

The Atomic Kinship: Re-Imagining Radioactive Agency Through Artistic Research

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Abstract

This article explores the space of potentiality in-between interpretation and failure, in re-imagining radioactive agency within the framework of artistic research. By presenting the collaborative project *Atomic Kinship*, the article references an existing idea, that of a cult of radioactivity, which was proposed in relation to the realization of a repository for spent nuclear waste, as a means of transmitting cautionary messages about the dangers of encountering buried radioactive waste through deep time.

The article explores the physics of radioactivity and proceeds by presenting historical connections between its discovery and photography, highlighting the interconnectivity of art and research. By acknowledging the material agency of radioactivity, the collaborative artwork *Decay Cyphers* speculates on the possibility of decoding messages from radioactive sources, to open up questions about the nature of matter, existence, time and belief.

The Atomic Kinship thus proposes to consider an affective relation to radioactivity; an emotional connection with this non-human agent that can embrace different temporalities and dis/placements of radioactive particles, through the introduction of a deity. By envisioning a communal way of relating to radioactivity, the project intends to open questions about the ethical value of these reflections in addressing the issue of radioactive inheritance.

Keywords

Alchemy, Artistic Research, Belief Systems, Collaborative Approaches, Deep Time, Experimental Art, Nuclear Culture, Practice-based Research, Radioactive Agency, Transdisciplinary Exploration

Introduction

The Atomic Kinship is a speculative research project constituted with the aim of re-visioning radioactivity, hereby thought of as carrying the potential of transmitting a hidden message to mankind. The project references an existing idea: that of a cult of radioactivity, which was proposed by scientists and researchers in relation to the construction of a nuclear repository in Yucca Mountain, USA. The intention

of the previously proposed and abandoned project was to transmit warning messages about the dangers of radioactive contamination through deep time with the aid of folkloristic devices.

This article begins by providing an overview of how radioactivity was discovered and continues by introducing research that connects aspects of radioactivity with belief. This is later being considered in relation to our artistic research project. *The Atomic Kinship* project proposes to assess the current need for a cult of radioactivity, departing from an analysis of what did not work when the idea was first taken into consideration, and to speculate on the possible consequences and reflections generated by such a cult. The project develops through multiple outcomes framed within the context of artistic research, outcomes which rotate around the possibility of deciphering a message from radioactivity, hereby considered as a deity.

This paper and research thus intend to explore the tension between interpretation and failure within societal expectations towards technological discoveries, and how the realm of what is considered possible can be stretched to the absurd.

In exploring the liminal space in between the possible and the impossible, this project addresses the hypothesis that, through radioactivity, the relationship between matter and life and the very boundaries of consciousness could be renegotiated. If, by chance, an actual message from radioactivity could be deciphered, the division between what is considered alive, or even sentient, and what is not, would disintegrate into a fully new vision of life and matter.

How Light Comes to Matter

Having spoken of the rays of the sun, which are the focus of all the heat and light that we enjoy, you will undoubtedly ask, ‘What are these rays?’ This is, beyond question, one of the most important inquiries in physics, as from it an infinite number of phenomena are derived.

—Leonard Euler, in a letter addressed to Princess Friederike Charlotte of Brandenburg-Schwedt and her younger sister Louise in 1760



Figure 1. Atomic Kinship: Decay Cyphers (2023). ©Katri Naukkarinen

When physicist Henri Becquerel began conducting his famous experiments with uranium salts in 1896, he was assuming to learn more about a phenomenon related to electromagnetic radiation. German engineer Wilhelm Röntgen had discovered X-rays only months before and named them with an X for their nature yet remained unknown. [1] While experiments showed that this new radiation had the ability to pass through various materials that blocked visible light, it was only years and multiple cases of tissue damage later when the scientific community began to understand the nature of ionizing radiation. [2] Henri, who was researching phosphorescence in the footsteps of his father Edmond Becquerel, set out to investigate whether there was a connection between natural phosphorescence and this new-found X-radiation. [3]

