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Vereinigung bildender KünstlerInnen Wiener Secession
Friedrichstraße 12, A-1010 Wien
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Press release

Katrin Hornek

testing grounds

**In collaboration with Karin Pauer, Sabina Holzer, and
Zosia Hołubowska**

8.3. – 2.6.2024

Hauptraum

Press conference: Thursday, March 7, 2024, 10 a.m.

Opening & performance: Thursday, March 7, 2024, 7 p.m.

Exhibition talk & book presentation:

Katrin Hornek in conversation with Katrin Klingan

Thursday, April 25, 2024, 6 p.m.

An event by the Friends of the Secession

Performances in March

Saturday, 9.3.2024, 1.00 pm - 4.00 pm

Saturday, 16.3.2024, 2.00 pm - 5.00 pm

Tuesday, 19.3.2024, 1.00 pm - 4.00 pm

Saturday, 23.3.2024, 2.00 pm - 5.00 pm

Wednesday, 27.3.2024, 11.00 am - 2.00 pm

Saturday, 30.3.2024, 1.00 pm - 4.00 pm

With her artistic oeuvre and curatorial practice, Katrin Hornek playfully engages with the strange paradoxes of living in the age of the Anthropocene, that is, the new geologic epoch where the effects of capitalism, colonialism, and extractivism are written into the body of the earth. She asserts a more complex understanding of the entwinement of so-called nature and culture that recognizes that our bodies and cultures are substantially and spiritually connected with other creatures and the elements that make up our world. As an artistic strategy, Hornek follows the stories and traces of the material world into their countless networks to create narratives.

testing grounds is a new, immersive live installation conceived by Katrin Hornek and developed in a collaborative process involving artists as well as researchers and scientists from different fields. The collaboration with Karin Pauer, Sabina Holzer, and Zosia Hołubowska lays a foundation for the work, which addresses a sensitive urgent matter: At stake is the measurable evidence of radioactive radiation around the world as a result of the testing and use of nuclear weapons in hundreds of above-ground tests since 1945. A

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local soil sample at Karlsplatz, in which plutonium was detected, as its starting point, *testing grounds* follows the permanent imprints left by nuclear fallout in our bodies, in plants and earth archives.

Embedded in an installation that evokes images of decaying landscapes, twice a week three dancers perform a score choreographed by Pauer. A recent scan of the "Baker" crater on the seabed of the former US nuclear bomb test site in Bikini Atoll spreads across the ceiling. On handheld devices shaped like turtles and tortoises, so-called "messengers", texts created by Sabina Holzer and Katrin Hornek provide multi-layered narratives on the subject matter, which enter a subtle, intimate dialogue with specially composed soundscapes by Zosia Hołubowska, while with their movements, the dancers delve into the depths of body archives. Together, the elements of the live installation create a sensual, immersive experience, a test set-up of the embodiment of the unspeakable.

Katrin Hornek

(*1983, Austria) studied performative art and sculpture in Vienna and Copenhagen. She is a member of the Anthropocene Commons network and teaches at the University of Applied Arts Vienna (Department of Site-Specific Art). Recent exhibitions at Ar/Ge Kunst, Bolzano (2022), Kunstraum Lakeside, Klagenfurt (2021), Riga Biennale (2020), Kunsthalle Wien, Vienna (2019). Awarded the Msgr. Otto Mauer Prize (2021).
www.katrinhornek.net

Karin Pauer

(*1983, Austria) is a performer and choreographer. The exploration of relations, in-betweens, empathy, and togetherness informs all her works. She negotiates these notions combining embodied choreographic practices with language, visual arts, and live music. Her works have been shown in various Viennese institutions as well as at local and international festivals. www.karinpauer.com

Sabina Holzer

(*1966, Austria) works as a dancer, choreographer and author in the field of extended choreography. She is concerned with practices of community, ecology, philosophy, materiality, science fiction and poetry. Her collaborative performances, interventions and texts are shown and published locally and internationally.
www.cattravelsnotalone.at

Zosia Hołubowska

(1988, Poland) is a sound artist, queer music activist, researcher, and producer. With performances, sound installations, radio works and soundscapes, they work on topics of queering archives, healing practices, and interspecies intimacy.

Performance

Martina De Dominicis, Cat Jimenez, Mani Obeya, Karin Pauer

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Concept, Artistic direction: Katrin Hornek

Choreography: Karin Pauer

Sound: Zosia Holubowska

Text: Sabina Holzer, Katrin Hornek

Performance: Cat Jimenez, Karin Pauer, Mani Obeya, Martina De Dominicis

Costume: Karin Pauer

Messengers:

/ Text: Sabina Holzer, Katrin Hornek

/ Editing, translation: Lisa Rosenblatt

/ Voices: Alex Zehetbauer, Arthur Trembanis, Greg Mello, Karin Pauer, Karipbek Kuyukov,
Martina De Dominicis, Michael Wagreich, Sabina Holzer

/ Objects production: Klemens Waldhuber

/ Programming: Franz Gasser

Production management performance: mollusca productions

Technical management: Hans Weinberger

Scenographic advice and production: Hektor Peljak (Studio Peljak)

Artistic assistance: Ivana Lazić

Consulting: Anne Faucheret, Julia Hohenwarter, Michael Wagreich

The exhibition is accompanied by a publication with an image spread compiled by Katrin Hornek and text contributions by Anne Faucheret and Brian Holmes.

The digital publication is available for free at https://secession.at/category/digital_publication.

Programmed by the Board of the Secession

Curated by Jeanette Pacher

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Current exhibitions

Hauptraum	Katrin Hornek <i>testing grounds</i> 8.3. – 2.6.2024
Galerie	Imran Perretta <i>tears of the fatherland</i> 8.3. – 9.6.2024
Grafisches Kabinett	Zach Blas <i>CULTUS</i> 8.3. – 9.6.2024

Publications

Collected Heretical Writings of Salb Hac. Ass of God
Softcover, dustjacket, 96 pages, EUR 21,00

Permanent presentation

Gustav Klimt, *Beethoven Frieze*
Beethoven – Painting and Music in cooperation with
Wiener Symphoniker

Opening hours

Tuesday – Sunday 10 a.m. – 6 p.m.

Admission

Regular € 12,00 | Students under 26 € 7,50
Seniors 65+ € 10,00 | Free admission for children under 12

Press contact Secession

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Press images

download at <https://secession.at/presse>

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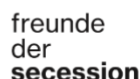
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Katrin Hornek

Biografie | Biography

Katrin Hornek, *1983, Austria
www.katrinhornek.net

Bildung | Education

2003–2008 Academy of Fine Arts Vienna
2007 CalArts, Los Angeles (guest student)
2006 Royal Danish Academy of Fine Arts, Copenhagen

Residencies

2021 B-A-U, South Tyrol
2018 i:project space, Beijing
2016 Borland Project Space, The Pennsylvania State University
2015 Red Gate, Beijing (BKA - Art/Culture)
2013 MAK Schindler Residency, Los Angeles
2012 The Banff Centre, Canada (Federal Ministry for Education, Science and Culture)
2012 Hotel Charleroi, Charleroi, Belgium
2011 Melbourne (RMIT / Air Kreams)
2010 The Guesthouse, Cork, Ireland
2009 National Sculpture Factory Cork, Ireland (Pépinières européennes pour jeunes artistes) 2007
Ulaanbaatar, Mongolia

Scholarships & Grants

2021 Mrs. Otto Mauer Award
2020 Studioprogram, Federal Ministry for Arts (2020-2026)
2019 Kapsch Contemporary Art Prize, nomination
2018-2021 WWTF research grant "The Anthropocene Surge – evolution, expansion and depth of Vienna's urban environment" in cooperation with Univ.-Prof. Dr. Michael Wagreich, University Vienna 2017
Staatsstipendium (State Grant)
2013 Theodor Körner Award
2012 Artist Award, Lower Austria
2009 stipend within the "Förderpreis" (Federal Ministry for Education, Science and Culture)
2008 one year working grant (Academy of Fine Arts Vienna/BMWF)
2008 Pfann-Ohmann-Award

