

fig.01



fig.02

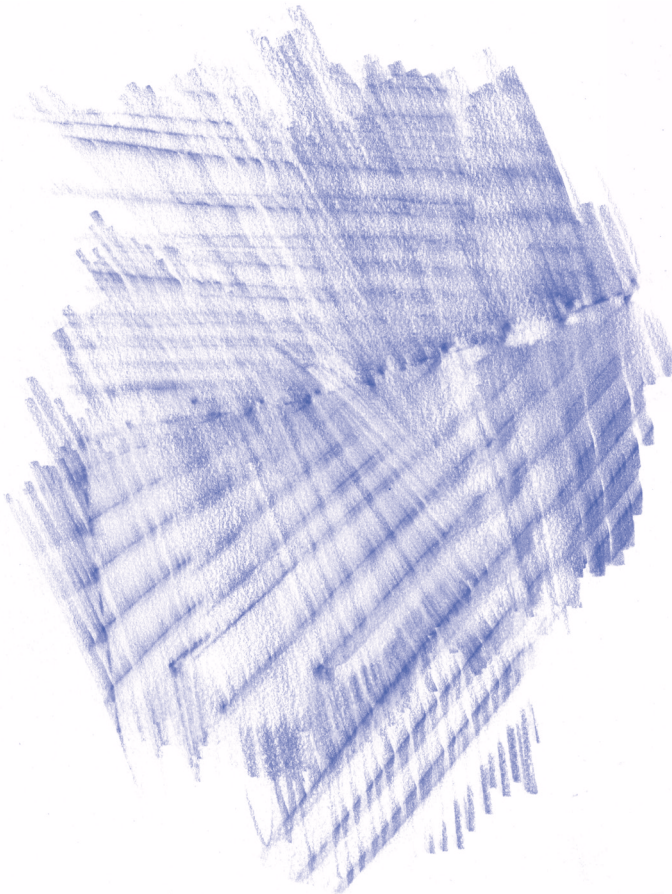


fig.03

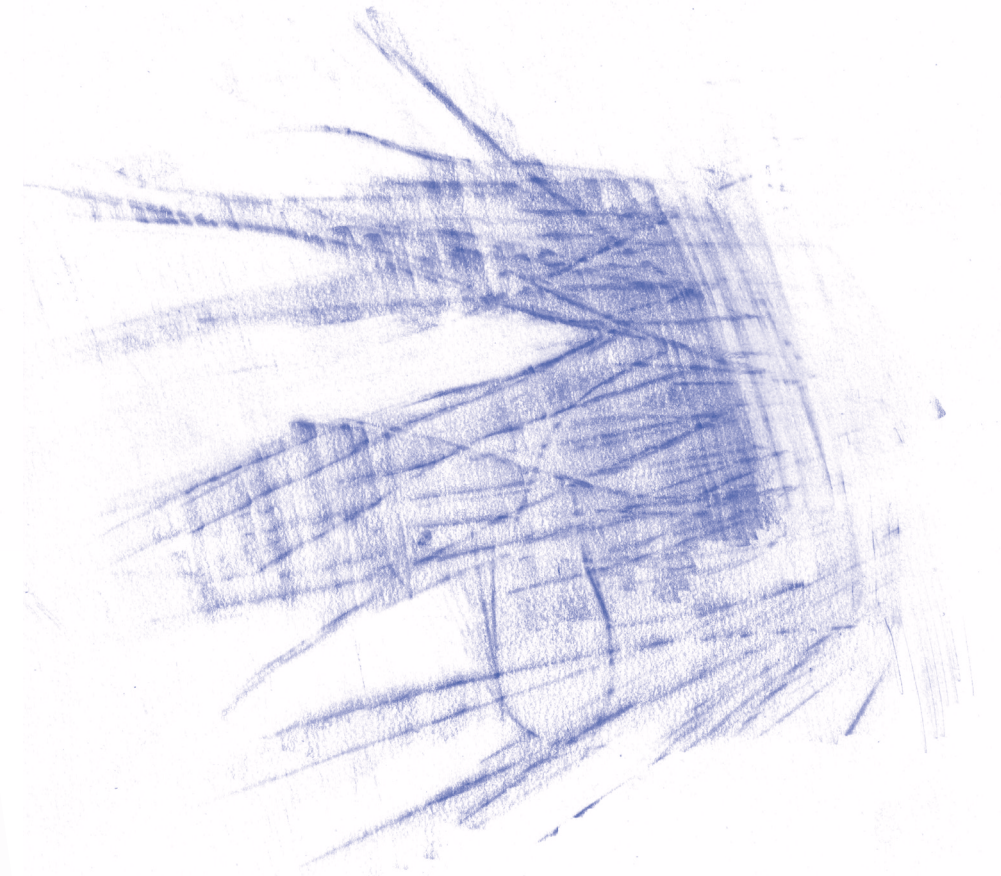


fig.04

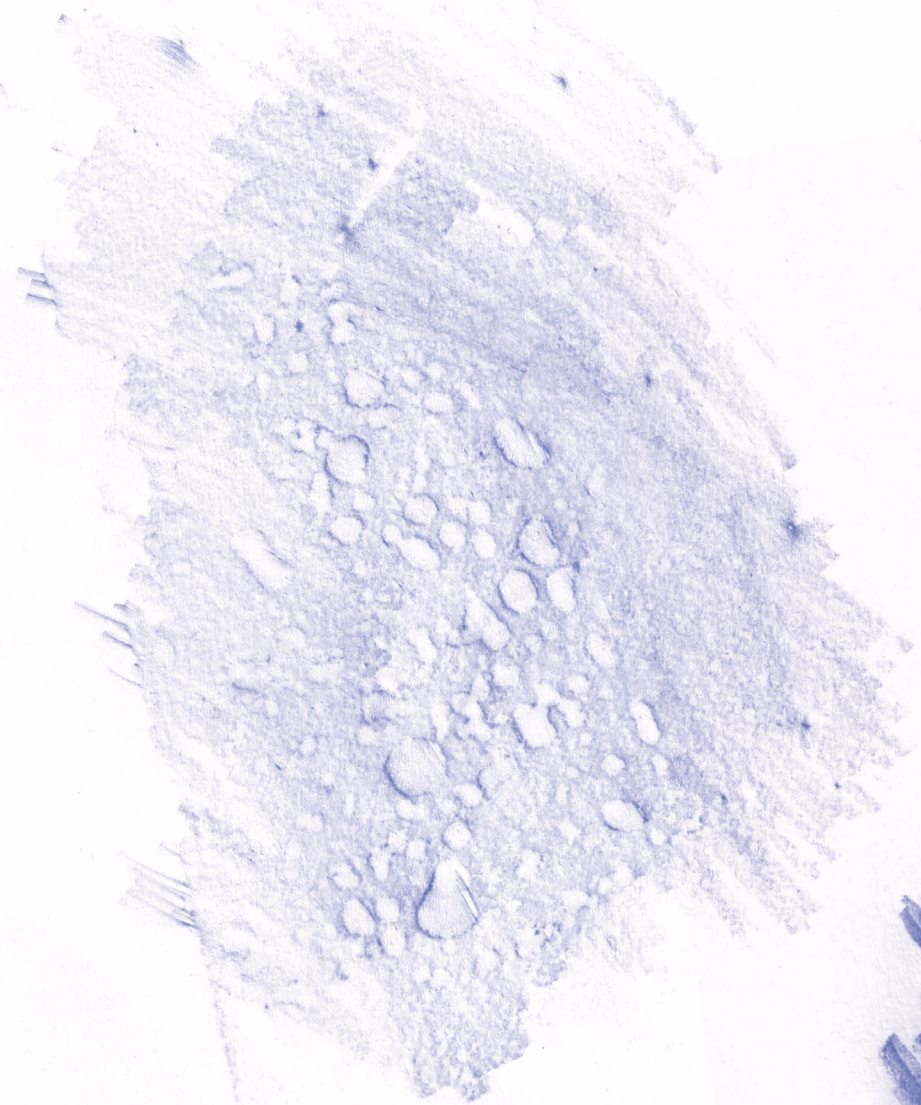


fig.05

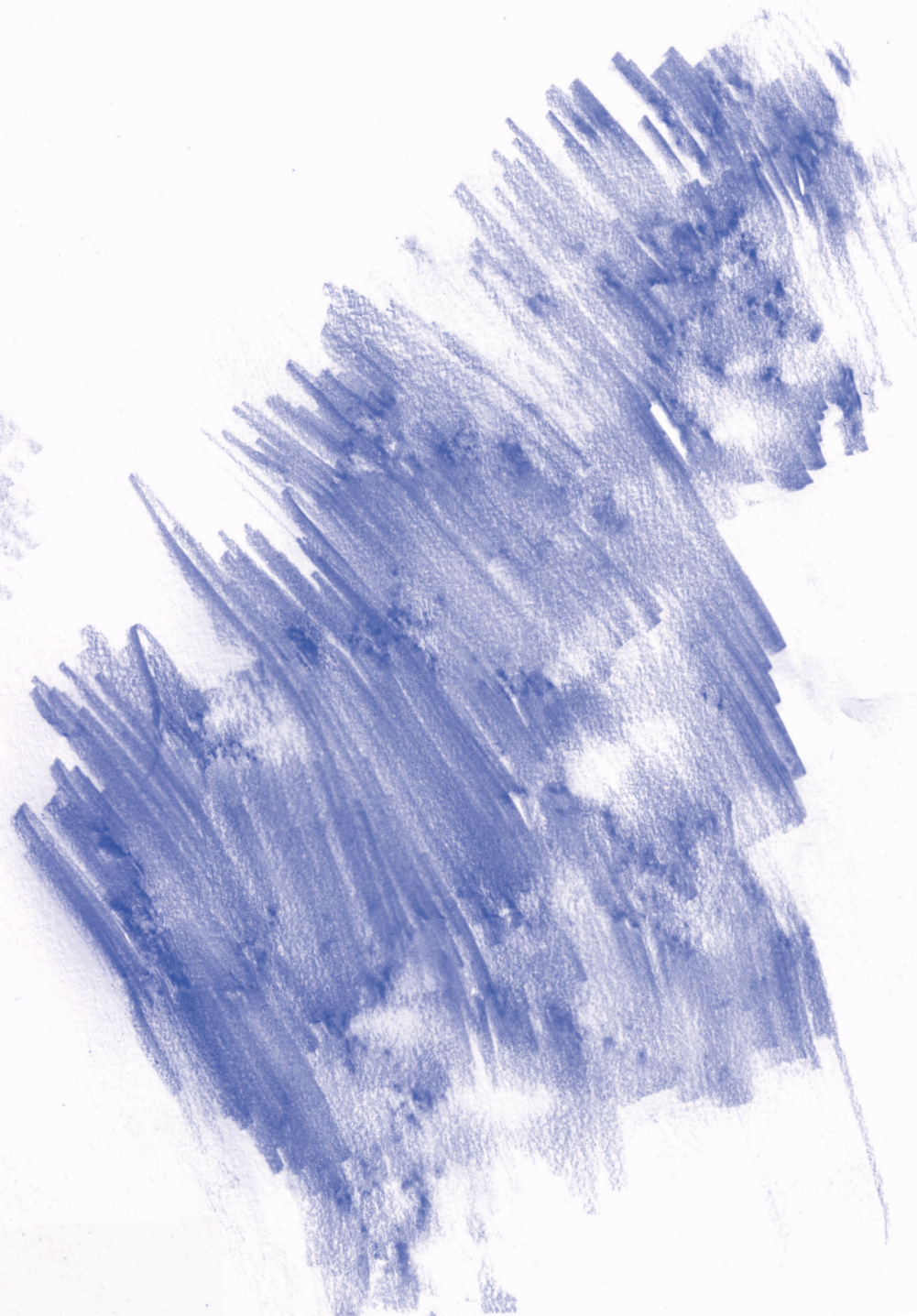


fig.06

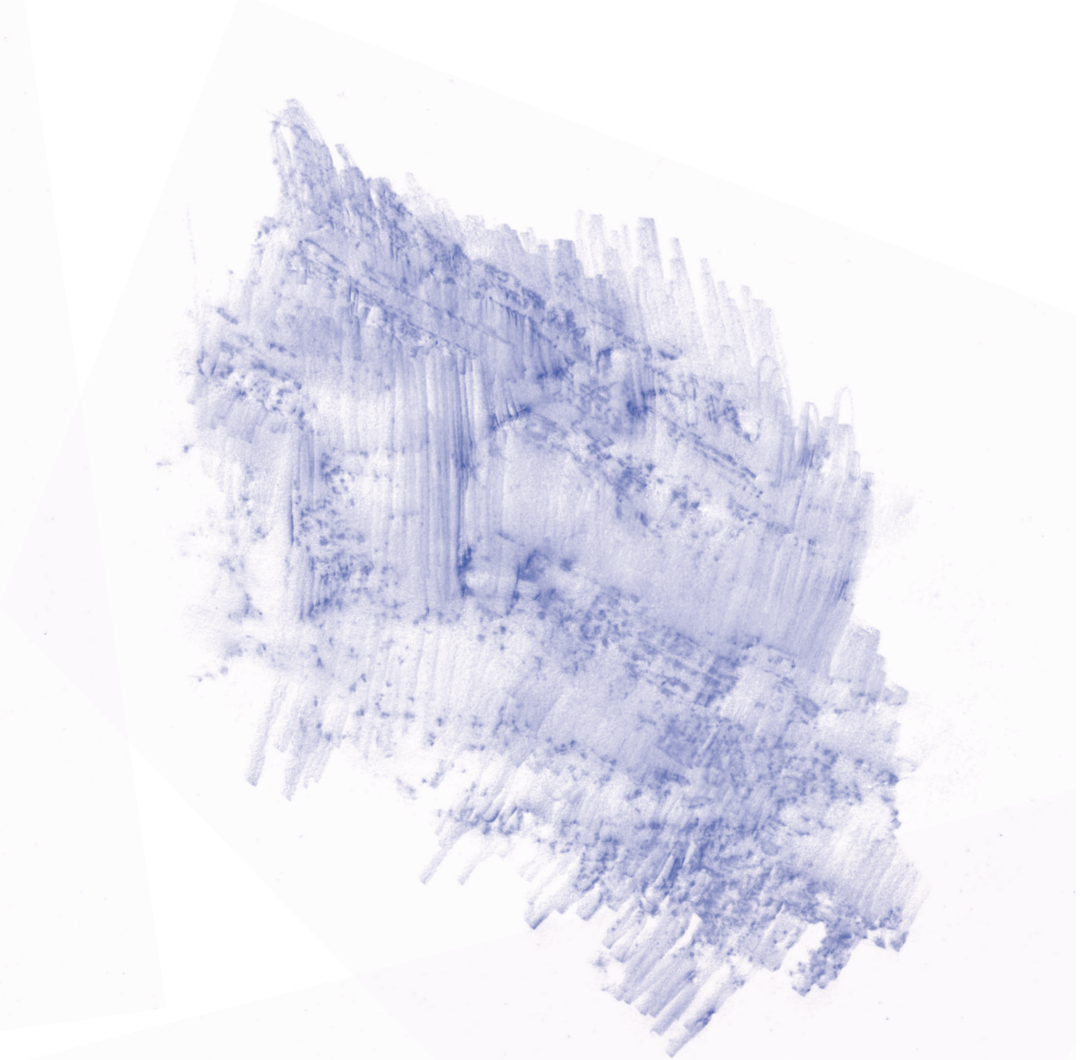


fig.07

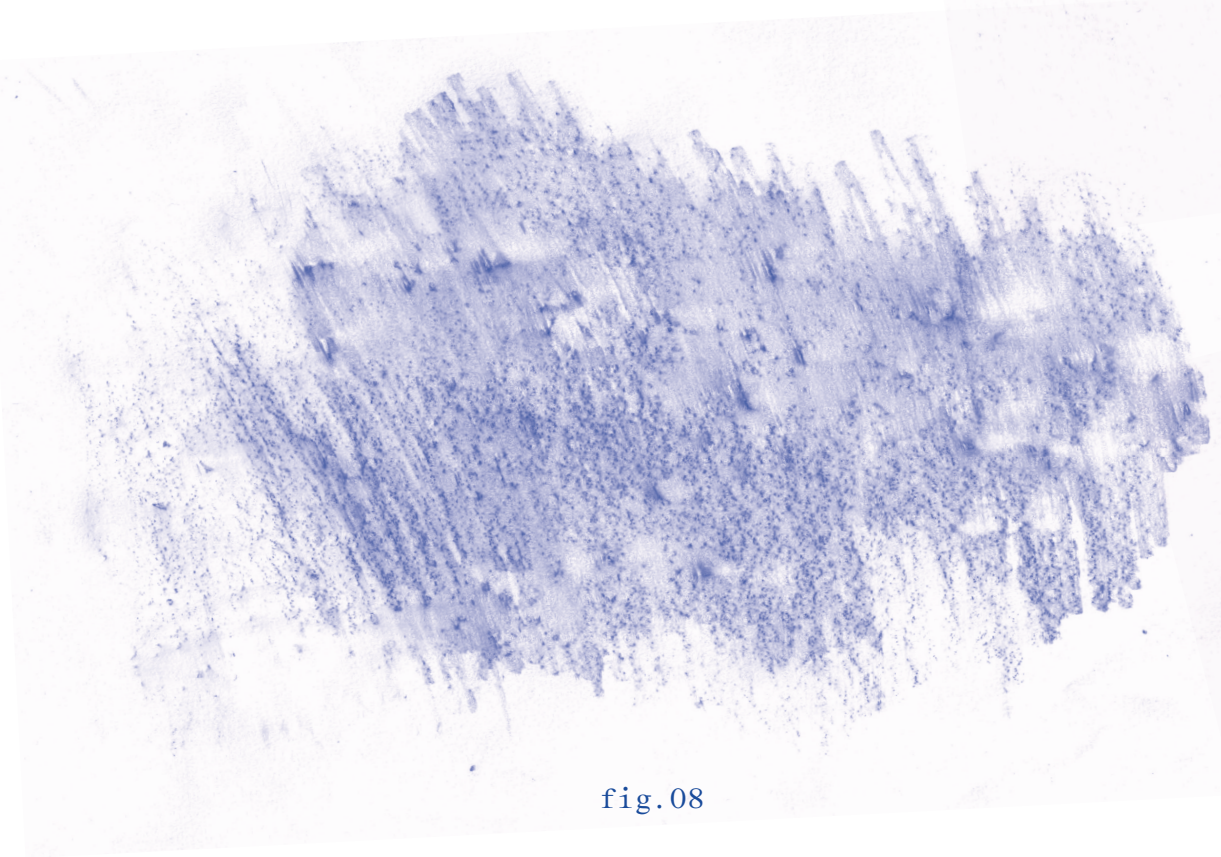


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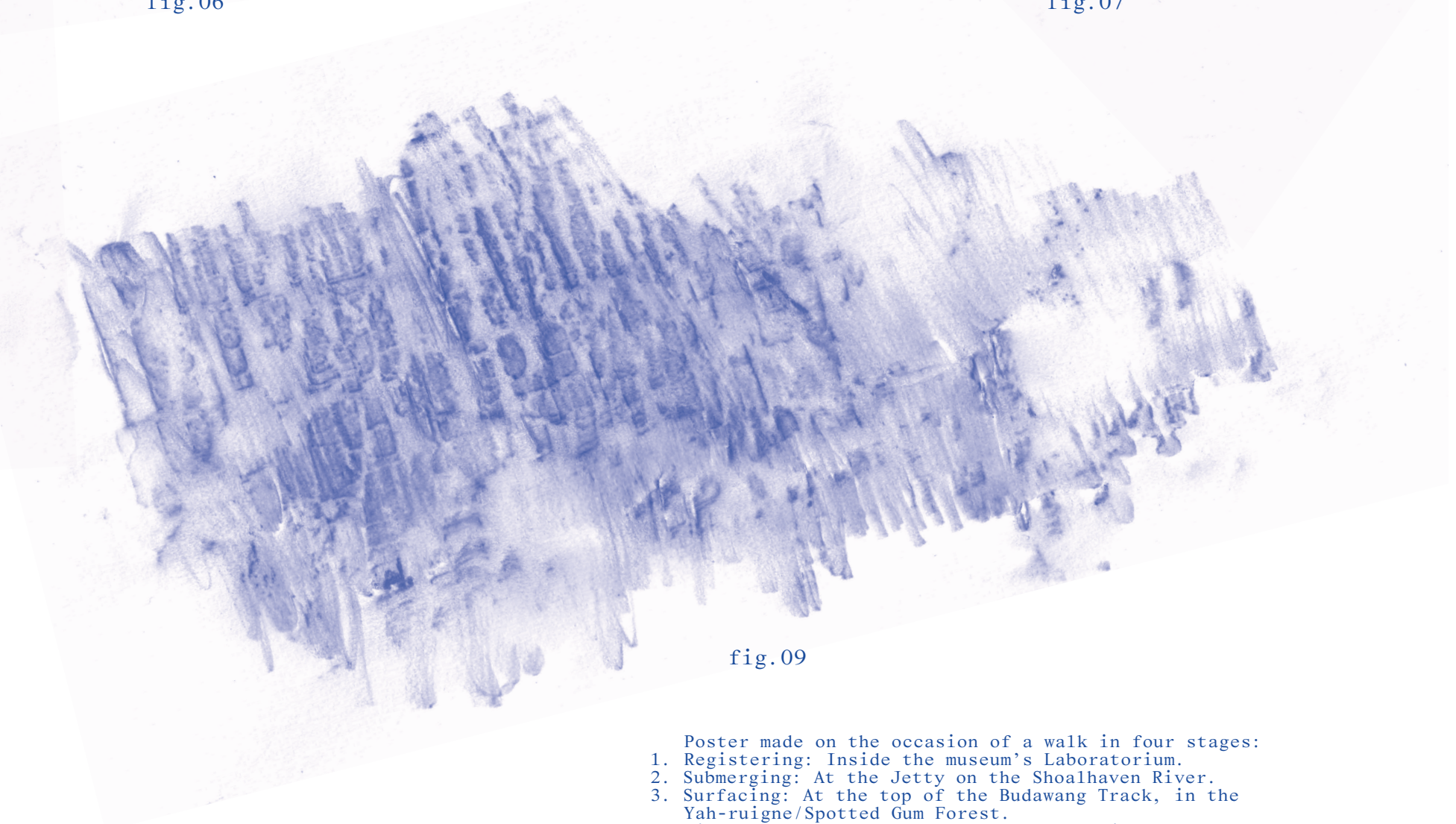


fig.09

This poster
