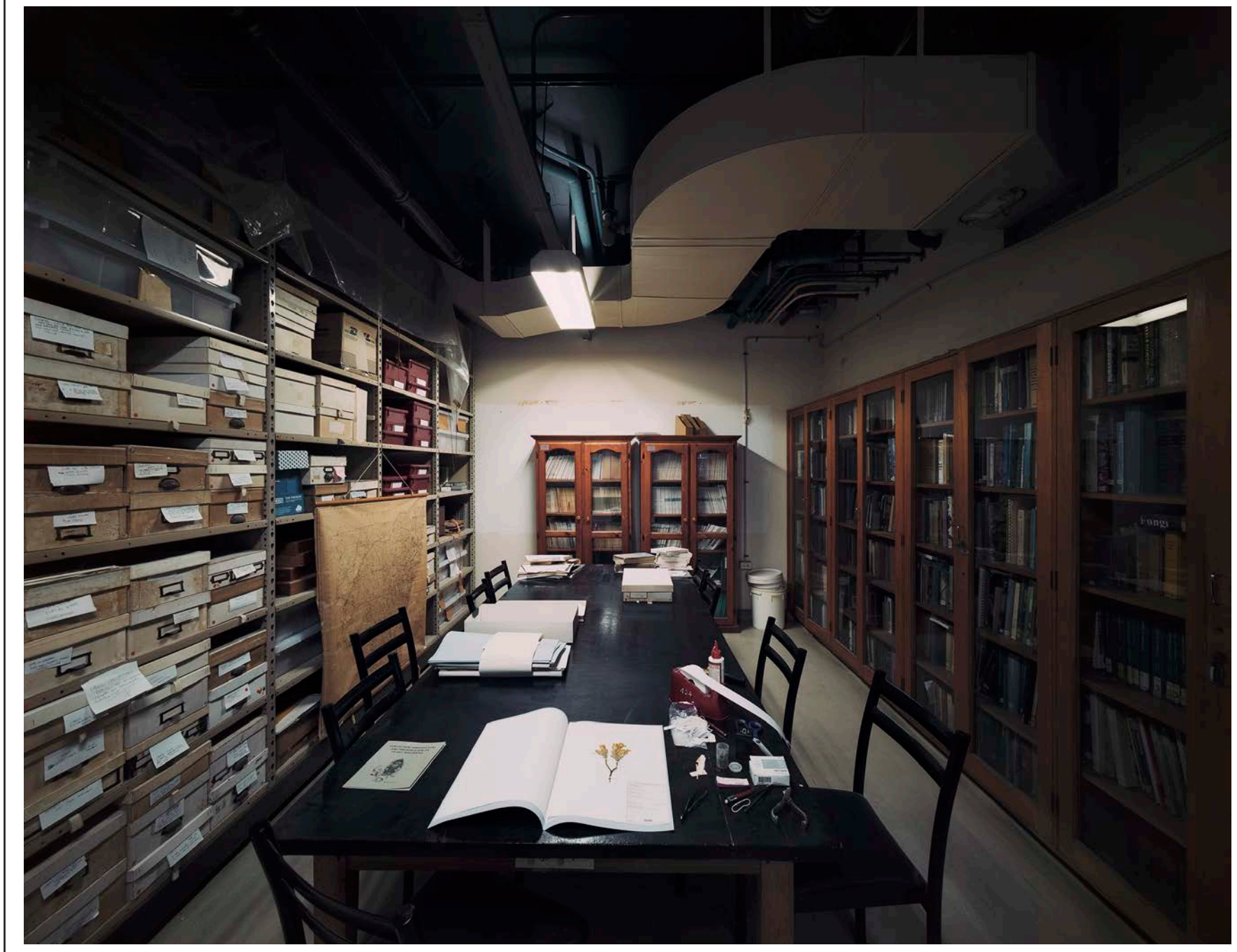


Fig. 68 - *Quantum interference can only occur when no one is watching.*

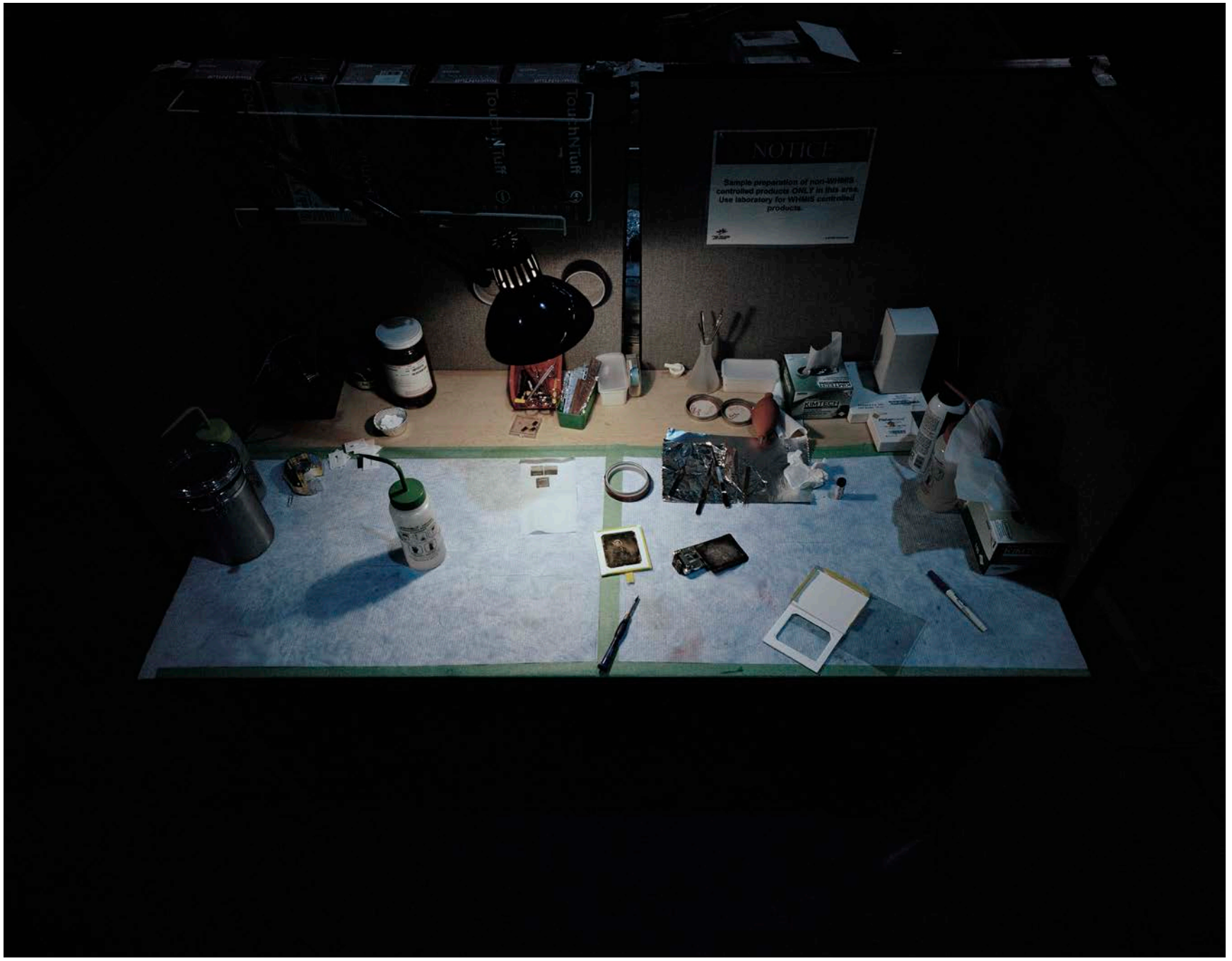


Fig. 69 - *Observing a situation or phenomenon necessarily changes it. This is often the result of instruments that, by necessity, alter the state of what they measure in some manner.*

