

Thinking Through Minerals: We Build Our Languages Out Of Rocks – Transpositional Geologies

Sascha Mikloweit

“No geology is neutral.”

(Kathryn Yusoff, 2018)

“Nature is only the raw material of culture, appropriated, preserved, enslaved, exalted, or otherwise made flexible for disposal by culture in the logic of capitalist colonialism.”

(Donna Haraway, 1988)

“[...] Mankind [sic], once bewildered by sheer facts, finally dominated them through reflection, observation, and experiment. Henceforth mankind [sic] [...] knows how to utilize the world. [...] The natural sciences classify, but the *quid proprium* of things eludes them. [...] In short, scientific knowledge enumerates, measures, classifies, and kills. [...] To acquire the impersonality of scientific knowledge mankind [sic] depersonalized itself, deindividualized itself. An impoverished knowledge [...]”

(Aimé Césaire, 1973)

"I build my language out of rocks."

(Édouard Glissant, 1969)

(1) Towards a 21st century classification system for minerals in institutional mineralogical collections

If you enter a mineral collection in Germany you are most likely to come across glass cabinets in which objects are organised based on the Nickel-Strunz classification system, structured according to the objects' chemical compounds: Sulfides, Oxides, Phosphates, etc. (Strunz and Nickel, 2001). Only small labels tell you about the origin of the objects on display with a bare minimum of information. Context appears to be rather unimportant in these settings – and provenance is mainly of interest if it comes to the object as commodity, since mineral specimens with unknown origins are commercially unattractive in the collectors' market (Fritscher, 2012).

Yet, from which contexts do these minerals originate? What are the legacies of the sites, communities and histories that they were literally unearthed from? In fact, the sparse indication of a region of origin on the archive labels provides a single point of departure: thousands of objects – not simply neutral chalcopyrites, andradite or goethites – but the keys to thousands of histories, from the very moment the mineral was extracted, possessed and traded, marked with a number and certified with an archival label and index card. From this point onward, these objects of geology are bound to histories shaped by *man*. In a different register from their *deep time* existence, minerals become dormant indices to personal and collective biographies, power relations and political dynamics of individuals and societies

involved in – or subject to – extraction:

‘Geology is a mode of accumulation, on the one hand, and a mode of dispossession, on the other, depending on which side of the geologic colour line¹ you end up on.’ (Yusoff, 2018, p.3)

Geological science constitutes ‘extractivist violence’² (Yusoff, 2021a, 2021b) since its inception, its findings and knowledge productions have been proliferating rapidly since the 16th century. In fact, the science of geology can be regarded as a substructure to modern life, as key to conceptualising earth as *raw material* that keeps on feeding contemporary materialities of consumption (Klare, 2012; Yusoff, 2020). Just as much as geological science is an instrument of power (Yusoff, 2018), also representation in institutional collections of mineralogy is (Hearth and Robbins, 2022). *Transpositional Geologies* reads these institutions as the materialization of a long journey of knowledge production.

Since the late 15th century, European systems of knowledge production proliferated into the sciences,³ which in turn became the major instrument in a fabrication of difference: the invention of ‘the other’, be it *nature*, *gender* or *race*, was – and still is – the constitutive epistemic element of ‘modern life’ (Wynter, 2003, 2006; Eder, 1988; Quijano 2007; Spivak, 1988; Haraway, 1988; Brassier, 2007).

The proliferating natural sciences formed institutions – such as botanical, zoological and geological collections⁴ – in which their ways of thinking ‘mattered’: what at an earlier stage of mineral collecting was driven by the desire of an affluent class to demonstrate sophistication and social status to their peers, developed later into effective institutionalised tools to teach academics, scientists and engineers in the field of (colonial) geology.

Eventually these systems of thought, along with their imaginaries⁵, were transmitted to a specific public audience – the modern European citizen – in the format of the museum of mineralogy (Hearth and Robbins, 2022; Yusoff, 2021a; Maier, 2020).