Ausstellungen & Projekte (Auswahl) | Exhibitions & projects (selection)

2023 postindustrial creatures, Super Natur, Public Art Lower Austria
2022 Metabolic Trips, Jesuiten Foyer
2022 Modified Grounds, Bodies of Data, with Judith Unterpertinger, Wien Modern, Vienna
2021 Plant Plant, Ar/ge Kunst, Bolzano
2021 Latent Soils, Kunstraum Lakeside, Klagenfurt
2021 A Landmass to Come, Collective Listening (Public Program), Belvedere 21, Vienna
2020 The Shape of a Practice, HKW, Berlin
2020 The 2nd Riga International Biennial of Contemporary Art, RIBOCA 2
2019 The earth – current way of living, Galerie Emila Filly, Ústí nad Labem, Czech Republic

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2019 Hysterical Mining, Vienna Biennale for Change 2019, Kunsthalle Wien, Vienna
2019 Modified Grounds #2, Concrete Voids, with Judith Unterpertinger, Wien Modern, Vienna
2019 The Anarchistic Amateur's Alphabet, Parallel Program steirischer herbst '19, Rotor, Graz
2019 Collect, Telescope, Caochangdi, Beijing
2019 Plastic Entanglements, Smith College Museum of Art, Northampton, USA
2018 Archipelago Mountain, Exhibition Laboratory, Helsinki
2018 Modified Grounds #1, Formwork, together with Judith Unterpertinger, Doka, Amstetten
2018 Plastic Entanglements, Jordan Schnitzer Museum of Art, Oregon, USA
2018 Casting Haze, Parallel Vienna
2018 Casting Haze, I:project space, Beijing
2018 Stones Like Us, Tischofer Cave, Kufstein, art in public space Tyrol
2018 Plastic Entanglements, Palmer Museum of Art, Pennsylvania, USA
2018 "Holes in the Wall", Anachronic Approaches to the Here and Now, Kunsthalle Exnergasse, Vienna
2018 Fleeting Territories, Kunstraum Niederösterreich, Vienna
2017 Tracing Spaces, with Johanna Tinzl, Nordwestbahnhof, Vienna
2017 Encouragement, Sacadura, Rio de Janeiro
2017 There are some things we need to talk about, with Johanna Tinzl, VBKÖ, Vienna (2014 - 2017)
2016 Paradoxa 3, Sabina Holzer & Jack Hauser, Tanzquartier Wien, Vienna
2016 Family System Summit #1, A Séance between ancient ocean krill and oily bubble wrappers, OMV pipeline, Vienna 2016 FLUCA - Austrian Cultural Pavilion, Plowdiw, Bulgaria
2016 The other Side, Vienna
2016 Radischschew Museum, Saratow, Russia
2015 Blickle Cinema, 21er Haus, Vienna
2015 Mission W, Wienerwald Biosphere Reserve, with Eva Engelbert, Public Art Vienna
2015 Landscapes of the Anthropocene. Humans make Nature, Round Table #1, department for Landschaftskunst. Landscape and Public Space, University for Applied Arts, Vienna
2015 subversiv - Raum für Alternativen, GrazMuseum, Graz
2014 Wohin verschwinden die Grenzen? former border checkpoint Fratres / Slavonice, Czech Republic 2014
Plein Air, Tiroler Künstlerschaft, Innsbruck
2014 A sculpture meant to be lived on, Office Hours, Los Angeles
2013 Smile, Mackey Apartments and Garage Top, Los Angeles
2013 Shiryaevo Biennial 2013, "Screen: between Europe and Asia", Russia
2012 Moving pics against a background, Saprophyt, Vienna
2012 A sense of place, with Eva Engelbert, Kunstraum Lakeside, Klagenfurt
2012 forest garden, breakfast tea, IG bildende Kunst, Vienna
2012 Hotel Ananas, Gallery 5020, Salzburg
2011 Project Space Spare Room, Melbourne
2011 Ellen de Buijten PROJECTS, Dolores, Amsterdam, the Netherlands
2011 Bare House. Ulaanbaatar, Zanabazar Fine Arts Museum, Mongolia
2011 Good prospects, Austrian Cultural Forum, 4th Moscow Biennial of Contemporary Art, Moscow 2010
Sweet Anticipation, Salzburger Kunstverein, Salzburg
2010 Bare House, Pori Art Museum, Finland
2009 Die Weite ist nicht fern, Galerie 5020, Salzburg

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Lectures & Performances

2022 Archaeology of the Anthropocene, HKW Berlin, with Shadreck Chirikure, Katrin Hornek, Kira Lappé, Oliver Sann
2020 A Trace, a Breath, Live-screening of A Landmass to Come, HKW Berlin
2019 To be made up of the earth is not necessarily easy II, Kunsthalle Wien, Vienna
2019 Casting Haze Base II, collective meditation on human-stone relationships, Kunsthalle Wien, Vienna
2019 Plastics in the world of tomorrow, lecture performance together with Sabina Holzer, 2. Forum Anthropocene
2019 UNTERGRUND II, lecture performance, Vienna Anthropocene Network
2019 Unlocking the clubhouse, rriot Festival, Vienna
2019 To be made up of the earth is not necessarily easy I, lecture performance, TWQ
2019 UNTERGRUND I, Statement, department for Site-Specific Art, University of Applied Arts, Vienna
2018 THE MODEL, Anthropocene Working Group meeting, Max-Planck Institute for Chemistry, Mainz
2018 Casting Haze Base I, collective meditation on human-stone relationships, I:project space, Beijing
2017 Gender Woodstock: Feminist Art Practices
2017 Earth Science Colloquium: Anthropocene, University of Vienna
2017 After Us, The Flood, Symposium, Kunst Haus Wien, Vienna
2017 Bewährungsprobe #13, Depot, Vienna
2016 PARADOXA, artistic research laboratory, TQW
2016 Fleeting Territories, urbanize! 2016
2016 Studies after Nature, John M. Anderson Endowed Lecture Series, The Pennsylvania State University
2016 Flüchtige Territorien_Eine Übung, Vienna

Lehre | Teaching

2019 Wiener Untergrund. Tracking the life of data in modified ground; seminar at the University of Applied Arts, Vienna
2017 Unplugged images. An observation on CERN; seminar at the department for Site-Specific Art, University of Applied Arts, Vienna
2017 Anthropozän, Zum Verhältnis von Blasensteinen und Plastikinseln, lecture at University of Art and Design Linz
2016 Artificial Islands from BBQ to FKK to OMV; seminar held at the department for Site-Specific Art, University of Applied Arts, Vienna
2018-2022 WWTF interdisciplinary research project „The Anthropocene Surge - evolution, expansion and depth of Vienna's urban environment“ together with Univ.-Prof. Dr. Michael Wagreich, University of Vienna since 2015
University assistant at the department for Site-Specific Art, University of Applied Arts, Vienna

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Katrin Hornek

Forensic Poetics. For our granddaughters

by Anne Faucheret

with Invisible Committee, Anna L. Tsing, Zosia Holubowska, Rosi Braidotti, Orchestral Manoeuvres in the Dark, Joseph Masco, Sabina Holzer & Katrin Hornek, Serpil Oppermann, Karen Barad, Heather Swanson & Anna L. Tsing & Nils Bubandt & Elaine Gan, Tōge Sankichi, Jim Dangerfield, Kathy Jetñil-Kijiner, Karin Pauer, Stacy Alaimo, Yvonne Volkart, Donna Haraway, Brian Holmes & Jeremy Bolen & Brian Kirkbride.