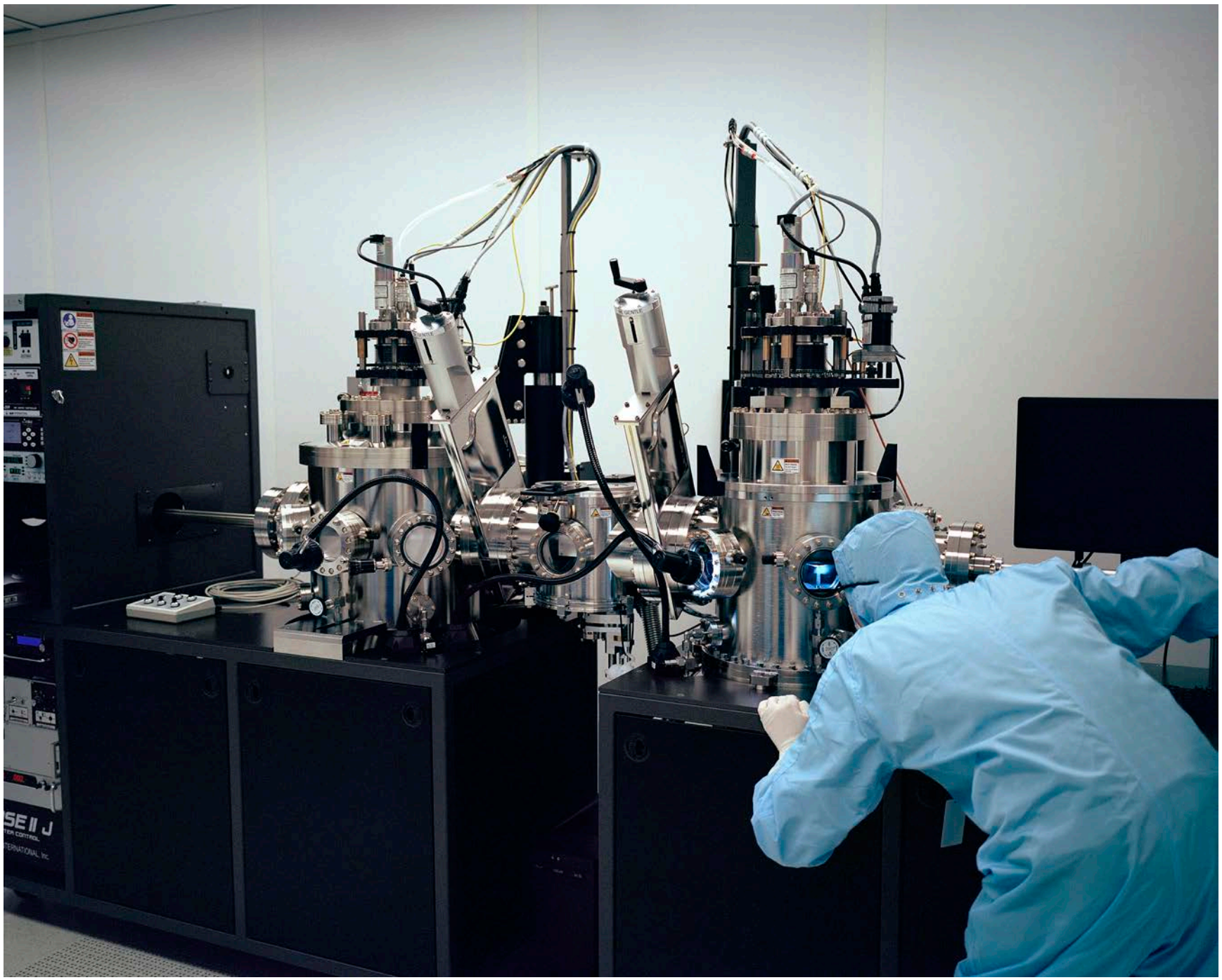


Fig. 9 - *Copper smelting, in minute quantities, is introduced in Mesopotamia.*[19]

19. **Be Gentle,** *Quantum computing experiment,*

Bronze enables the dagger form to be stretched into a sword.

Iron smelting is introduced on an industrial scale in Armenia.

Gold coins are introduced in Lydia, western Anatolia, as a standard of exchange.

Someone removes the air from within two metal hemispheres.

Teams of horsemen are challenged to pull them apart, which they fail to do.

Someone produces hydrogen by reacting metals with acid.

Someone publishes a textbook espousing the notion that light is made of particles.

Someone postulates that all knowledge comes from perception.

What we perceive are ideas, not things in themselves.

Someone discovers lenses that correct for aberration.

Atoms are quantum multiplied in laser light.

A group of people transfer data by quantum teleporation, over a distance of 10 feet, or rather 3,048 millimeters.


CAUTION
Do Not
Operate
This
Equipment
DELL

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INTERPRETIVE GLOSSARY

ABERRATION
A departure from what is normal, usual, or expected, typically one that is unwelcome.