Henri Becquerel first exposed the uranium salts to sunlight and placed them on top of photographic film enclosed inside an oblique paper. As the film became exposed, his first assumption was that the salts phosphoresced X-rays after receiving a dose of sunlight. Legend tells of Paris suffering a period of cloudy weather, and how this prevented Becquerel from repeating the experiment. Instead, he placed another enveloped film and the uranium salts into a drawer of his desk without exposing the salts. It had been speculated

that the assumed phosphorescence ability of uranium salts might last for some time after the initial exposure, so Becquerel developed the film expecting to find minor clouding on it. Instead, a well-exposed image was revealed, proving to Becquerel that he was not dealing with phosphorescence after all. Something else was going on. [3]

Becquerel repeated the experiment over and over while at the same time actively reporting his findings to the French Academy of Science. Following six months of experimentation, he reported there was no discernible decrease in the intensity of radiation given by the uranium salts. For the first time, he wrote of ‘uranic rays’ that seemed to be related to something different from the luminary effect he originally set out to investigate: “The duration of the emission of the uranic rays is completely outside the ordinary phenomena of the phosphorescence, and it was not yet possible to establish where the uranium borrows the energy which it emits with such a long persistence”. [4]

A less-known addition to this history details how Becquerel’s finding was predated by almost 40 years by a very similar serendipitous finding, arising from a very similar experimental setup. Cousin to one of the inventors of photography, Abel Niépce de Saint-Victor sent a report of his recent photographic experiments to the French Academy of

Science in 1858, clearly stating how “a drawing traced on a piece of carton with a solution of uranium nitrate ... whether or not exposed before to light [emphasis added], and applied on a piece of sensitive paper prepared using silver chloride will print its image”. [5]

Niépce de Saint-Victor’s findings were hailed as a fundamental discovery by his superiors. They were also brought to the wider public in the year of discovery by physicist Léon Foucault, through a scientific review section of the French newspaper *Journal of Debats*, with a manner of fascination—but also a certain ambivalence—towards the fashion in which his findings seemed to “demonstrate how light gets fixed in certain substances to then dissipate as a form of a radiation invisible to our eyes.”¹ The curiosity towards the discovery did not end there but was later briefly recounted in a book published in 1868 by none other than Becquerel’s father, Edmond, [6] and again in 1870, in a book published by Thomas Lamb Phipson.. [7]

One can only speculate, how perhaps the times weren’t right to give Niépce’s discovery the serious consideration it deserved, or maybe it was the family background, profession and momentum created by Röntgen’s recent findings of X-rays that allowed Becquerel to continue with his experiments and be considered the person to officially discover particle radiation. Some contemporaries, such as Gustave le Bon, tried to ascribe Niépce the discovery, only to be quickly dismissed by Becquerel himself. [8] But from what we now know, we can say with confidence that the initial encounter with the phenomenon belongs to an inventor working in the field of photography rather than the physicist it has long been accredited for.

Active Rays

In the section above we briefly visited the discoveries of both human-made ionizing radiation and naturally occurring radioactivity. At this point, it is beneficial to better understand what we are dealing with.

Radioactivity is defined as the spontaneous emission of radiation from the nucleus of an unstable atom, resulting from its decay into other nuclei. During this process, the unstable nucleus emits radiation in order to reach a more stable state. The emitted radiation is ionizing. When ionizing radiation passes through matter, it can transfer its energy to the atoms or molecules it encounters. This can cause them to lose or gain electrons and become electrically charged—ionized.

While all radioactive radiation is directly or indirectly ionizing, not all ionizing radiation results from radioactive decay. The main three types of radioactive radiation are alpha, beta, and gamma radiation. In addition, neutrons, protons, and other ionizing particles can be emitted during

¹ “...qui tendent à démontrer que la lumière se fixe dans la substance de certains corps de manière à se dissiper ensuite sous forme d’un rayonnement imperceptible à nos yeux.” [9] [own translation]



Figure 2. Atomic Kinship: Decay Cyphers (2023).
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radioactive decay. These types of primary radiations are emitted directly from the unstable nucleus of an atom during its decay. As a secondary effect, due to interaction between the emitted particles and surrounding matter, electromagnetic X-rays and high-energy UV radiation might also occur. It is important to note that these do not originate straight from the atomic nuclei but from the surrounding material, thus, while being ionizing, radioactive radiation they are not.

Of the primary radioactive radiations, alpha and beta are particle radiation while gamma is electromagnetic. These are two fundamentally different kinds of radiation. Let us look into the differences between them.