The rubbings on this poster are made from a series of surfaces ranging from the botanic to the geologic, spanning a vast sequence of timescales. Some are made from currently living formations while others document life-forms long extinct, but which remain registered in the geologic record associated with the Shoalhaven and Illawarra regions, on lands of the Dharawal and Dhurga language groups.

Poster made on the occasion of a walk in four stages:
1. Registering: Inside the museum's Laboratory.
2. Submerging: At the Jetty on the Shoalhaven River.
3. Surfacing: At the top of the Budawang Track, in the Yah-ruigne/Spotted Gum Forest.
4. Airborn: On the museum's roof, overlooking the canopy of the Eucalyptus Botryoides Forest in the west.

(1) Palynology is the study of dust, from the Greek: *of particles that are strewn*. The slides referred to are documented in the journal article listed in footnote #2.

(2) Vivi Vajda, Stephen McLoughlin *et al.*, "End Permian (252 Mya) deforestation, wildfires, and flooding – An ancient biotic crisis with lessons in the present," *Earth and Planetary Science Letters*, 529 (September 2019): 9.

(3) Christopher R. Fielding *et al.*, "Age and pattern of the southern high-latitude continental end-Permian extinction constrained by multiproxy analysis," *Nature Communications* 10, no.1 (January 2019): 9.

(4) Vivi Vajda, Stephen McLoughlin *et al.*, "End Permian (252 Mya) deforestation, wildfires, and flooding – An ancient biotic crisis with lessons in the present," *Earth and Planetary Science Letters* 529 (September 2019): 1.

(5) *Ibid.*, 1.

(6) For the NSW drilling dataset and the locations of drillholes, see: <https://minview.geoscience.nsw.gov.au>

(7) For an extended discussion, see Michael Shann Fletcher, "Bolin Bolin," in *Plants: Past Present, Future* (First Knowledges series), ed. Margo Neal (Port Melbourne: Thames and Hudson, 2022), 60–61.