¹The concept of ‘race’ as a scientifically established fact, when in reality it is a mere scientific imaginary, gave birth to a ‘colour line’, which has led to the global division of humanity based on skin colour. This division has been identified by W.E.B. Du Bois as “the problem of the twentieth century” (1903, p.15) and has impacted all aspects of human existence (ibid., pp.68,113,121). Today, the ‘colour line’ continues to exist as a means of subordination, serving to perpetuate the myth of endless economic growth that primarily benefits a privileged few, while exploiting a marginalised majority through the use of cheap labour (Yusoff, 2018).

² Extractivist violence refers to harm caused by extractive industries, including displacement of communities, destruction of ecosystems, and economic inequality. It is perpetuated by a global economic system that prioritises the corporate interests of those entities who extract (e.g. mine) over the interests of the societies, communities or individuals that are affected or employed by extraction operations and the environment, and disproportionately affects marginalised demographics (Acosta, 2013; Veltmeyer and Petras, 2014).

³ The interest of the Transpositional Geologies (TG) project lies in the science’s “dirty histories”; there have been countless achievements that were born out of natural, social and applied sciences at large and will continue to result from its cultural practices of rigour, enquiry and exploration in the future. Rather, TG’s approach calls for the necessity of revisiting the epistemic violence that remains omitted in telling their History (regarding history with capital H see fn.13). This omitted violence continuously mutates and replicates in our present globalised world system – resulting in a prolongation of injustices. An unfinished project of mono-humanism needs to be driven further towards a humanism that includes all forms of existence and ways of life (Scott, 2000; Wynter and McKittrick, 2007).

⁴ In places such as here in the Poppelsdorfer Schloss in Bonn, Germany or the Royal Museum for Central Africa, Tervuren, Belgium, all three categories are united in an architectural proximity ‘under one roof’.

⁵ An imaginary refers to the shared cultural beliefs, values, and myths that shape our understanding of the world and our place in it. It is socially constructed and subject to change over time, and dominant imaginaries can serve to exclude and marginalise certain groups, while reinforcing power structures and systems of oppression (Wynter, 2006).

Among collections of geological, botanical and natural history specimens the institutional “mineralogical collections, still presented as ‘neutral’ scientific specimens, are arguably the most politically charged collections of all” (Basu, 2023). Approaching institutional collections of mineral objects today, we might ask ourselves what the (epistemic) violence⁶ of these collections is and how it rests within the common classification systems for minerals that are used to structure and present these collections⁷.

There are three common classification systems by which the approximately 1,500 institutional mineralogical collections maintained worldwide are currently organised⁸:

(i) the Dana classification system, developed in the 19th century by American geologist, mineralogist, volcanologist, and zoologist James Dwight Dana (Dana, 1837);

(ii) the Strunz classification, developed by German mineralogist Hugo Strunz (Strunz, 1941),⁹

(iii) the Nickel-Strunz classification system, developed in the late 20th century by Canadian mineralogist Joel D. Grice and German mineralogist Werner H. Baur. (Strunz, Klein, 1977; Nickel, Mandarino, 1987; Nickel, Nichols, 1991; Nickel, 1995; Mandarino, 1998)

All three systems base their organisation of mineral objects on chemical composition and crystal structure. Such classification systems themselves are vivid examples of how a science – driven by particular field-specific interests – produces a specialised and narrowed reading regarding its object of enquiry. This epistemic perspective in turn, shapes the physical formal museal presentation, as it can often be observed with the display of systemically ordered mineral specimens presented in glass vitrines¹⁰. This specialised gaze wishes to instil a setting of scientific ‘neutrality’: but such teleological forms of display omit cause and effect – the socio-political context of objects presented in this manner is not accessible to an observer or scholar. In this sense, the field specific specialisation decouples: the compartmentalisation of

6 Here the project is rooted in Elizabeth Grosz’s reflections on the concept of violence in Jaques Derrida, and his notion of the arch-violence and the arch-writing (Grosz, 1999). Derrida’s “arch-violence” refers to the hidden violence and domination in power structures. “Arch-writing” challenges these structures by exposing hidden biases and creating new possibilities. Together, they reveal the connection between language and power, and the need for radical change.