On the practical side, we can produce controlled amounts of gamma rays, X-rays, and UV radiation by following the same principles as Röntgen: accelerating charged particles towards a target material and producing high-energy

photons at collision. The machines used to produce them rely on external sources of energy and not on radioactive decay. Radioactivity on the other hand is a natural process that occurs until the unstable nuclei decay into a stable form, without any external input. When we speak of the radioactivity of a material, we refer to the rate at which it emits radiation, determined by its properties such as half-life and decay chain.

But the most fundamental difference between particulate and electromagnetic radiation is that particles have mass while photons, the smallest quantities of electromagnetic radiation, are packets of pure energy that have neither mass nor electric charge. The phenomenon of radioactivity therefore can be seen to simultaneously manifest these two fundamentally different ways of existing: the material and the non-material.

Physics of a Deity

When Soddy first realized that radioactive decay was converting one element into another, he is said to have exclaimed, ‘Rutherford this is transmutation!’ Rutherford retorted: ‘For Mike’s sake, Soddy, don’t call it transmutation. They’ll have our heads off as alchemists.’

—Timothy J. Jorgensen, *Strange Glow: The Story of Radiation*

The materiality of our world is but an illusion. There is no need to venture into affairs of spirit or even of the mind to arrive at this conclusion when we can consider the fundamental role those massless energy packages, photons, have in our physical world. And yes, this is about the physical. Indeed, in everyday life, we might use words derived from physics to describe matter, but the origin of the word comes from ancient Greek *physika* which simply means “knowledge of nature”. While the common definition of scientific physics as “science for treating of properties of matter and energy” [10] is from 1715, the root of the word does not exclude the study of properties now known as metaphysics, the specific meaning of which was gained through a misinterpretation by Latin translators of Aristotle’s “*Metaphysics*”.²

If we were to consider a deity of radioactivity, the criteria for doing so should be based on what we know of its physics—its nature. Radioactivity plays a vital role in the life cycles of stars and the formation of elements. A cosmic interplay between energy and matter becomes facilitated by radioactive processes: when the fusion reactions of stars release vast amounts of energy, high-energy gamma photons can also end up producing particles.

The creation of particles from electromagnetic radiation lies in the conversion of energy to mass and vice versa.

Einstein’s famous equation $E=mc^2$ from 1905 establishes a relationship between energy (E), mass (m), and the speed of light (c). The equation states that energy and mass are interchangeable, with the conversion factor being the speed of light squared (c^2). [12]

Intuitively it seems to make more sense how mass could create energy, but coming to terms with the flipside of the equation might be harder. Through a quantum phenomenon called pair production, massless electromagnetic radiation can also produce mass. Our understanding of nuclear reactions, where small amounts of mass are converted into large amounts of energy, has been largely informed by Einstein’s equation, leading to our nuclear industries—and to further understanding of the Sun.

The concept of nuclear fusion as a source of energy for the Sun was first proposed in the 1920s by English astrophysicist Arthur Eddington, but the concept was understood better only in the late 1930s after the contributions of German physicist Hans Bethe. When hydrogen nuclei collide in the Sun, they fuse into heavier helium atoms and release the energy we sense as light and warmth. The more energy a star has, the heavier elements can result from fusion, including precious metals such as gold.

All of Earth’s gold deposits originate from cosmic events most probably involving collisions of neutron stars. [13] Gold’s chemical symbol Au comes from the Latin *Aurum*, which stems from *Aurora*, the Roman goddess of the glowing dawn. Our Sun would not have the necessary amount of energy to synthesize gold even if it were to go supernova, but the direction of thought has been right.

Based on this knowledge, a research group was finally able to produce stable gold with particle acceleration in the 1980s. [14] For centuries, alchemists were set to find the *Philosopher’s Stone*, a substance with which lesser metals could be turned into stable silver and gold, to achieve the so-called ‘transmutation’. As it turns out, it was nuclear fusion all along.