At the apex of his insanity, Man has even proclaimed himself a “geological force,” going so far as to give the name of his species to a phase of the life of the planet: he’s taken to speaking of an “anthropocene.” For the last time, he assigns himself the main role, even if it’s to accuse himself of having trashed everything – the seas and the skies, the ground and what’s underground – even if it’s to confess his guilt for the unprecedented extinction of plant and animal species. But what’s remarkable is that he continues relating in the same disastrous manner to the disaster produced by his own disastrous relationship with the world. He calculates the rate at which the ice pack is disappearing. He measures the extermination of the non-human forms of life. As to climate change, he doesn’t talk about it based on his sensible experience – a bird that doesn’t return in the same period of the year, an insect whose sounds aren’t heard anymore, a plant that no longer flowers at the same time as some other one. He talks about it scientifically with numbers and averages. [...]

The objective disaster serves mainly to mask another disaster, this one more obvious still and more massive. The exhaustion of natural resources is probably less advanced than the exhaustion of subjective resources, of vital resources, that is afflicting our contemporaries. If so much satisfaction is derived from surveying the devastation of the environment, it’s largely because this veils the shocking destruction of interiorities. Every oil spill, every sterile plain, every species extinction is an image of our souls in shreds, a reflection of our absence from the world, of our personal inability to inhabit it. Fukushima offers the spectacle of this complete failure of man and his mastery, which only produces ruins – and those Japanese plains, intact in appearance but where no one can live for decades. A never-ending decomposition that is finishing the job of making the world uninhabitable: the West will have ended up borrowing its mode of existence from what it fears the most: radioactive waste.

– *Invisible Committee, To Our Friends, 2014*

Grasping the atom was the culmination of human dreams of controlling nature. It was also the beginning of those dreams’ undoing. The bomb at Hiroshima changed things. Suddenly, we became aware that humans could destroy the livability of the planet – whether intentionally or otherwise. This awareness only increased as we learned about pollution, mass extinction, and climate change. One half of current precarity is the fate of the earth: what kinds of human disturbances can we live with? Despite talk of sustainability, how much chance do we have for passing a habitable environment to our multispecies descendants?

– *Anna L. Tsing, Mushroom at the End of the World, On the Possibility of Life on Capitalist Ruins, 2015*

It’s first the atmosphere that grabs my body. With it, a feeling. The space is darker than usual, the air seems thick, it seems to be twilight. The shades of black and anthracite, punctuated by the whiteness of the walls and of some sand piles, create an artificial, monochromatic, motionless landscape. An artificially terraformed futuristic landscape. Paradoxically, the space that opens wide before me can be embraced in one glance, but not really grasped: the vision is blurred by the dark shades overlapping, by tiny topographical variations, by reflections on surfaces and by an uncanny soundscape. Thus, my body needs to plunge into the space to

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apprehend it, to listen to it, to feel it underfoot, to touch it, to probe it and, perhaps, to linger therein, despite a vague prescience that I will not come out unscathed.

The sound envelops my body like a spell. It calls me to stay. It opens up to other sensible and intelligible layers and connects them with each other. Katrin Hornek invited sound artist Zosia Holubowska to create an eerie composition for the exhibition, oscillating between concrete experimental and serial electronic music, made of estranged sound captures or synthesized sounds. I remember the chapter names in the artist's shared folder: coral, empty ruins, turtle, wet cave, hydrogen scales, portal, siren. Filling the space unevenly from varied broadcasting points, at times intense and at times evanescent, at times mechanic and at times organic; at times inward-looking and at times vibrating; at times dark and at times – rarely – joyful, the composition plays with the materiality of sound, emphasizing the very physicality of sonic waves and its touching qualities. The sound waves don't just hit my eardrums; they seem to get into my skin, like radiation. Sound connects everything, taking up the bodies and rebalancing signs and references in the system of the exhibition.

sea sound / coral / underwater / beach / atmospheric sound / wind / touching coral / hot summer / trickle / drizzle / up and down movement / empty ruins / crackling snow / crackling glass / excavation / scraping sound / wind remote / birds / semipalatinsk tundra / burning sound / uncanny / piercing / resonating / noise/ inside sounds / hair / skin / bones / moisture / small space / intimate / hidden / played from one corner at a time / breathing / instrumental portals / sirens / drone / airplane / inside of the reactor / sci-fi vibe / future ruins / concrete dome / reverberation / endless space / ominous / contradicting rhythms / confusing / upsetting / digging / drilling / water drops / falling things / scanning / polarized / petrified / emotional / darkness /
– Zosia Holubowska, *List of Sounds, 2023*

The low topography expands on the floor out of dark matter and enters in tension with the high ceiling. Rubber granulate carpet pieces made from recycled car tires, rise here and there into platforms and are punctually adorned with piles of white marble sand. Turtle-shaped colored objects are disseminated in the space. The mat and soft appearing floor is interrupted by pools of black water stretching across the space and reflect the ceiling. The zenithal glass panels have been covered by transparent filters with black printed patterns. At first glance abstract, these unveil as a topography, too. The image derives from a sonography of the Bikini Atoll's seabed, realized in 2019 by Arthur Trambanis' research team around the crater left by the underwater explosion of the atomic test bomb Baker from 1945. The oblong spots are the wrecks of the destroyed ships used in the tests. Katrin Hornek takes the scars from the bottom of the sea to the roof of the exhibition space, and transforms them into a light filter. For both the ceiling and the floor, she plays with effects of enlargement and reduction. The basins filled with water figure gigantic chromosomes 9 and 22 – those predominantly storing information about the bones, which in turn absorb plutonium and other nuclides, confusing them with calcium. Atomic radiation left its traces everywhere, at every scale, from the microscopic atom up to the planetary surface.

Our era has turned visualization into the ultimate form of control. [...] This is of special concern from a feminist perspective, because it tends to reinstate a hierarchy of bodily perception which over-privileges vision over other senses, especially touch and sound. [...] Postmodern feminist knowledge claims are grounded in life experiences and consequently mark radical forms of re-embodiment. But they also need to be dynamic – or nomadic - and allow for shifts of location and multiplicity.
– Rosi Braidotti, *Cyberfeminism with a Difference, 1996*

The map of nuclear devastation on the ceiling determines the brightness of the exhibition and symbolizes the lens through which the world can be sensed in the Atomic Age, in the Age of Global Fallout, in the Anthropocene. Vision and visual technologies frame this new geological age – data visualization, satellite imagery, climate modelling (where radionuclides have been used to make flows visible). At the same time, radiation, being invisible for most capturing devices, challenges visual and representational systems as well as it expanded spatial and temporal scales, from ultra-quick to the ultra-long geological time.

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The paradox of visualization as the ultimate form of control and the sensorial and cognitive estrangement is what characterizes the atomic condition. A condition that was gradually established by extractive imperialist capitalism, and accelerated during the World War II with the exploitation of atomic energy for military purposes, the explosion of the first nuclear bombs decimating Hiroshima and Nagasaki, and the following 540 aerial and submarine nuclear tests perpetrated between 1945 and 1980 on territories stolen from their human and more-than-human inhabitants.

Enola Gay / You should have stayed at home yesterday / Ah-ha, words can't describe
/ The feeling and the way you lied / These games you play / They're gonna end in
more than tears someday / Ah-ha, Enola Gay / It shouldn't ever have to end this way
/ It's 8:15 / And that's the time that it's always been / We got your message on the
radio / Conditions normal and you're coming home / Enola Gay / Is mother proud of
little boy today? / Ah-ha, this kiss you give / It's never ever going to fade away / Enola
Gay / It shouldn't ever have to end this way / Ah-ha, Enola Gay / It shouldn't fade in
our dreams away
– *Orchestral Manoeuvres in the Dark, Enola Gay, 1980*

The exhibition's title, *testing grounds*, straightforwardly designates those nuclear bomb test sites, underwater or on land, installed on territories that were appropriated and then devastated, "for the sake of peace." And here we are, right into the testing grounds of human's hubris, ignorance, and denial. The Semipalatinsk site in Northeast Kazakhstan was once the very secret main testing venue for the Soviet Union's nuclear weapons. More than 450 bombs were detonated there between 1949 and 1989 and affected more than a million people, who were misinformed and reduced to silence.