(8) For a critical discussion concerning the transformation of cultural landscapes into 'natural resources', see Kathryn Yusoff, "Mine as Paradigm," *e-Flux Architecture*, June 2021 and Elizabeth A. Povinelli, *Geontologies: a Requiem to Late Liberalism* (Durham: Duke University Press, 2016).

(9) Blanche Verlie, "Feeling Climate (in)justice," Postdoctoral Fellowship Lecture, Sydney Environment Institute, University of Sydney, September 14, 2022.

(10) Eleanor Ainge Roy, "New Zealand glaciers turn brown from Australian bushfires' smoke, ash and dust: Snow-capped peaks and glaciers discoloured as former PM says ash could accelerate glacial melting," *The Guardian*, January 2, 2020.

(11) For information on the difference between Country that had Cultural Fire applied in 2018, with Country destroyed by wildfire in the Shoalhaven region in 2020, see the firesticks website <https://www.firesticks.org.au/dharawal-yuin-ngurra/>

(12) Kathryn Yusoff, "Geologic Realism: On the Beach of Geologic Time," *Social Text* 1, no. 37 (March 2019): 16.

(13) "Plants and Trees," Dharawal Words. NSW Government, accessed January 27, 2023. <https://www.dharawal-words.com.au/plants>

(14) Terry Ranckmore, *Bush Medicine Plants of the Illawarra*. (Wollongong: Illawarra Aboriginal Corporation, 2013): 48.

(15) "Red Cedar." Kiama Library, Kiama Municipal Council, Accessed January 18, 2023. <https://library.kiama.nsw.gov.au/History/Explore-Kiama-Past/Local-history-stories/Red-cedar#:~:text=Cedar%20was%20seen%20as%20the,to%20Sydney%2C%20from%20this%20area>

(16) Terry Ranckmore, *Bush Medicine Plants of the Illawarra*. (Wollongong: Illawarra Aboriginal Corporation, 2013): 48.

(17) Norman C. Ellstrand *et al.*, "Genetic structure of the Australian Cycad, *Macrozamia Communis* (Zamiaceae)," *American Journal of Botany* 77, No. 5 (May 1990): 677.

(18) Steven Varga, "Macrozamia Communis – Burrawang." Information about Australia's native Flora: Growing Native Plants, Australian National Botanical Gardens. Accessed February 2, 2023. <https://www.anbg.gov.au/gnp/interns-2011/macrozamia-communis.html>

(19) "Bundanon Living Landscape: Fact Sheet 3 Geophysical." (Bundanon: Landcare Australia, n.d.): 10. Accessed October 22, 2022. <https://www.bundanon.com.au/wp-content/uploads/2021/03/3-Geophysical.pdf>

(20) G.R. Shi and Stephen McLoughlin. *Permian Stratigraphy, Sedimentology and Paleontology of the Southern Sydney Basin, Eastern Australia: A Field Excursion Guide* (Burrwood: Deakin University, School of Aquatic Sciences and Resources Management, 1997): 35.

(21) "Bundanon Living Landscape: Fact Sheet 3 Geophysical." (Bundanon: Landcare Australia, n.d.): 10. Accessed October 22, 2022. <https://www.bundanon.com.au/wp-content/uploads/2021/03/3-Geophysical.pdf>

(22) *Ibid.*, 10.

(23) G.R. Shi and Stephen McLoughlin. *Permian Stratigraphy, Sedimentology and Paleontology of the Southern Sydney Basin, Eastern Australia: A Field Excursion Guide* (Burrwood: Deakin University, School of Aquatic Sciences and Resources Management, 1997): 48.

(24) "Mass Extinctions," National Geographic Society, accessed May 2019. <https://www.nationalgeographic.com/science/prehistoric-world/mass-extinction/>

(25) Damian Carrington, "Earth's Sixth Mass Extinction Event under Way, Scientists Warn," *The Guardian*, July 10, 2017.

(26) Bianca Hester, *Sandstone* (Hobart: A Published Event, 2020), 71.

(27) Jones, Richard. "Geology of the Illawarra and Southern Highlands." Fossil Australia, n.d., accessed June 2019, <http://fossilaustralia.com/geology-of-the-illawarra-southern-highlands.html>

(28) Bianca Hester, *Sandstone* (Hobart: A Published Event, 2020), 70.