Alchemy, Science and Belief

The field of nuclear physics emerged as entangled with alchemy. From being previously considered non-scientific, alchemy witnessed a moment of revival towards the end of the nineteenth century. Within a decade, the emerging science of radioactivity was regularly compared with alchemy. [15]

In those years, several occult societies became interested in the new scientific discoveries, which saw prominent chemists of the time claiming to have achieved alchemical

² While the meaning of something existing beyond the physical has persisted ever since, the title was simply given to indicate how this work followed Aristotle’s “*Physics*”. [11]

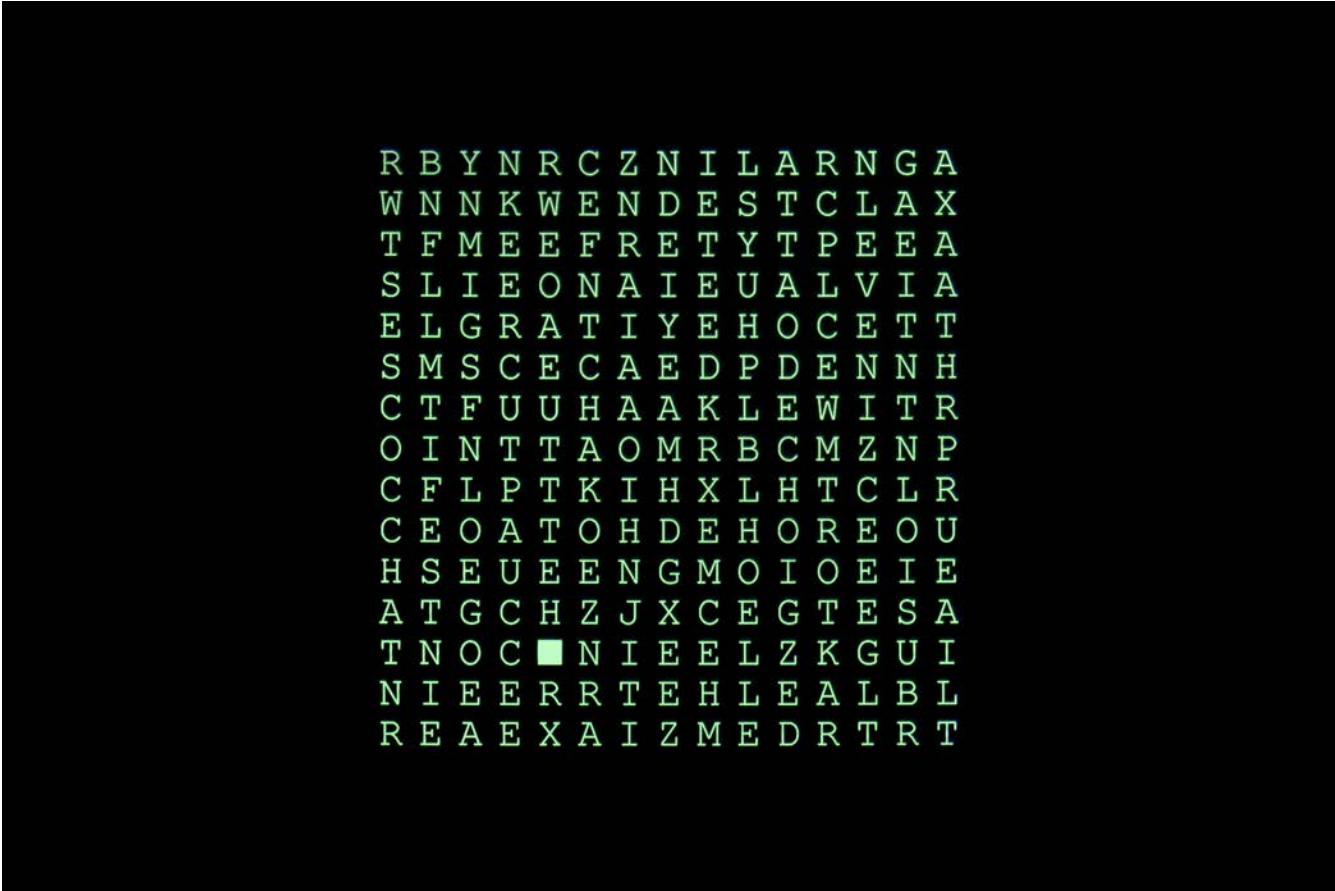


Figure 3. Atomic Kinship: Decay Cyphers (2023). ©Katri Naukkarinen

“transmutation” by the use of radium. Among them is the “Alchemical Society”, which was founded in 1912 by a group of occultists and chemists. To grant credibility to a viewpoint that saw radioactivity as “modern alchemy”, its members were publishing regularly in scientific journals such as *Nature* and *The Chemical News*. Through their scientific and occult research and publications, they contributed to renegotiating the disciplinary boundaries between occultism and science. [15]