AETHER
The ancient Greek personification of the clear upper air of the sky.

ARCHEAN
Denoting the eon that constitutes the earlier (or middle) part of the Precambrian, in which there was no life on earth.

BASAL GANGLIA
A group of structures linked to the thalamus in the base of the brain and involved in coordination of movement.

BEING
The nature or essence of a person or living creature.

BETA-BLOCKER
Drugs that prevent the stimulation of the adrenergic receptors responsible for increased cardiac action.

BIOSPHERE
The regions of the surface, atmosphere, and hydrosphere of the earth (or analogous parts of other planets) occupied by living organisms.

BLACK HOLE
A region of space having a gravitational field so intense that no matter or radiation can escape.

BRAIN
The portion of the vertebrate central nervous system enclosed in the skull and continuous with the spinal cord through the foramen magnum that is composed of neurons and supporting and nutritive structures and that integrates sensory information from inside and outside the body in controlling autonomic function, in coordinating and directing correlated motor responses, and in the process of learning.

CAENORHABDITIS ELEGANS
A free-living, non-parasitic, transparent roundworm, about 1mm in length, that lives in temperate soil environments.

CELLULAR AUTOMATON
Consists of a regular grid of cells, each in one of a finite number of states, such as on and off.

CEREBRUM
Responsible for the integration of complex sensory and neural functions and the initiation and coordination of voluntary activity.

CHAOS
Complete disorder and confusion.

CONSCIOUSNESS
The fact of awareness by the mind of itself and the world.

COMPLEXITY
Consisting of parts intricately combined and difficult to analyze, understand or explain.

CRISPR-Cas9
The protein Cas9 is an enzyme that acts like a pair of molecular scissors, capable of cutting strands of DNA.

DARK ENERGY
A theoretical repulsive force that counteracts gravity and causes the universe to expand at an accelerating rate.

DARK MATTER
Dark matter has not been directly observed, but its presence is implied in a variety of astrophysical observations, including gravitational effects that cannot be explained unless more matter is present than can be seen.

ENTANGLE
To involve another in a perplexing or troublesome situation.

EVOLUTION
Cumulative inherited change in a population of organisms through time leading to the appearance of new forms

EXPERIMENT
A scientific procedure undertaken to make a discovery, test a hypothesis, or demonstrate a known fact.

FEEDBACK LOOP
Feedback loops take a system output into consideration, which enables the system to adjust its performance to meet a desired output response.

FORMALDEHYDE
Used in embalming to disinfect and temporarily preserve human remains pending final disposition.

GALAXY
A system of millions or billions of stars, together with gas and dust, held together by gravitational attraction.

GAS
An air like fluid substance which expands freely to fill any space available, irrespective of its quantity.

GREAT OXYGENATION EVENT
Cyanobacteria triggered this event when they produced oxygen as early as 2.3 billion years ago.

GREENHOUSE EFFECT
The greenhouse effect is the warming effect of the sun on greenhouse gases that act to trap this heat in our atmosphere.

HEAVEN
The sky, especially perceived as a vault in which the sun, moon, stars, and planets are situated.

HOLOGRAM
A three-dimensional image formed by the interference of light beams from a laser or other coherent light source.

ILLUSION
A thing that is or is likely to be wrongly perceived or interpreted by the senses.

IMAGINATION
The faculty or action of forming new ideas, or images or concepts of external objects not present to the senses.

INFORMATION
What is conveyed or represented by a particular arrangement or sequence of things.

INDUSTRIAL REVOLUTION
The mechanization of agriculture and textile manufacturing and a revolution in power, including steam ships and railroads, that effected social, cultural and economic conditions.

LABORATORY
A room or building equipped for scientific experiments, research, or teaching, or for the manufacture of drugs or chemicals.

LIMBIC SYSTEM
A complex system of nerves and networks in the brain that controls the basic emotions (fear, pleasure, anger) and drives (hunger, sex, dominance, care of offspring).

LOVE
An intense feeling of deep affection.

MEMORY
The mental capacity or faculty of retaining and reviving facts, events, impressions, etc., or of recalling or recognizing previous experiences.

MIND'S EYE
The mental faculty of conceiving imaginary or recollected scenes.

MORNING STAR
A bright planet, especially Venus, when visible in the east before sunrise.