Among other sites appearing in the web of stories enshrined in the exhibition, the infamous Bikini Atoll in the Marshall Islands, an important U.S. test site in the Pacific Ocean, reoccurs several times. Operation Crossroads, consisting of two realized tests under the code names Able and the aforementioned Baker was the first series of postwar nuclear tests carried out by the U.S. in July 1946. It marked a headlong rush into Western Man's destructive ambitions, starting the arms race, the Cold War, and an endless list of nuclear tests – following the deterrence principle.

Almost ten years later, the Operation Castle (March 1954) marked a new stage in the nuclear race with the first hydrogen bomb. The Castel Bravo bomb, the most powerful nuclear device ever detonated by the U.S., also took place at the Bikini Atoll; it exceeded more than two times the foreseen yield and contaminated a large surrounding area. The fallout, the heaviest of which was in the form of pulverized surface coral, fell on residents of neighboring atolls, while particulate and gaseous fallout spread around the world. The inhabitants of the surrounding islands were not evacuated until three days later and suffered radiation sickness. Most of the crew of a Japanese fishing vessel were also contaminated by the fallout and experienced acute radiation syndrome. The blast incited a strong international reaction over atmospheric thermonuclear testing.

[T]he environment itself has been transformed into a potentially deadly space, remaking clouds and air as dangerous entities. The atomic bomb transforms the atmosphere on which living beings depend, converting it from a life support system into something now suspect, potentially loaded at any moment with invisible and harmful elements. [...]

Fallout is thus an environmental flow, one that matters to public health and safety but that also requires a new form of everyday perception and governance. Fallout positions the citizen less as a national subject than as an earth dweller, one increasingly at risk, as Tim Choy would put it, simply for being a "breather." This conversion of atmosphere, from the most rudimentary domain of life into an uncertain circulation, also directly challenges the territorial vision of the national security state system, as international borders and security states are rendered irrelevant by windborne industrial effects within changeable earth systems.

– *Joseph Masco, The Age of Fallout, History of the Present: A Journal of Critical History, Vol. 5, No. 2, Fall 2015*

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Through fallout, the testing ground is also Europe; it is Austria, a “neutral” country refusing any military alliance, an anti-atomic country, which never opened a single nuclear power plant. Still, since 1957 Vienna has hosted the International Atomic Energy Agency, promoting the peaceful use of nuclear energy worldwide, the improvement of nuclear safety, as well as the verification of States’ compliance under the Nuclear Non-Proliferation Treaty regime. Besides, the only urban sample to date used as a marker of the Anthropocene has been taken from Vienna’s underground at Karlsplatz. Finally, the testing ground is also the main hall of the Secession, a modernist island created by artists in the city center at the beginning of the 20th century, contained and porous at once.

The particles were brought here by the winds and the rain.

I’m touching the layer with my hand now...

...At the same time...what I am actually touching is parts of the Bikini Atoll, the Novaya Zemlya test site, the Nevada test site, and all the others...Hundreds of atomic blasts...And these atomic blasts vaporized numerous tons of earth in these so-called Test Sites. The closer the bombs detonated to the ground, the more soil and other materials were drawn upwards, sucked upwards – imagine! – inside the rising fireball... Like a fierce stream of vaporized matter, all sucked into a massive, boiling cloud... The radioactive particles attached to this vaporized earth and together, they were carried by global winds ... they traveled on coral dust, desert sands, tundra dust...

and settled right here. At Karlsplatz [...]

And also... in my bones. “Plutonium is a bone seeker” they say...because it mimics calcium... and its chemical composition looks almost the same. Yes...we simply inhale this plutonium... and it settles directly in our bone marrow, which is hungry for calcium, but gets plutonium instead. [...]

This plutonium in my body turns me – or rather, turns all of us into weird artifacts. Recorders of events that happened before my generation was born. And it marks our belonging to the epoch of the Anthropocene for which the marker will be plutonium 239, which is now part of our bodies...We are evidence... [...]

And the Karlsplatz soil sample? It will be used as an auxiliary measurement to mark the beginning of the Anthropocene.... I mean, in geological terms.

– Sabina Holzer & Katrin Hornek, *Karlsplatz excavation site, source text for voice message, Messenger #9, 2024*

Through a polymorphic, polyphonic, dispersed, and diffracted account, Katrin Hornek makes graspable the extent to which atomic energy, its effects and its narratives, have penetrated every aspect of life on earth, right down to the smallest nooks and crannies, in the atmosphere, in the soil, in the organisms, in the cells, reorganizing the matter and its sedimentation but reorganizing at the same time our imaginations. The artist has collected a wide range of archival, documentary, and scientific material, ranging from general vulgarization to former classified information, from official propaganda to vernacular stories, which she incorporates, translates, fragments, and disseminates through matter, objects and devices working like communicating vessels – communicating with the visitors and with each other.

Turtle-shaped colored objects populate the landscape of the exhibition space. The surfaces of the turtles change from object to object: warm or cold, smooth or rough, gelled or hard. Each object is cast in a different material, color, texture, and body shape. Encased in the turtle-shaped cases, I discover smartphones, where several voices are recorded either in written or in oral form – developed in collaboration with the writer and performance artist Sabina Holzer. I hold a black turtle to my ear and listen to a dreamscape written by the two. It reminds me of the cynical origin of the eponymous piece of clothing, bikini. The fate of the Bikini Atoll, site of pride and test for the ones who occupied it, and site of terror, anger and longing for those who still inhabit it, can be traced via several narrative paths. A poem by writer Kathi Jetñil-Kijner, a native of the Marshall Islands, calls against oblivion and anonymity. Turtle shells retain evidence of previous nuclear contamination – much like how tree rings hold information on the past environment. The multiple turtles in space evoke the

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sacred and cherished animal in the Pacific zone. Associated in numerous cosmogonies and mythologies in the Pacific Ocean with protection, shelter, and luck, they take in the exhibition the role of carriers and protectors. They protect the messages they carry, they bear in their bodies some memories, for the future.

I've always wanted to tell you that hmm ... that meeting you was one of the most powerful, more-than-human encounters I've ever had...

It was 20 years ago, during that warm summer...

I still see you and your gang of sea turtles crawling onto land.

I'd never seen this before. [...]

I'm telling you all this because yesterday I read an article that really blew my mind.

It was about scientists who were searching for uranium traces in the shells of sea turtles and tortoises. They collected them around former nuclear testing grounds or at sites of modern and contemporary nuclear activities. [...]

They say: "Unusual uranium signatures were found in a green sea turtle from the Marshall Islands. The same signature appeared in a desert tortoise in Utah, near the Nevada Test Site."

And the story that touched me the most, was the one of a turtle from Oakridge, Tennessee. The turtle was collected close to a complex called Y-12, a factory that, ever since World War II, has been producing and is still assembling components for nuclear weapons.

The shell layer that was most contaminated was the one the turtle was born with. This suggests that the mother was even more contaminated..., right? Transferring these signatures on to her children.

– Sabina Holzer & Katrin Hornek, *Dreamscape: Voice Message to a Turtle*, source text for voice message, *Messenger* #5, 2024

So, we were sitting at her desk... and she was tapping her toes against a cardboard box under the table... You know, this typical tapping sound. And she said something like... "this is my little crematorium box down here." She said it in a very warm and affectionate voice.

It still makes me smile and shiver somehow. [...]

Then she opened the box and showed me some small glass tubes. They were filled with something whitish, grayish. It looked somehow like ash... Some even had shades of pink.

She told me that it's the ash of human lungs... Hey... I was so surprised.

I really didn't expect to encounter lung ash under her table... [...]

Attached to each autopsy report you see counting curves. The measurements from the ashes show that traces of radioactivity from nuclear explosions are detectable in all samples and most lungs seemed to have produced somewhat similar counting curves. [...]

They wanted to prove the high amounts of radioactive materials in human lungs here in Austria – so far away from the test sites.