Excerpts

The fragments of text that populate this poster are excerpts from a script read at four locations on a walk tracking a circuit around the grounds at Bundanon, from the lowest reaches of the Shoalhaven River, to the highest accessible elevation in the Spotted Gum Forest behind the museum. To access the full script, visit biancahester.com and the World Weather Network, worldweathernetwork.org/station/bundanon

From time's depths and dead zones

In a museum is a large room full of cabinets. In these cabinets are rows of archival draws. In several of these draws are glass slides the scale of two fingers. On some of these slides are slices of rock ground down to 30 micrometres thin, adhered with a smear of epoxy glue. On other slides are fragments of matter collected from paleosol – ancient soil buried in the sedimentary record – made from the dust that settled downwards under gravity's command around 252 million years ago, now captured on glass surfaces. The vision of Earth Scientists is intensified through microscopes and cast deep into time to witness a 'dead-zone' in the paleo-biota. The material cohering upon these palynological¹ slides 'lacks pollen and plant spores, and incorporates only wood fragments, charcoal, algal thalli and fungal spores,'² which register relentless cycles of wildfire and flood, fluxing in and out of the dominant Gondwanan Glossopteris Forests that stood here at the time. This scatter of particles on glass documents the ecosystem collapse that occurred at the Permian-Triassic boundary,³ signalling 'a catastrophic scenario of vegetation die-off and extinction'.⁴ Scientists understand this event – disclosed by the ancient dust – to be a 'global, deep time analogue for modern deforestation and diversity loss.'⁵

Some of this dust is collected from core samples extracted from boreholes that puncture the body of sandstone which sits – sedimentary thick – as the Sydney Basin Bioregion on the east coast of Australia. Boreholes have been drilled in countless places across the state, over so many decades. Most of these holes are made by mineral, coal and petroleum industries digging for the materials that continue to make the colony.⁶

The paired practices of prospecting and extraction central to these industries is anchored by – and shaped through – the logic of terra nullius, the principal ideology that justified the annexation of the continent.⁷ The legacy of this fictitious framework and the theft that it enabled is embodied through the present management of its so-called natural resources,⁸ which continue to be unearthed 24 hours a day, from the mosaic of cultural landscapes upon which we stand right now.

Smoke

We woke, and the smoke was here. We woke because of the smoke. This smoke: a material-temporal convergence registering the relentless process of transformation of a countless billion trees burning for weeks on end, while planetary loads of carbon sequestered inside their ligneous forms were released – volatile and circulating thick in the atmosphere. This smoke, a particulate admixture of botanical–animal bodies metabolised by the fires raging all summer long, directly demonstrating what Blanche Verlie notes as 'the limitation of our very breath...as the toxic embodiment of climate change.'⁹ You will probably remember how the fires consumed vast swathes of sclerophyll and rainforest in places that had never encountered fire before. You probably also heard about how the ash and dust from the blaze travelled on wind currents as far as Aotearoa, tinting glaciers a yellowish-brown in the South Island.¹⁰

This smoke: through the windows, in the house, in the bedroom, amongst the sheets, in your hair, in our noses, inhabiting our lungs. This smoke shrouding both the sun and the moon – sometimes at once. This smoke so dense that we could stare square at the sun – an orange stranger filtered thick through perpetual dread, for as long as we liked. This smoke featuring with 'no filter' on a cascade of Instagram pictures churning out of Sydney. This smoke dematerialising the neighbour's houses on every street and settling onto parked cars. The particles of this smoke overwhelming the familiar accumulation of coal dust on our windowsills, blown in from the colliery behind Mt Nebo in the Illawarra.

The smell-taste of this smoke – inescapable – as it was delivered to the door upon furious pyro-winds in advance of the inferno, raging just over the edge of the escarpment. This smoke made us cry on the 22nd day of its seemingly endless visitation.

The fire was here too. Can you see it registered in these trees? M says that it crept over the hill just there in the southwest. Because of cultural burning led by the Mudjingaalbaraga firestick team which is carried out each Autumn and Winter (and before invasion, for thousands of generations), the fire didn't catch on as fiercely and so was more easily appeased.¹¹ S speculates that if the case was otherwise, and the fires had taken hold, they would have probably entered the Illawarra, and consumed it.

Post-script

In this moment only certain things become visible, while others remain obscured – buried, submerged, eroded – or disappeared entirely. The many worlds evident in the material residues that persist through time and appear at the surface, brings us into what Kathryn Yusoff describes as a 'confrontation with the lithic processes of the earth... and the (geo)powers that organise beyond life and without interest in its sense of progress or purposefulness'.¹²

DUST OF THESE DOMAINS Bianca Hester

Siteworks, Bundanon 26.02.2023

fig.02

Bark of the trunk of the second last Polai¹⁴/Red Cedar/Toona Ciliata alive at Bundanon:

Polai/Red Cedar once dominated the rainforest ecologies of the Shoalhaven and Illawarra but were extracted extensively between 1810 and the 1850s by 'cedar getters' for building ships, buildings, and furniture – becoming one of the most valuable exports of the colony.¹⁵ The commercialisation and consumption of this tree-turned-resource contributed to a radical transformation of the landscapes of the region. Polai/Red Cedar was used as medicine by Dharawal women.¹⁶ Timeframe: 2022–2023. *Rubbing produced during fieldwork on 14 October, 2022.*

List of figures: species names are listed in Dharawal/English/Latin where possible.

fig.01

Bark of the trunk of a Yah-ruigne¹³/Spotted Gum/Corymbia Maculata:

Currently alive and standing on the highest ground in the forested southwestern corner of the Bundanon property, accessible via the 'Budawang track'. Timeframe: 2022–2023. *Rubbing produced during fieldwork on 14 October, 2022.*

fig.03

Burrawang¹⁷/Australian Cycad/Macrozamia communis:

The Burrawang living on the hill at Bundanon are descendants of ancient plants whose material remains are present in the fossil record of the Lower Permian period, around 280 million years ago. These plants were used by Dharawal custodians as a food source after careful processing.¹⁸ Timeframe: 2022–2023. *Rubbing produced during fieldwork on 14 October, 2022.*

fig.04

Fine leaf Mat Rush/Lomandra confertifolia rubiginosa:

Lomandra grows in partnership with Purple Coral Pea/Hardenbergia Violacea low to the ground within the Yah-ruigne/Spotted Gum Forest of Bundanon, scattered amongst Burrawang plants. Timeframe: 2022–2023. *Rubbing produced during fieldwork on 18 October, 2022.*

fig.05

Pockmarked bluestone surface which makes the forecourt of the Boyd Education Centre, designed by Glenn Murcutt:

The basalt from which bluestone is derived was once lava which emerged through Earth's volcanic bodies, transporting magma from the mantle to the surface. The tiny holes present in basalt register the encounter between lava and water, whereby the extreme difference in temperature causes steam, transforming the surface of the material. This process is registered as ancient air bubbles captured within the rock. Timeframe: unknown. *Rubbing produced during fieldwork on 9 August, 2022.*

fig.06

Dropstone in Nowra sandstone:

At the end of Riversdale Road, on the last steep descent into the Bundanon car park, is a cutting which reveals the stratigraphy of the hill. In this cross section dropstones embedded in the sandstone are visible. These stone fragments speak to a time when this landscape was covered by ocean,¹⁹ and when it was situated at higher southern latitudes and in a much colder climate associated with 'widespread Gondwanan glaciation that began in the Carboniferous and persisted into the Early Permian.'²⁰ Dropstones were released by melting icebergs which deposited 'sand, pebbles and small stones onto the sea bed'²¹ – 'the resulting sandstone was elevated 600 metres approximately 100 million years ago and the Shoalhaven River eroded the valley.'²² Timeframe: Early Permian, 280 million years. *Rubbing produced during fieldwork on 14 October, 2022*

fig.07

Coalified Glossopteris fragments, Pheasant's Nest Formation.

At low tide, if you look closely enough (and have sense of what you're looking for), you might witness a scatter of coal-coloured fragments embedded in the sandstone platform. If you arrive too long after low tide, the residual salt of the temporarily absent ocean obscures these forms, making them difficult to locate. But if you time it right, the coalified and silicified remains of a now-extinct Glossopteris Forest yields to the efforts of embodied vision. A scatter of tree logs, stumps, branches, 'wood, charcoal and foliage fragments'²³ are distributed across an expanse of the Pheasant's Nest Formation, at the base of the Illawarra Coal Measures. Timeframe: Late Permian, 250 million years. *Rubbing produced during fieldwork on 22 September, 2022.*

fig.08

Pebbles and grit in the shale above the Bulli coal seam:

In the space directly above the Bulli coal seam sits a thick layer of shale deposited after the End-Permian Extinction. The change in colour – from carbon-black to grey – delineates this extinction event and registers the temporal boundary between the Permian and Triassic geologic epochs. "At the end of the Permian, a period of intense volcanism from an igneous province in Siberia pervaded,²⁴ Volatile outpourings of volcanic debris unsettled the balance between oxygen and carbon dioxide, precipitating runaway global warming bringing about the extinction of more than 95% of marine and 70% of terrestrial species living at the time. Scientists know this as the fourth mass extinction, taking 3–10 million years²⁵ for land-dwelling life to recover."²⁶ Timeframe: Late Permian/Early Triassic, 252 million years. *Rubbing produced during fieldwork on 28 October, 2022.*

fig.09

Illawarra Coal Measures – Bulli Coal Seam:

In 2018, after moving to the Illawarra, it suddenly dawned on me that the entire landscape was underpinned by coal. This happened late one ignorant evening, after I had breastfed my infant to sleep and was scrolling through Google maps. I noticed a large black circle in the Kemira Valley, just over the hill from where I was situated. "The coal formed because of the Glossopteris Forests that thrived in the swampy bogs of Gondwanaland which stood here at the time. The trees of these forests absorbed and metabolised the sun's relentless radiation while shedding pollen and leafy materials for millennia.²⁷ The rate of deposition outpaced that of decomposition and over long durations masses of carbon rich vegetal matter compacted into fossilised formations."²⁸ This is the material that makes the Illawarra Coal Measures, including the Wongawilli seam being extracted through long-wall processes at South32 Dendrobium mine over the hill. Surplus cosmic energy – materialised as fossilised sunshine buried deep underground, carries forward into the present through a relentless unearthing – forcefully shaping the future. Timeframe: Late Permian/Early Triassic, 252 million years. *Rubbing produced during fieldwork on 28 October, 2022.*