Nd:YAG LASER
A laser that uses an Nd:YAG crystal that emits light through a process of optical amplification based on the stimulated emission of electromagnetic radiation.

NEBULA
A clouded spot on the cornea causing defective vision.

NEOCORTEX
A part of the cerebral cortex concerned with sight and hearing in mammals, regarded as the most recently evolved part of the cortex.

NERVE
A whitish fiber or bundle of fibers that transmits impulses of sensation to the brain or spinal cord, and impulses from these to the muscles and organs.

NETWORK
A group or system of interconnected people or things.

NGC 1052-DF2
An ultra diffuse galaxy in the constellation Cetus. It is thought to contain little or no dark matter, the first such discovery.

OPHTHALMOSCOPE
An instrument for use in viewing the interior of the eye and especially the retina.

ORGANISM
A whole with interdependent parts, likened to a living being.

OZONE
A colorless unstable toxic gas with a pungent odor and powerful oxidizing properties, formed from oxygen by electrical discharges or ultraviolet light**.**

PARTICLE
A hypothetical object having mass but no physical size.

PERCEPTION
The neurophysiological processes, including memory, by which an organism becomes aware of and interprets external stimuli.

PLUTONIUM BOMB
A nuclear weapon in which enormous energy is released by nuclear fission, by splitting the nuclei of plutonium 239.

PRESENT
The time right now.

PROBABILITY
The extent to which an event is likely to occur, measured by the ratio of the favorable cases to the whole number of cases possible.

PSYCHOSOMATIC ILLNESS
An illness caused or aggravated by a mental factor such as internal conflict or stress.

QUANTUM ENTANGLEMENT
A phenomenon in which the quantum states of two or more objects have to be described with reference to each other, even though they may be spatially separated.

QUANTUM INTERFERENCE
The notion that elementary particles can not only be in more than one place at any given time, but that an individual particle, such as a photon, can cross its own trajectory and interfere with the direction of its path.

RAPID EYE MOVEMENT (REM)
The stage of sleep characterized by rapid saccadic movements of the eyes. Most of the vividly recalled dreams occur during REM sleep.

REALITY
The state or quality of having existence or substance.

REASON
The faculty or power of acquiring intellectual knowledge, either by direct understanding of first principles or by argument.

RESIDUAL AIR
That portion of air contained in the lungs which can not be expelled even by the most violent expiratory effort.

SCHIZOPHRENIA
A long-term mental disorder involving a breakdown in the relation between thought, emotion, and behaviour, leading to faulty perception, inappropriate actions and feelings, withdrawal from reality and personal relationships into fantasy and delusion, and a sense of mental fragmentation.

SOLAR PROTOPLANETARY DISK
A rotating disk of dust and gas that surrounds the core of a developing solar system. It may eventually develop into orbiting celestial bodies such as planets and asteroids.

STARDUST
Something that causes a pleasant dream-like or romantic feeling.

STRIFE
Angry or bitter disagreement over fundamental issues; conflict.

SUPERNOVA
A star that suddenly increases greatly in brightness because of a catastrophic explosion that ejects most of its mass.

SYMBIOSIS
Interaction between two different organisms living in close physical association, typically to the advantage of both.

SYNAPSE
A structure that permits a neuron (or nerve cell) to pass an electrical or chemical signal to another neuron or to the target efferent cell.

SYNCHRONICITY
The simultaneous occurrence of events that appear significantly related but have no discernible causal connection.

THALAMUS
Part of the brain responsible for relaying sensory information and acting as a center for pain perception.

TIME
The system of those sequential relations that any event has to any other, as past, present, or future; and the indefinite and continuous duration regarded as that in which events succeed one another.

TUNGSTEN CARBIDE
A very hard gray compound made by a reaction of tungsten and carbon at high temperatures, used in making engineering dies, cutting and drilling tools, etc.

TURING MACHINE
A mathematical model of a hypothetical computing machine that can use a predefined set of rules to determine a result from a set of input variables.

UNIVERSE
All existing matter and space considered as a whole; the cosmos.

VARIABLE
Not consistent or having a fixed pattern and liable to change.

VISUAL CORTEX
The part of the cerebral cortex that receives and processes sensory nerve impulses from the eyes.

WORLD SOUL
An animating spirit or creative principle related to the world as the soul is to the individual being.