– Sabina Holzer & Katrin Hornek, *Voice Message: Visite Dr. Wallner*, source text, *Messenger* #11, 2024

The white marble sand in space resembles pulverized coral riffs; the shape of some platforms replays the shape of some coral riffs which grew back after the Baker explosion. Storied matter plays a great role here. The incommensurable power deployed in the destruction of Hiroshima by the first bomb ever dropped (by a bomber airplane called Enola Gay) is glimpsed through the presence of human shadows etched in stones or through the evocation of the *Hiroshimaites*, these countless small teardrop-shaped glass beads to be found on beaches nearby the city, formed in the melting of the city, in the extreme heat of the explosion. Amalgamated concrete, marble, stainless steel, glass and rubber.

[S]toried matter helps us better understand fragile ecosystems, polluted landscapes, carbon-filled atmosphere, acidifying oceans, changing climate, retreating glaciers, species extinctions and social crises than the scientific data presented in figures and numbers. Simply because, through these stories welcome to know 'not only ... the hidden plots and meanings of a reality, but also ... the often unheard voices of this reality,' which has today become quite disenchanted with catastrophic human practices.

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Thinking about storied matter in a disenchanted world means thinking seriously about how our invasive economic practices produce planetary cycles of pollution, how our political decisions and cultural meanings are enmeshed in their production, and how they all enfold into one indissoluble process.
– *Serpil Oppermann, Storied Matter, 2018*

Occurring through variable media and formats (visual or sonic, image- or text-based), through different voices (native population, military veterans, scientists, poets, artists), through different embodiments (humans, turtles, lung ashes), and different scales, dissemination, in the exhibition, calls for different modes of attention, cognitive or emotional, concrete or abstract, intuitive or referential. Katrin Hornek makes me feel under my feet, under my skin, down to my bones the situatedness and dispersion, separation and connection, fascination and depression, that characterize the atomic condition.

Matter fell from grace during the twentieth century. What was once labeled “inanimate” became mortal. Very soon after that, it was murdered, exploded at its core, torn to shreds, blown to smithereens. The smallest of smallest bits, the heart of the atom, was broken apart with a violence that made the earth and the heavens quake. In an instant, in a flash of light brighter than a thousand suns, the distance between heaven and earth was obliterated – not merely imaginatively crossed by Newton’s natural theo-philosophy but physically crossed out by a mushroom cloud reaching into the stratosphere. “I am become death, the destroyer of worlds.”

– *Karen Barad, “No Small Matter, Mushroom Clouds, Ecologies of Nothingness, and strange Topologies of Spacetime-mattering,” in Anna Tsing (et al.), Arts of Living on a Damaged Planet, 2017. With a quote by J. Robert Oppenheimer in the wake of the first atomic bomb explosion, being itself a translation by the physicist from a line of the Bhagavad Gita.*

The vertigo of the Western sorcerer’s apprentice who brings together forces he barely understands and whose consequences he doesn’t measure, the fascination for this terrific deployment of energy which even pierces bodies like X-rays, for the magic of the colorful nuclear mushroom, that – added to the voyeuristic fascination with destruction *at all* – has underpinned the biased, enchanted narrative of the benefits of radioactivity, the blindness maintained regarding its toxicity and half-life lifespan. The battle of communication around the bomb and the nuclear energy has always aimed at fulfilling cheap desires, maintaining ignorance and orchestrating oblivion. Oblivion of the violent logics underlying it.

At every single site where nuclear bomb testing was performed, it was accompanied by dispossession of land, of stories, of multi-species languages. Natives were sacrificed, contaminated without compensation. Environments and life forms were destroyed and annihilated in the long term. Nothing – or too little was said about it. Reflected in the mirror of the water, the ceiling and floor fall into each other in the space of the artwork, the way radioactive particles precipitate and sediment over the planet, after having been propelled into the stratosphere, and then carried by the winds, contaminating everything. Planetary radioactive fallout and other ecological disasters were not created by the human species, as the word Anthropocene seems to assert, but by the complex entanglement between militarized security, powerful industry, global finance, and reckless science in imperialist nations.

Our modes of noticing [...] are themselves monstrous in their connection to Man’s conquest. Much of what we know about ecological connection comes from tracking the movement of radiation and other pollutants. Contamination often acts as a “tracer” – a way to see relations. We notice connections in part through their ruination.
– *Heather Swanson, Anna L Tsing, Nils Bubandt, Elaine Gan, “Bodies Tumbled into Bodies,” Introduction to Arts of Living on a Damaged Planet, 2017*

It is too hot this summer. As though the sun were too close.

And I, who was always laughing and saying I am a salamander – which expresses no more than my wistful admiration of this animal that lies motionless in the sun, lost in

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dreams, barely discernible from the surroundings, ready to react and disappear at any moment ... I am moving as though I am slowly evaporating. The heat is making me claustrophobic. I am not sweating, I am drying out. I try to spend as much time as possible away from the city, on the water.

I'll never be able to wear a bikini again without thinking of the South Pacific Bikini Atoll. [...]

In fact, it was named after the island. The name of the island comes from the Marshallese, *Pikinni* (.....) - "*Pik*" means surface and "*Ni*" means "coconut," so, the surface of the coconut. [...] French designer Louis Réard named it after the atoll in 1946. 1946. The year of the first atomic bomb test of "Operation Crossroads," which was carried out on the Bikini Atoll. Réard, on the contrary, was conjuring up sun, sex, and pleasure. [...]

All of that and the heat are making me dizzy. I look for somewhere to sit down. To stretch out my tired legs. I close my eyes and listen to the sounds around me. ... but what would a postnuclear creature be like, a postnuclear being marked by nuclear weapon science. My bikini is with me in my bag. What a mysterious, monstrous sign.
– Sabina Holzer & Katrin Hornek, *Dreamscape: Bikini, source text, Messenger #3, 2024*

The ungraspable violence, the disintegration of life, and the silencing of critical voices created countless traumas. Cultural and poetic translations, like memorial narratives, scientific observations, late first-hand testimonies, futurist fictions, angry daydreams, created to survive and to weave a collective resilient imaginary, constitute the core of *testing grounds*. From an eyewitness account of Andrei Sakharov, who developed the first megaton-range Soviet hydrogen bomb, to the U.S. veterans of nuclear testing who are allowed to finally speak out, to the scientist-author of the Baker crater's sonography addressing his grandson, to the activists of the Los Alamos Research Group – the very site where the U.S. worked on the bomb during WWII, to that of the artists invited, involved, who themselves weave their words into other texts, they all work as antidotes against forgetfulness, depression, and despair.

can we forget that flash? / suddenly 30,000 in the streets disappeared / in the crushed depths of darkness / the shrieks of 50,000 died out / when the swirling yellow smoke thinned / buildings split, bridges collapsed / packed trains rested / and a shoreless accumulation of rubble and embers – Hiroshima / before long, a line of naked bodies / walking in groups, crying / with skin hanging down like rags / hands on chests / stamping on crumbled brain matter / burnt clothing covering hips / [...] / city of 300,000 / can we forget that silence? / in that stillness / the powerful appeal / of the white eye sockets of the wives and children who did not return home / that tore apart our hearts / can it be forgotten?!

– Tōge Sankichi, "August 6," in *Poems of the Atomic Bomb, 1951. Translated by Karen Thornber*

Bodies are both receptacles and markers of radiation. If exposed to it, bodies are passive witnesses of the entropy hitting them: the absorption of radioactive nuclides in place of calcium in bones, or the ionization in cells leading to their death or mutation, and ultimately, depending on exposure, acute global irradiation syndrome or, in the longer term, development of cancers, congenital malformations or destruction of the microbiome. Storing and retaining traces, bodies function as markers to measure exposure to radioactivity a posteriori, like the lung ashes from a laboratory in Vienna, or the shell of a turtle. Touched bodies serve for future health monitoring. Differentially marked bodies mark different exposures and hence can testify to the separation between bodies that count and bodies that don't (local population, human and animal). Through the stories they carry and tell, in the exhibition, with or without words, they are also agents of memory, resistance, and, perhaps, some future bifurcation.