A different approach was brought forward by the “Theosophical Society”, founded in 1875. Helena Petrovna Blavatsky, the co-founder, was a spirit medium who gathered occult knowledge, including alchemy, from different societal contexts. Across her work, Blavatsky presented a “scheme of spiritual evolution not only of mankind but also of the inanimate world and the animal and vegetable kingdoms, all of which she saw as pervaded by a life force. Blavatsky chose a Tibetan word, ‘Fohat’, to name this life force”. Fohat considered the idea of a relationship between this life force, electricity, and magnetism. [15]

The Theosophical Society was also actively following the experimental work of scientists. The discovery of radiation

was announced right after Blavatsky’s death. Afterward, successors of the movement saw Blavatsky’s theories, like the one of the life force, as related to radioactivity. Some of the Society’s members such as Besant and Leadbeater conducted experiments clairvoyantly, claiming to be able to reach through their bodies a direct perception of the subatomic structure: a perception they deemed to be even superior to that of the scientific data which was gathered from instrumentation. [15]

Blavatsky had envisioned the “highest deity” as without form and gender but embracing polarities. [15] The *Atomic Kinship* project takes inspiration from these descriptions and experiences, reflecting on belief and its implications concerning humans and more-than-human entities, and assessing the possible current need for a cult of radioactivity.

Human Interference Task Force. How Deep is Your Time?

Currently (2023), the first repository for high-level radioactive waste, the Onkalo repository, is being completed in

Finland. However, an earlier plan for this kind of repository was discussed for Yucca Mountain, USA, in the 1980s. At the time, the issue emerged of preventing the possibility of human interference with the burial site.

In considering the timescale of radioactive contamination, the idea of an interruption in current civilization, and consequently the possibility that future societies may be unaware of the radioactive danger—and still possess the technology to potentially interfere with the site—was deemed as possible. A discussion over “long-term communication - protection against loss, destruction, and major language/societal changes” was thus initiated. [16] The U.S. Department of Energy convened a “Human Interference Task Force”, a group of researchers from different fields to “determine whether reasonable means exist (or could be developed) to reduce the likelihood of future humans unintentionally intruding on radioactive waste isolation systems”. [16] In this context, the idea of constituting an “atomic priesthood” to ensure the transmission of warning messages through deep time was proposed by semiotician and linguist Thomas Sebeok.

This idea was the central point of Sebeok’s first report, which starts as a description of the task of semiotics and linguistics in studying how messages are transmitted. The report presents analogies between different systems in the transmissions of messages by comparing the functionality of neurotransmitters within the human body to messages transmitted by means of technology, throughout history and across time. [17] Sebeok highlights the importance of the concept of redundancy, presenting the example of “noise” in the channel: redundancy, or the repetition of the message, can become a key factor in ensuring a correct transmission. As he points out, “the important point is that the principle of redundancy advocated here requires that as many stable systems and devices be utilized as imagination suggests and technology permits”. [17]

The report proceeds by comparing a possible opening of radioactive waste containers with that of Pandora’s box, resulting in the release of evil in the world. [17] To prevent this apocalyptic scenario, the report suggests that “information be launched and artificially passed on into the short-term and long-term future with the supplementary aid of folkloristic devices, in particular a combination of an artificially created and nurtured ritual-and-legend”. [17] These kinds of rites would not be tied to any language or culture, and could eventually have regional divergence, or change over time. But the intention remained the same: “the uninitiated will be steered away from the hazardous site for reasons other than the scientific knowledge of the possibility of radiation and its implications; essentially, the reason would be accumulated superstition to shun a certain area permanently”. [17]

Sebeok has foreseen an annual ritual to be held and renewed, where a legend could be told over time, obviously with slight variations. But “the actual ‘truth’ would be entrusted exclusively to—what we might call for dramatic

emphasis—an ‘atomic priesthood’, that is, a commission of knowledgeable physicists, experts in radiation sickness, anthropologists, linguists, psychologists, semioticians, and whatever additional expertise may be called for now and in the future. Membership in this ‘priesthood’ would be self-selective over time”. [17] Interestingly, one can notice how Sebeok seems to have forgotten his principle of redundancy when implying that only the initiated could retain information about the burial site.