7 In question here is not the usefulness of such systems for the geo-sciences themselves within their own logic of inquiry, but the standalone application of such systems to structure institutional mineralogical collections and their public display today. The standalone application as is common practice now creates topical silences (Mason and Sayner, 2019) – it divorces the mineral objects from their socio-political contexts and histories, which are, however, relevant to unearth the historical relations of the geo-sciences to larger structures of power.

8 This is the case if they use one of these official systems. A fair amount of collections, especially older ones, are likely to use their individual classification system. These most likely are, however, in a majority of cases organised by chemical class. (With thanks to Selby Hearth for clarifying this fact.) The Bonn collection uses the Strunz classification, as do the collections of TU Berlin.

9 The original state of his working collection is preserved at the Mineralogical Collection of the Technical University of Berlin.

10 This for example is the case in the exhibition hall 1 of the *Mineralogical Museum of the University of Bonn, Germany* and the display of the *Mineralogical Collections of the Technical University Berlin, Germany*.

knowledge isolates the mineral objects from their complex world-relations in favour of subjective scientific interests¹¹.

With field-specific, decoupled readings, questions of ethics are seldomly raised. What were and are the socio- and geo-political histories of these mining places (Hearth, 2021)? Who is involved in these power structures (Drechsler, 1966; Klare, 2012)? Who benefitted (Bond, 2006)? Who brought these objects to the light of day? What were these peoples' living conditions? What were the impacts on their own and their families' health caused by the mining operations? What are the consequences to the lands surrounding mining operations in regards to toxicity and destruction? What were the efforts in international relations and politics that gravitated around such mining operations (Hill and Ashipala, 2022; Hill, 2023)? Which trade routes did these mineral objects share with 'illegitimate' human specimens (Alberti, 2005, p.563)¹²? What is the fallout in these places (Imalwa-Nangolo et. al., 2023)? And there are many more questions that remain to be answered by historians of science, by historians of law, and researchers from a diverse range of fields who are yet to discover the unexpected relations between collections of mineralogy and their research interests.

Geology and its practices have inadvertently created a *History*¹³ of mineral objects divorced from their socio-political realities and histories by a specialised and narrowed reading of their epistemic objects. In educating students of geology today mineralogical collections simply ceased to function as teaching tools and fell dormant, spaces of a forgetful past; in some cases, however, they still operate under highly charged and problematic ideological paradigms that are – one way or another – part of ongoing violent regimes of knowledge production (Hearth and Robbins, 2022; Manson/Sayner).

There is a vast epistemic potential in rethinking the traditional scientific classification systems of mineral objects in institutional collections in light of their socio-political histories that stretches way beyond the field of geo-sciences. New classification systems could cross registers¹⁴ and transgress the borders that were put in place by the specialisation of the geo-sciences.

The often overlooked format of the 'Institutional Mineralogical Collection' raises fundamental questions. Developing effective ways to address these questions may disrupt and transform the systemic perpetuation of epistemic violence, in which geo-science plays a role. This violence enables health, environmental, social, and

¹¹ This might be an interesting matter for analysis by science historians.

¹² 'Illegitimate' human specimens refer to those that ended up in medical collections such as the Herero skulls in the Charité in Berlin, Germany (Bandle, et. al., 2013) – as well as other ethnological, taxidermic or botanical objects (Alberti, 2005, p.563). Accumulated colonial objects were transported on respectively established trade routes. Alberti remarks in his reflection on human anatomy museums that: "Human remains collected from elsewhere moved along the same acquisition routes as plants, animals, and books, in the process shifting from subject to object." It is fair to assume that we can include mineral objects intended for collections into this list.