[W]e discover a portal beneath artificial tree lines and undrinkable coconuts—a lagoon, a tranquil respite. Here, we gather resilience from our shared experience before moving onward. Emerging on the other side, a field unfolds, inhabited by atomic soldiers. Faceless, just

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numbers, we witness the mushroom cloud overhead. Bodies ablaze, protecting each others' eyes, we move—escaping, leaning, resisting. Frozen on the ground, immobilized, we step on one another, pick each other up, a dance against the forces attempting to erase our identities. We keep digging, unearthing stories with unwavering determination.

As we traverse this journey, we metamorphose into radioactive mutants, exploring a melted reactor from within. We grapple with the consequences of matter splitting, its impact on our space-time existence, cells, and the very order of the universe. In our resistance, we persist, remaining, remembering, and healing. We carry the weight of history, vowing not to forget—for the good of mankind, and in the pursuit of an end to all wars.

– Karin Pauer with Cat Jimenez, Mani Obeya, Martina De Dominicis & Chat GPT, *Szenario #1*, 2024

In the exhibition space, my body encounters other bodies, imagined or real. The shadow bodies of the bomb: dead people, scientists, politicians, soldiers, residents. The turtles' bodies. The performers' bodies. Suddenly, I see and feel presence, I hear movements around me. Three performers, under the direction of Karin Pauer, seem to embody different states under the atomic condition, through gestures, movements, rhythms; they become alternately, successively, walking bodies, damaged bodies, mute bodies, mutant bodies, resisting bodies, excavating bodies, bending bodies, dreaming bodies. The thin line between performing and just being is subtly worked out. I feel in their movements the postnuclear condition we share. The bodies around me seem driven by anger and despair, drawn by forces of attraction or repulsion, but also empowered by collective strength and reciprocal care, carried along by shared stories. They sometimes look at me, or is it through me? They sometimes seem to be falling into each other. They bring back ghosts from the past as much as they invent future mutants.

Imagining human corporeality as trans-corporeality, in which the human is always intermeshed with the more-than-human world, underlines the extent to which the corporeal substance of the human is ultimately inseparable from "the environment." It makes it difficult to pose nature as a mere background for the exploits of the human, since "nature" is always as close as one's own skin. Indeed, thinking across bodies may catalyze the recognition that the "environment," which is too often imagined as inert, empty space or as a "resource" for human use, is, in fact, a world of fleshy beings, with their own needs, claims, and actions.

– Stacy Alaimo, *Trans-corporeal Feminisms and the Ethical Space of Nature*, 2009

The vertiginous rift torn wide open on a scientific as well as an ethical level by the bomb also made clear that nothing is separate, everything is connected. In the show I am reminded all the time of my ties to the molecules, atoms, and more-than-humans that compose me and surround me. The inaccuracy of an ontological separation between human and non-human comes to the fore: Everything is linked and interdependent – but not within a super-resilient, self-regulating system as James Lovelock and Lynn Margulis hoped with their Gaia hypothesis – but rather within a porous, fragile, even precarious system, where each element has a position and a role, and where a rupture can unfold into a disruption.

I am not only right in the middle of it, in the networked and virtualized era of cyberpunk, which at the time, when we read "Neuromancer" or "He, She and It," I did not imagine to be so ordinary; rather, what is more is that I also belong to that reprehensible species (the "human" species) that takes control of, pollutes, and eradicates everything. But I am also a mother, cyborg, art theorist, bacteria, water, plant, subjectified "in the belly of the monster;" I am a sentient, moving, feeling being, an earthling with and among others. I exist, I am open, I am ... It is about the oikos, the household understood in both a macro- as well as microscopic sense, that is to say, with connections, with couplings and decouplings, sequences and effects.

– Yvonne Volkart, *Techno-Ecofeminism. Nonhuman Sensations in Technoplanetary Layers*, (trans. Rebecca van Dykes) in Cornelia Sollfrank (ed.), *The Beautiful Warriors. Technofeminist Praxis in the Twenty-First Century*, 2020.

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Atomic energy is only a part of the harmful relation extractive capitalism imposed on earth and on living. While deconstructing this toxic relation, sometimes resorting to the springs of formal spell and magic, Katrin Hornek does not yield to naive exemption from her own entanglement. The materials, either synthetic or minerals, come from the extractive and chemical industries, mostly from petrochemistry. The artist does not hide the unmistakable participation of the artworld in a planetary capitalist regime of extraction, oppression and competition, with its oiled circuits of work, production, circulation, distribution and predation, which gave birth to the bomb.

Katrin Hornek gathers stories and creates meaning beyond official instrumental narratives or statistical accounts; ethically and poetically decodes them. *testing grounds* is a space of material, symbolic and political concentration, stratification, and reverberation of effects and affects from the Atomic Age. Her installation becomes the echo chamber for multiple voices, from the past, present and future, distilling a feeling of ontological *inseparation* and collective responsibility.

As artists, our work was not only to analyze, but above all to register a shift in social sensibilities. We found that the Anthropocene mode of production is associated with a certain *feeling*, which remains quite palpable today: an exhilarating but troubling feeling, wildly expansive yet weirdly claustrophobic, threatening too.

– Brian Holmes, Jeremy Bolen, & Brian Kirkbride, “Born Secret (Cash for Kryptonite): A field guide to the Anthropocene mode of production,” in *The Anthropocene Review, Volume 8 Issue 2, The Mississippi Papers (Part 1), August 2021*

We are not posthuman; we are compost. We are not homo; we are humus. We are terran; we are earthlings; we are many; we are indeterminate. We bleed into each other in chaotic fluid extravagance. We eat our own snakey tails in sympoietic whorls to generate polymorphic ongoingness; we are enmeshed with the ouroboroi of diverse interlaced netherworlds. We are chthonic, of and for the earth, of and for its unfinished times. We live and die in its ruins. We tunnel in the ruins to germinate in the seams. We can yet be resurgent. There may still be time. Composting is so hot.

– Donna Haraway, “Capitalocene and Chthulucene,” in *Rosi Braidotti & Maria Hlavajova, Posthuman Glossary, 2018*

testing grounds is an immersive live installation conceived by Katrin Hornek and developed in a collaborative process with artists Karin Pauer, Sabina Holzer, and Zosia Holubowska, as well as researchers from different fields.

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Katrin Hornek

Wendepunkt Anthropozän. Erinnerung an die Zukunft

von Brian Holmes

“...art inscribes (artistically bears witness to) what we do not yet know of our lived historical relation to events of our times.”

Shoshana Felman and Dori Laubⁱ

You've seen sunsets over the water. Now try to imagine an underwater sun.

On July 25, 1946, for the “Baker shot” of US Navy Operation Crossroads, a bomb was lowered into the lagoon of Bikini Atoll and suspended by cable at a depth of 27 meters, exactly halfway to the bottom. Its ten kilograms of fissionable plutonium would unleash a force equivalent to 20 kilotons of TNT. The plan was to test the effects of an A-bomb on an entire fleet of captured and surplus warships, beneath the gaze of innumerable cameras on land, at sea and in the air.ⁱⁱ

In milliseconds the underwater fireball expanded to strike the seabed and break the surface all at once, pulverizing the coral below and hurling some two million tons of sand and vapor into the air. Like a waterspout turned solar flare, the vapor column rose to a height of almost two thousand meters, expanding at the top into a vast and convoluted mushroom cloud streaked with radioactive debris. Much of the water, sand, fission products and unconsumed plutonium then fell back into the lagoon in slow motion cascades, raising an agitated ring of waves and radioactive spray some thirty meters high, surging outward from the center. The target warships mostly weathered the initial blast – but the spray rendered them so toxic that thousands of sailors were dangerously exposed and subsequent phases of the operation had to be canceled. Meanwhile a lighter harvest of irradiant dust took flight on stratospheric winds, to settle across the four corners of the Earth.