Sebeok here has departed from the necessity of a trans-cultural and trans-epochal transmission of information regarding radioactive danger, and intended, through a possible folkloristic device of ritual-and-legend, or cult, to convey the message that dangerous sites shall be considered impure sites. An association between sacred and danger has been already highlighted by anthropologists such as Mary Douglas. Douglas’ book “Purity and Danger” from 1966 is a description of how the concept of sacred across various cultures relates to the articulation of a taboo or prescription that may concern purity or dirt, and a set of prescribed, religious rules would originate from it. [18]

Indeed, as historian Sebastian Musch has stated, the need to communicate “danger beyond the confines of our cognitive framework” has led to the idea of converting radioactive sites into impure sites. [19] However, a mention of a cult of radioactivity was already excluded in the report document presented by the “Human Interference Task Force”, as several problems arose. Firstly, the plan lacked feasibility, and the idea of an elite scientific caste in charge of leading the masses was considered anti-democratic. Furthermore, the implications of future developments of such a cult are uncontrollable, as religion can always generate possible heretics who may behave in the exact opposite way as expected. However, Musch has identified a possible solution:

“One option to reduce the likelihood of instrumentalization of the Atomic Priesthood is to make the Priesthood actually believe in its own lies and myths. While the question of how exactly this could be deliberately accomplished must (for now) be left unanswered, Miller and Darnay have provided us different variations on this theme in their writings. The inherent hubris of the idea of deliberately establishing a deceiving religious elite is here subverted through monastery orders that protect the secret out of genuine belief.” [19]

Our *Atomic Kinship* project departs from the analysis of previous research, as well as from the consideration that radioactivity can be associated with the realm of the sublime and the sacred. We are well aware of the negative connotations that are linked to the modern concept of a cult. The Open Education Sociology Dictionary relates this term with an excessive control exercised by a leading group towards its members. [20] But a characteristic of a cult is also that of practicing a form of devotion that is considered deviant from the norms of society, and in this case, we believe that such