¹³ I am using history with and without a capital H in Glissant's understanding: "*History [with a capital H] ends where the histories of those peoples once reputed to be without history come together.*" *History is a highly functional fantasy of the West, originating at precisely the time when it alone "made" the history of the World. If Hegel relegated African peoples to the ahistorical, Amerindian [sic] peoples to the prehistorical, in order to reserve History for European peoples exclusively, it appears that it is not because these African or American peoples "have entered History" that we can conclude today that such a hierarchical conception of "the march of History" is no longer relevant.*" (Glissant, 1981, p.64)

¹⁴ That like Sylvia Wynter in her thinking moves between different discursive frameworks and modes of understanding. That recognises the importance of embracing diversity and engaging with multiple forms of knowledge in order to achieve a more nuanced and inclusive understanding of ourselves and our world.

economic inequalities that negatively impact the well-being and livelihood of populations:

- (i) What purpose do these ~1,500 institutional mineralogical collections that spread around the globe now fulfil?
- (ii) What can specialists and the general public learn from their archives if looked at from a socio-political perspective?
- (iii) What can these collections subsequently become in the future?
- (iv) In which way can we employ these institutions to advance our understanding of other concepts further than compounds, structures and properties?

These collections should not be storage facilities of dead matter, but rather *laboratories of thought* where the individual mineral specimen becomes a *thinking device* to unearth power structures that facilitate historical and current inequalities. They could enrich reductive logics of scientific thought, leave behind its compartmentalisation, and instead *re-link, re-connect, and relay* them to their multiple dormant histories.¹⁵

We Build Our Languages Out Of Rocks – Transpositional Geologies as an artistic format ‘relays’ (Glissant, 1990, pp.169-179) as geo-poetical experimental thinking in space (Glissant, 1969, p.33; Last, 2015) ‘periphery’ and ‘centre’ with their historical and contemporary times. Neither *Transpositional Geologies* as an extended journey through space and time, nor the experimental framework of this exhibition specifically, will produce direct answers to all the questions that emerge: it rather aims at multiplying the questions posed here until their accumulating polyphony unfolds within the silences of the museum (Mason and Sayner, 2019).

The *Mineralogical Collection of the University of Bonn* thus becomes an alternate epistemic space, an exemplary laboratory, a model: realities that were neutralised, omitted and suppressed in its historical organisational forms due to a hard science perspective, are re-forming relations.

Classification systems have brought this sinister, inhumane reality we find ourselves in here and now into existence via their imaginaries of difference (most prominently the concepts of *nature, gender, and race* as mentioned above): their methods and rigours should be used to explode (O’Kane 2023) them into a future that will not be a mindless prolonging of modernity’s barbarism (Glissant, 1981; Bond, 2006).

(2) In regards to my methodology

We Build Our Languages Out Of Rocks – Transpositional Geologies explores the inextricable and tangible links between the science of geology, its episteme, mineral extraction and racism in German colonial history with a focus on aesthetics and aisthesis. Through working with the archive of the *Mineralogical Museum of the University of Bonn*, *Transpositional Geologies* acknowledges, understands and handles mineral objects as keys to German colonial history: in this exhibition the particular attention is with mineral specimens from Tsumeb, Otavi district, Namibia.

¹⁵ Of course, institutional collections are archives that should serve scientific research and contribute to knowledge transfer in a wide variety of disciplines. It would be limiting to consider them exclusively in terms of historical and current inequalities – their usage must be multi-layered, addressing socio-political matters without silencing other forms of knowledge production inherent in these formats. However, socio-political readings are the most underdeveloped perspective in these formats of collections at present.

From 1884-1915 Namibia was German South West Africa (Wallace, 2013, pp.97-102). OMEG (Otavi Minen- und Eisenbahn-Gesellschaft, founded in 1900 in Berlin, Germany (Schnorbusch, 2000, pp. 23-30.) was as a German colonial operation unique within the context of German colonialism (Drechsler, 1966, pp.193-121). The Tsumeb mine itself is regarded as one of the world's most prolific mineralogical sites (Hearth, 2021. p.433) with specimens held in significant mineralogical collections internationally¹⁶.