On the ceiling of the Secession's main hall, artist Katrin Hornek has placed an elevation map of the undersea crater left by this unnatural cataclysm. On the dark, matted ground are piles of sand and low platforms with pools of water evoking the chromosomes that store genetic information for human bones. Mobile phones inserted into the bodies of sculpted turtles relay fragmentary testimonies, visions and hallucinations that coalesce around the origins, destinies, and consequences of nuclear fallout, with its pervasive global reach. Mysterious electronic tones vibrate in the air; three performers give body to inchoate emotions.

Katrin Hornek has worked with writer and performer Sabina Holzer for the voice and text messages; with composer Zosia Hołubowska for the electronic music; composer Zosia Hołubowska designed the soundscape, and choreographer Karin Pauer developed the performances. In addition, Hornek is a member of the Anthropocene Surge project that recently collaborated with a team of archeologists to carry out excavations under Vienna's Karlsplatz, as part of a coordinated effort to identify the base layer of a new phase in Earth's history. In the course of this project, so-called “technofossils” – including military helmets, insignia, dated coins, and toys – were unearthed from World War II rubble, while a more finely graded postwar layer (1950–59) was analyzed for the presence of plutonium. The results of the investigation were submitted to the Anthropocene Working Group, as supporting evidence for the new geological epoch.ⁱⁱⁱ

With the scientists, Katrin focuses on the role of plutonium isotopes as a stratigraphic marker, whose concentration in sedimentary layers shows a clear uptick or “bomb spike” during the years of atmospheric

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testing. But in the exhibition she seems to be asking much more intimate questions – even haunting ones. Did the Atomic Age of the 1950s ever end? Has the plutonium marker gotten under your skin? Can you feel this old/new epoch in your own body? What is the uncanny message of the Anthropocene?

Nuclear geography

Given the extreme rarity of fissionable isotopes in nature, physicist Niels Bohr thought that enough material for an atomic bomb could never be refined “without turning the whole country into a factory.”^{iv} Strictly speaking, he was wrong: he hadn’t foreseen the kinds of uranium enrichment processes that would soon be invented, nor the fact that raw uranium could be used as fuel in a nuclear reactor that would transmute it into significant quantities of fissionable plutonium. Yet his remark is unforgettable, because it captured the scale of the Manhattan Project. Certain buildings such as the K-25 enrichment plant grew to seemingly impossible dimensions; while the overall production network sprawled across the continent. Its expanding footprint was driven by exactly what Bohr opposed: the military demand for compartmentalization and secrecy, which destroys scientific self-critique and leaves democracy blind and rudderless.

All this began with a single dot on the map. In 1942 a team of researchers in exile at the University of Chicago’s Metallurgy Lab built the world’s first nuclear reactor, Chicago Pile-1, which was rapidly moved from the campus to a guarded site in a nearby forest preserve called Red Gate Woods. Two top-secret production facilities were set up in remote locations: the Clinton Engineering District on the rolling hills around Oak Ridge, Tennessee, where uranium enrichment techniques were developed and plutonium was produced experimentally; and the Hanford Engineering District in the state of Washington over three thousand kilometers away, where industrial quantities of plutonium were extracted from production reactors and purified in gigantic chemical separation canyons. Crucial inputs came from prestigious universities such as Columbia and UC Berkeley, and from giant corporations such as Du Pont, Mallinckrodt, M.W. Kellogg and Union Carbide, all under the coordination of the Army Corps of Engineers. At the end of the intersecting production lines, the bombs themselves were designed and built in the weapons labs of Los Alamos, New Mexico.

After the two strikes on Japan in 1945 this nuclear geography underwent further expansion, matching and exceeding Bohr’s predictions. The American production complex was replicated at continental scale in the Soviet Union, which exploded its first device in 1949. Britain, France and China all built nuclear weapons, which they detonated in the open air. By 1963 over five hundred atmospheric tests had been conducted, enacting a highly mediated form of symbolic warfare. The yields ranged from 20 kilotons (for the “small” plutonium devices of Operation Crossroads) to an inconceivable 50 megatons for a single thermonuclear explosion (the “Tsar Bomba” detonated by the Soviets in 1961). As literary theorist Gabriele Schwab notes, the awesome spectacle of the blasts unleashed contradictory feelings of numbing fear and godlike exaltation – a “psychic splitting” that continues to affect citizens of the overdeveloped world.^v Even more broadly, the invisible fallout triggered an enduring anxiety over the fate of the Earth. And in concrete terms, it deposited an exceedingly fine but geologically significant layer of plutonium across the planet: the ubiquitous signal of the Anthropocene.

Natural archives

An irony of the present is that the monitoring and modeling techniques now used to assess global ecological change emerged directly from the arms race.^{vi} The first priority for nuclear security states was to monitor the air, land, and water for signals of a rival weapons program. Later, as the dangers of radioactivity became more

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apparent, government scientists began modeling the potential environmental consequences of nuclear exchanges. And when the fear of fallout took hold among civilians, testing for radioactive isotopes like strontium-90 became widespread, particularly in foodstuffs but also in other natural archives.

Like plutonium, strontium-90 has a chemical similarity to calcium, so it is easily taken up in bones, especially during developmental phases. Therefore, the same radionuclides that geologists now discover in the seasonal lamination of sediment cores can also be found in human skeletons. Acting on this knowledge, the US Atomic Energy Commission launched a secret RAND corporation study under the duplicitous name of Project Sunshine, which began illicitly gathering bones, especially children's bones, from doctor's offices and morgues around the world. Independent scientists and civil-society groups responded to the bomb-test fallout with their own investigations, notably the ingenious Baby Tooth Survey by the Greater St. Louis Citizens' Committee for Nuclear Information. This grassroots research program encouraged little kids to send in their magical tokens of infancy, complete with age, date of birth and place of residence, for strontium-90 analysis by public-interest scientists. The results showed a "bomb spike" recorded in the milk teeth of the young children.^{vii}

Similar initiatives for the testing of human tissues as well common foodstuffs such as milk and wheat were undertaken by individual scientists and civil-society groups as well as officials at various levels of local government. They revealed unexpected hotspots of radioactivity in certain geographic areas and in certain foods, giving the lie to the vanishingly small "average doses" calculated by the nuclear security states. At the United Nations, Japan and other Asian governments produced evidence of high levels of strontium-90 in rice, extending the dispute to the international arena. In Austria, the Lung Ash Study – documented in the exhibition – bears local witness to the global response.^{viii} Widespread efforts of this kind built public pressure for the signing of the Partial Test Ban Treaty in 1963, which stopped the massive release of radioactive isotopes into the ocean, the atmosphere, and outer space. Three decades later, in 1996, the United Nations Comprehensive Nuclear-Test-Ban Treaty marked an end to most underground testing – though it has not been ratified by eight crucial powers, including China and the United States.

Stratigraphic signal

After a long and controversial debate, the Anthropocene Working Group finally settled on the period of 1950–1963 for the inception of the new epoch, and invited teams of geologists to analyze a bewildering variety of annually layered archives: ice sheets, seabeds, lake bottoms, corals, stalagmites, peat bogs, tree rings and even disturbed Viennese soils. The aim was to identify a characteristic and precisely datable marker within a richly documented stratigraphic context. The choice of plutonium isotopes as the "golden spike," or primary index of a phase change in the Earth system, had nothing to do with the bomb's destructive force, nor with the lingering environmental consequences of radiation. Instead, the "bomb spike" is understood as a stratigraphic signal. What it signifies is known to scientists – and increasingly, to the general public – as the Great Acceleration.^{ix}

This unprecedented explosion of industrial production and human population pushed a wide range of environmental indicators into exponentially rising curves from the early 1950s onward, resulting in global warming, species extinction, and the disruption of crucial biogeochemical cycles. The Great Acceleration is driven by cumulative human behaviors, leading in particular to the release of greenhouse gases from industry and mechanized agriculture as well as individual transportation, consumption, nourishment, and metabolism. Among the many consequences is an alarming rise in the temperature of the oceans. As one scientist notes,

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in the single year of 2021 “the oceans have absorbed heat equivalent to seven Hiroshima atomic bombs detonating each second, 24 hours a day, 365 days a year.”^x Today, the underwater sun is all around us.