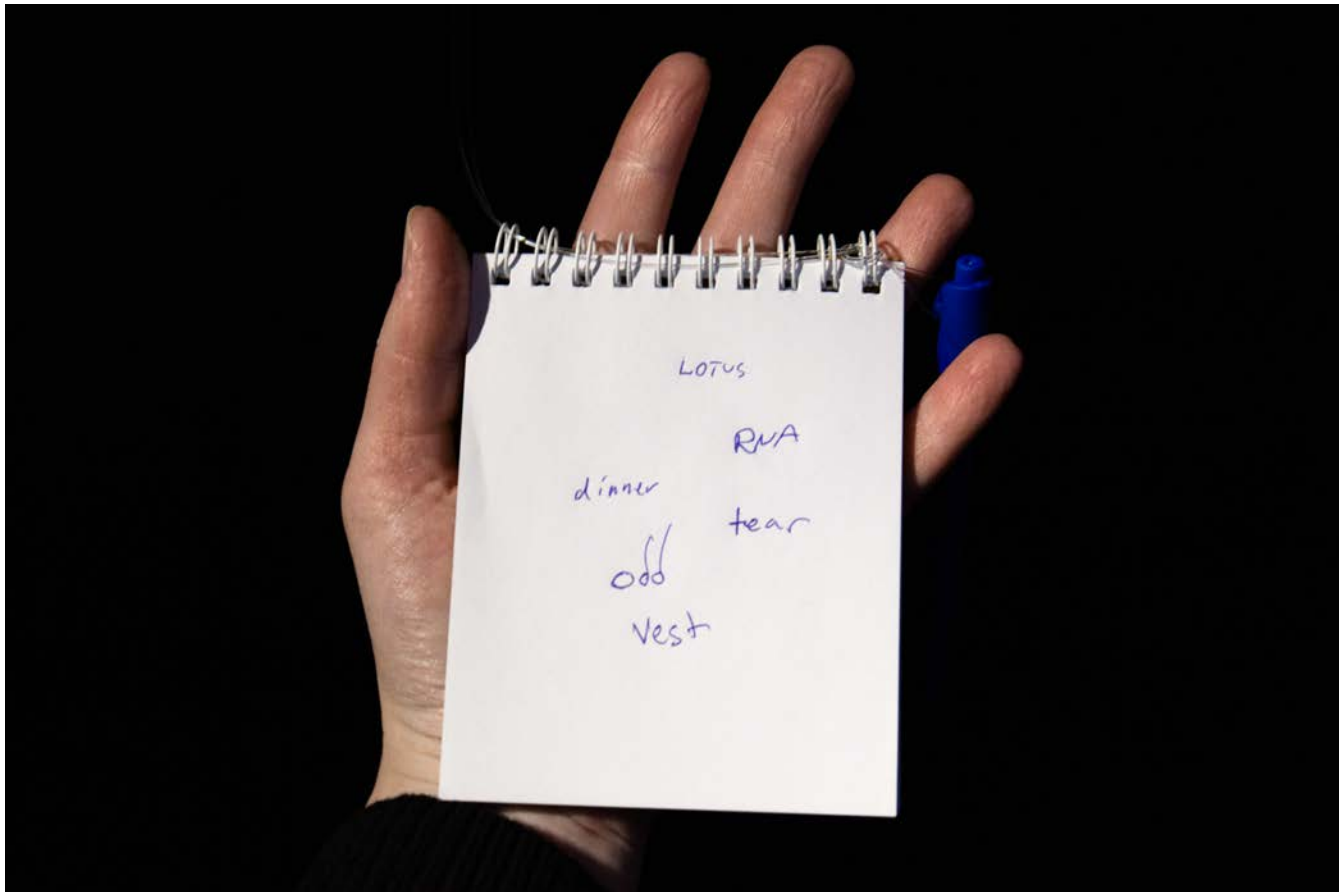


Figure 4. Atomic Kinship: Decay Cyphers (2023). ©Katri Naukkarinen

devotion could bring new perspectives to the established norms regarding spirituality. Moreover, this project's way of conceiving a cult refers primarily to the ancient use of this term, which is described in the Oxford dictionary as "The action or an act of paying reverential homage to a divine being; religious worship". [21]

Furthermore, and more importantly, this cult will have no leader, but only a deity to be adored. In expanding the idea of worshipping a divinity to encompass radioactivity, this project has a strong commitment to include more-than-human and other-than-man into the discourse of radioactive inheritance and to re-work the many inconsistencies of the previous ideas. Considering previous research on this topic, one possible way of reducing the possibility of an instrumentalization of a cult of radioactivity could be, following Musch's thought, the discovery of a *genuine belief*.

³ Our collaboration started within the context of the ABRA project (Artificial Biology, Robotics and Art). *Decay Cyphers* has been realized thanks to the precious collaboration of Markus Löchtefeld, who coded the algorithm for the artwork.

Atomic Kinship. Evoking a Genuine Belief

Departing from the analysis of previous research, the *Atomic Kinship* project intends to speculatively investigate the idea of a cult of radioactivity in two artistic ways: by decoding messages from radioactivity itself, newly considered as a deity, and successively by re-imagining and re-interpreting ritualistic practices. The experimental—and artistic—components of the project started by gathering data in the form of measurements of radioactive material.

The artwork *Decay Cyphers* (2023) focuses on the process of measuring ashes deriving from the cremation of radioactive organic material gathered from areas affected by the Chernobyl fallout in Finland.³ Different cuts from game, fish and certain fungi, such as *Lactarius* and *Hydnoid*, are known to accumulate fallout materials. The ashes resulting from the cremation of materials are used in the artwork. The

installation shows a vitrine that hosts the ashes, and a projection displaying a grid of letters, similar to a game where words can be spotted. In real-time, a hidden Geiger counter records decay events and pairs them with a known alphabet, producing new letters on the grid. This process generates new combinations of possible words that may lead the visitor to the identification and decoding of a message. The installation includes a notebook where the discovered words can be collected and further interpreted.