The exhibition is based on a two-fold and site-specific approach¹⁷:

- (i) An extensive visual and contextual study of minerals archived in the collection of the *Mineralogical Museum of the University of Bonn*, and;
- (ii) Archive work and an explorative field trip to Windhoek, Swakopmund and Tsumeb, Namibia that took place from October to November 2022¹⁸.

The visual and initial contextual study has been conducted since September 2019 at the museum, extended during the field trip to Namibia in 2022 and will continue at the *Mineralogical Collection of the Technische Universität Berlin*¹⁹. Both collection places, as representing current and former seats of the German government and in case of the latter – the place in which Hugo Strunz developed his *Strunz Classification System* (Strunz, 1941; Strunz and Klein, 1977; Strunz and Nickel, 2001²⁰).

In collaboration with on-site staff, I identified sub-collections of minerals related to *geologies of race* (Yusoff, 2018, p.6; 2021, pp.664, 666). They were then examined using an aesthetico-technical approach that I have been developing and refining continuously since 2009, for objects that were exposed to immense forces of physical violence in institutional contexts (deliberate or inadvertent explosions such as by anti-terrorism police or during space launch failures), but applying this now to the tangent of the physical force of extraction and epistemic substrata of colonial oppression²¹.

At the core of this approach lies, as method, a transformative image production process in which the physical object of the archive (*O*) becomes *Object-Image (O-I)* by means of employing an off-the-shelf high-resolution scanner with modified hard- and software, which leads to the generation of a digital high-resolution image file library (an archive of mobile *O-I*s). These re-mobilised *O-I*s become modular devices throughout

16 The Lecture Intervention of Prof. Dr. Dr. Helmut Maier, Interdisciplinary Centre for Science and Technology Studies, University of Wuppertal will address this knowledge production and circulation during German colonial times: 19/04/2023 | 1630h transposition 135 (Helmut Maier (DE): Circulations: Colonial Geology, the Prussian Geological State Institution, and the South West African Copper (1850-1919)). (Video recordings of all Lecture Interventions will be made available on the Transpositional Geologies webpage in their aftermath. www.transpositional-geologies.org) Hosted at the Institute of Geosciences, Department of Geochemistry/Petrology, Lecture Hall, Poppelsdorfer Schloss, Bonn, Germany.

17 This approach will be deepened and extended in the forthcoming Transpositional Geologies exhibition in Tsumeb, Namibia – hosted by, and in collaboration with the Tsumeb Municipality, Nov. 2023 – and the Transpositional Geologies publication. Berlin / Bielefeld: Kerber Verlag, 2024.

18 Supported by *Institut für Auslandsbeziehungen (ifa)* program "Künstlerkontakte" and *Kunststiftung NRW*.

19 An artist in residence will take place during the summer of 2023 at the *Mineralogical Collections of the Technical University Berlin* that will focus on specimens from the Rössing uranium mine, Namib Desert, Arandis, Namibia.

20 Further developed by N. H. Nickel et. al. (Nickel and Mandarino, 1987; Nickel and Nichols, 1991; Nickel, 1995) and J. A. Mandarino (1998).

21 2009/10: Luggage left unattended and destroyed on suspicion of terrorism in a controlled explosion by the British Transport police at Waterloo Station, London. 2015/16: Remnants of a spacecraft explosion of a catastrophic rocket launch failure at the spaceport in French Guiana, 1996. 2019-23: Further developed and formalised working with the mineralogical collection of MMdUB.

the further working process, and re-materialise as *Image-Objects (I-O)* eventually²². These are deployed in three ways:

- i) As devices to communicate and engage institutions of interest for the TG process;
- ii) As devices to communicate and engage actors within these milieus;
- iii) As aesthetic raw material, the *O-I* allows the original archive objects to be transposed into differing media and contexts: The resulting *I-Os* are central in bringing to life subject specific bodies of work in which the different entities relate to each other in a way that has been theorised by M. Schwab (2018) as 'Transpositions'.