The anthropogenic disruption of the Earth system brought about by aggregate human behaviors clearly dwarfs the power of nuclear weapons. Yet even during the Cold War, anxiety centered on the environmental *consequences* of an atomic exchange. Thus, in the early 1980s, the concept of “nuclear winter” focused on the sunlight-blocking properties of the black carbon soot that would be delivered to the stratosphere, not by the explosions themselves, but instead by the immense firestorms they would ignite in technological cities.^{xi} Under such a scenario the material basis of human civilization is literally unearthed, hurled into the upper atmosphere by its own combustive force, after ignition by the nuclear match.

To be sure, nuclear winter remains a highly speculative concept. Not so for the planetary-scale consequences of the Great Acceleration – in particular, the sunlight-*trapping* properties of carbon dioxide and other greenhouse gases. From the early Atomic Age onward, the successive alterations of earth’s metabolism have been extensively recorded, allowing detailed modeling into the future. What has emerged from this scrutiny is an unprecedented pattern of ecological change affecting the entire Earth system. The ubiquitous “bomb spike” revealed by the geologists is a signal of global-scale transformations yet to come – a smoking gun at the starting gate of a weirdly exultant race to mass extinction.

Thinking the unthinkable

When describing the sensations produced by encounters with a post-natural world, scholars in the humanities often speak of a haunting feeling: “the uncanny.” In his essay *The Great Derangement: Climate Change and the Unthinkable*, novelist Amitav Ghosh attributes this feeling not to ghostly encounters between the living and the dead, but instead, to the recognition that non-human forces such as storms are capable of intruding on human thought. But he adds an important caveat:

The freakish weather events of today, despite their radically non-human nature, are nonetheless animated by cumulative human actions. In that sense, the events set in motion by global warming have a more intimate connection with humans than did the climatic phenomena of the past – this is because we have all contributed in some measure, great or small, to their making. They are the mysterious work of our own hands returning to haunt us in unthinkable shapes and forms.^{xii}

This experience of self-recognition provides the generative matrix of Anthropocene aesthetics. It arises in both life and art from the return of our own actions to a world they have changed irrevocably. A haunting sense of personal involvement lodges in the gap between small and often imperceptible human causes, such as the release of invisible gases amid daily routines, and massively disruptive ecological effects, such as violent storms, searing heatwaves, prolonged droughts and floods. The uncanny sensation gives bodily and psychic presence to the estranging power of natural forces that have never been fully controlled by human beings, despite our pretensions to the contrary. Above all, it challenges us to find our place, as unwitting cause and fractal agent, within a global mosaic heretofore inconceivable by individuals. Thus, in a weird doubling characteristic of the uncanny, the Anthropocene crisis returns us to the existential anxieties of the Atomic Age, when American thermonuclear strategist Herman Kahn urged his contemporaries to start “thinking about the unthinkable.”^{xiii}

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There could be no more troubling moment for the return of this injunction than today, when nation-states have begun closing their borders once again, and war dominates the headlines. The plutonium signal itself emerges from the wartime mobilization of national states, and from their capacity to coordinate academic research and corporate enterprise for military ends. The sprawling geography of the Manhattan Project provided the blueprint for unprecedented scales of industrial activity in the postwar period.^{xiv} What the nuclear match really ignited was a global surge in extractive prosperity, accompanied by vastly unforeseen ecological consequences. The radioactive signal that geologists now discover in innumerable natural archives is the spearhead of a technological power to disrupt the biogeochemical cycles of the earth. In that sense we all carry plutonium memory in our bones, as paralyzing fear or spur to action.

Encrypted message

In the world that returns to us from human hands, the ground is covered in burnt rubber, the sky has become an undersea crater and the genetic code of human bones appears alongside piles of sand from some forgotten cataclysm. The exhibition at the Secession invites us to traverse all the paradoxes of the Anthropocene. Like Nathaniel, the hero of E.T.A. Hoffmann's fantastical tale "The Sandman," we become witness to a secret alchemy that threatens our democracies with blindness. Will we just rub the radiant sand into our eyes, to find untroubled sleep again? Or, like Nathaniel, will we be seduced into madness by the sight of the latest technological marvels: the mechanical goddess Olympia in the story, or the many guises of artificial intelligence in our own time?

Memory rises like vapor in the sunlight. To experience its uncanny intrusion on everyday life I took a short drive from my home to Red Gate Woods, where the debris of Chicago Pile-1 were unceremoniously dumped into a shallow pit. Like the techno-fossils of Vienna's Karlsplatz – or the plutonium signal itself – these entombed remains continue to radiate their complex powers. The lingering traces of the Atomic Age stand forth as harbingers of the new geological epoch, bearing an encrypted message of human vulnerability. They form the strictly material basis of what Gabriele Schwab calls a "haunting from the future."^{xv}

Art takes on a particular meaning at this crossroads. As witness of what remains unthought in daily experience, its role is to break through the numbing anxiety that surrounds all the traces of global ecological change, and help everyone feel the future urgency of present decisions.

ⁱ Quoted in Gabriele Schwab, *Haunting Legacies: Violent Histories and Trans-Generational Trauma* (Columbia University Press, 2010), p. 7.

ⁱⁱ See the final report of the Joint Chiefs of Staff Evaluation Board, "The Evaluation of the Atomic Bomb as a Military Weapon," 1947 (redacted and declassified, 1975), available at <https://nsarchive.gwu.edu/document/21908-document-33-joint-secretariat-joint-chiefs>.

ⁱⁱⁱ Michael Wagreich *et al.*, "The urban sediments of Karlsplatz, Vienna (Austria) as a reference section for the Anthropocene series," in *The Anthropocene Review* 10(1), 2023, pp. 316–329.

^{iv} Quoted in Edward Teller with Allen Brown, *The Legacy of Hiroshima* (Doubleday, 1962), p. 211.

^v See Gabriele Schwab, *Radioactive Ghosts* (University of Minnesota Press, 2020), chapter 7, pp. 217–35.

^{vi} Paul N. Edwards, "Knowledge infrastructures for the Anthropocene," in *The Anthropocene Review* 4(1), 2017, pp. 34–43.

^{vii} For the events described in this and the following paragraph, see Toshihiro Higuchi, *Political Fallout: Nuclear Weapons Testing and the Making of a Global Environmental Crisis* (Stanford University Press, 2020).

^{viii} T. Schönfeld and Christina Friedmann, "Deposition of Inhaled Fission Products in Lungs and Pulmonary Lymph Nodes of Human Beings, Final report on research project under contract with the IAEA," 1965, IAEA-R-156.

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- ix See Jan Zalasiewicz *et al.*, *The Anthropocene as a Geological Time Unit* (Cambridge University Press, 2019), section 7: “The Stratigraphic Boundary of the Anthropocene,” pp. 242–86.
- x John Abraham, “We study ocean temperatures. The Earth just broke a heat increase record,” in *The Guardian*, January 11, 2022).
- xi See Paul J. Crutzen and John W. Birk, “The Atmosphere after a Nuclear War: Twilight at Noon,” in *Ambio* 11, 1982, pp. 114–25.
- xii Amitav Ghosh, *The Great Derangement: Climate Change and the Unthinkable* (Chicago University Press, 2017), p. 32.
- xiii Herman Kahn, *Thinking about the Unthinkable* (Horizon Press, 1962). Note that in the book cited above, Amitav Ghosh makes no reference to Herman Kahn.
- xiv See Brian Holmes *et al.*, “Born Secret (Cash for Kryptonite): A field guide to the Anthropocene mode of production,” in *The Anthropocene Review* 8(2), 2021.
- xv Gabriele Schwab, *Radioactive Ghosts* (University of Minnesota Press, 2020).