It is interesting to notice how this process develops inversely to the one from Sebeok, regarding the transmission of a message. Sebeok has identified the process of “encoding” as a constitutive part of the transmission of messages. [17] His idea was to encode a message regarding radioactive danger, to be decoded in the deep future. The *Atomic Kinship*, instead, foresees the possibility of decoding an already existing message, namely, to find a *voice* of radioactivity, which is imagined as being constantly transmitted from different sources and possibly attempting to communicate and even wishing to be decoded. If such a message will result as readable, which is one of the main hypotheses of this project, a genuine belief could spontaneously surge in those who read—and understand.

Turning to Art for Guidance

This is not the first artistic project concerned with the issue of transmitting warnings about the dangers of radioactive contamination through deep time. Indeed, art has a historically recognized role not only in provoking reflections about the dangers of radioactive waste and its management, but in negotiating unconventional methods of communicating about it.

Artist Andy Weir’s sound work, or sonic fiction “Deep Time Contagion” uses recordings made in four geological repository sites, which the artist imagined as “acoustic amplifications of deep time”. [22] The artwork is for him a means for testing out “ways that art could start thinking about figuring the reality of ecological crisis”. [22] However, for Weir the outcome is uncovering paradoxes: “I was stuck in a representation/non-representational negative dialectic. In trying to somehow create a figure for deep time I was either reducing it to my description of it, or presenting it as irreducible” [22]

Furthermore, the work is presented as problematic as “it doesn’t really model anything, giving too much authority to either romantic abandonment or the recuperation of romantic abandonment under its description by theory/philosophy” [22]

Here, it is interesting to notice how the supposed failure of this artwork is able to bring about an embodied knowledge, that of the irrepresentability of deep time, and thus contribute to fostering ethical reflections on the implication of building deep nuclear waste repositories.

Around 10 years after the Human Interference Task Force was conveyed, a similar project for the Waste Isolation Pilot

Plant (WIPP) repository gathered once more teams of experts to identify possible markers for the burial site. During the process, different artworks were looked at, especially targeting Land Art, such as Robert Smithson’s “Spiral Jetty” (1970) [23] and Indigenous Australian art, [23] as examples of ways to transmit messages into the deep future.

Yucca Mountain as a site for a high-level nuclear waste repository was approved in 2002, but dismissed after. In 2002 the Desert Space Foundation in Nevada invited international artists to a competition where the objective was to design a possible marker system for the site. [24] The winning project was Ashok Sukumaran’s “Blue Yucca Ridge”, a genetically modified blue yucca to be thickly planted on the site. The strange color of the plant, constituting a living system, would induce the viewer to “instinctively comprehend the danger of what lies beneath” [24] For the artist, the issue of provoking human curiosity with a human-made marker system would here be overcome. [24]

Conclusion: Stay a While... Stay Forever

As shown even by Niépce de Saint-Victor’s experiments with radioactive matter before Becquerel, artists and inventors have historically contributed to scientific discoveries. We are aware of the problems that might arise from a cult of radioactivity, such as the effectiveness of such a method and related ethical concerns, as examples of the past have already shown. By reflecting on the meaning of this cult one could see that, first of all, a cult needs commitment. Rather than a passive attitude, one can consider it as an active choice, or a conscious statement. If belief is a way of collectively looking at things, one needs to acknowledge that looking is never a mere neutral action: it implies reading, deciphering, decoding, and understanding. In other words, looking is already a means of creating personal and collective realities.

By initiating this discourse, we are expecting to find questions, as well as to question our findings. But it is through the very act of creation that the possible comes to matter, to be further assessed and evaluated. We can do nothing but remain in adoration of the very nature of the simultaneously transcendent and immanent force of radioactivity. This adoration of the deity ultimately aims at connecting the non-material to the material physicality of the world, to overcome the polarity of two fundamental ways of existing, merged into one as if in a magnificent nuclear fusion.

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Aurora Del Rio is a professional artist and doctoral researcher at Aalto University, Helsinki. Her artistic work is transdisciplinary, including video, performance, sound, installation, painting, and bioart. Her research looks at beliefs to consider the state of tension between 'possible' and 'impossible' in the creation of personal and collective realities. Her current focus is on radioactive contamination as a psychic entity, through the means of ritualistic practices. Del Rio holds a BA in Painting from the Academy of Fine Arts Bologna, and an MFA in Creative Practice from Transart Institute Berlin/New York.