By scrutinising the mineral objects through the gaze of the technical apparatus of the scanner, the resulting visual characteristics of the images are of voyeuristic proximity, allowing for the object under investigation to be seen anew²³. By altering the scale of the object, a relationship between viewer and Image-Object is established that is both alienating and intimate at the same time.

The findings from archive and field visits, theoretical inquiry and meta-reflecting on my working process are captured and structured through working diagrams. They reciprocally inform this work, enriching it and becoming part of the object of enquiry themselves.

In combination, these different strands form an approach that allows a transpositional engagement through and around the mineral object: from deep geological time to human histories, from a chemical compound to the institutional realities of a mine, and the reverberations it has today. Having literally again unearthed some new qualities of poetic nature, the images that result from applying this method to the mineralogical collections expose both harmonic and brutal ways that minerals grow, and for instance invite us to contemplate on modes of mutual coexistence.

By showing a way to shift perspectives on the role of the object on a meta-level, particularly in the German (post-)colonial context, this exhibition offers a contribution to the topical discourse on institutional approaches to contemporary mineralogical collections and their display.

This project is at its core theoretically informed by, and intellectually indebted to, a range of thinkers: Sylvia Winter's reflections on epistemic systems and racism (1989; 1995; 1997; 2003; 2006; 2007; Scott, 2000); Édouard Glissant's philosophy of (geo)poetics and relation (1969; 1981; 1990; Glissant and Diawara, 2011); Kathryn Yusoff's contemplations on geology, racialized matter and concepts of origin (2013; 2015; 2018; 2019; 2021a; 2021b); Elizabeth Grosz's contemplations on violence

²² O → O-I → I-O

This transformative process allows for the mobilisation of localised, factually static archived object. As digital *Object-Image* (O-I) they can circulate, travel beyond transnational borders without bureaucratic constraints and re-materialise in context specific settings.

²³ *transposition 001 (Happy Banality of Everything)*, or i.e. using a printed format as in *transposition 504 (I-O_MMdUB-50215)* generating a different kind of intimate proximity to the spectator while relating to the context it is placed in.

(1999), her philosophy of chaos, territory, art, life and matter, (2008; 2011); Jaques Derrida's conceptualisations of arch-writing and arch-violence (1982; 1989; 1992; 1997); Enrique Domingo Dussel's (1992; 1993; 1996; 1997; 2000; 2002), Anibal Quijano's (2000; 2007), and Walter Mignolo's (2000; 2011; 2018) thinking on world systems, coloniality of power, and the dark side of modernity; and Adolfo Albán Achinte's notion of re-existence (2012).

BIBLIOGRAPHY

- Achinte, A. A., 2012. Epistemes “Otras”: ¿Epistemes Disruptivas?. KULA: Antropólogos del Atlántico Sur, 6. pp.22-34.
- Acosta, A., 2013. Extractivism and Neoextractivism: Two sides of the same curse. In: B. D. Theobald (Ed.), *Beyond Development: Alternative Visions from Latin America* (pp. 61-86). Quito, Ecuador: Rosa Luxemburg Foundation.
- Alberti, S., 2005. Objects and the Museum. *Isis* 96(4), pp.559-571.
- Bandle, A.L., et. al., 2013. Case 20 Herero and Nam Skulls – Namibia and Charité Universitätsmedizin Berlin, Germany. Geneva: ArThemis Art-Law Centre University of Geneva.[online] Available at <<https://plone.unige.ch/art-adr/cases-affaires/20-skulls-of-colonial-victims-2013-namibia-and-charite-universitatsmedizin-berlin/case-note-2013-20-herero-and-nama-skulls-2013-namibia-and-charite-berlin/view>> [Accessed 212 March 2023].
- Bond, P., 2006. *Looting Africa: The economics of exploitation*. London: Zed Books.
- Brassier, R. 2007. *The Thanatosis of Enlightenment*. In: R. Brassier, C. Kerslake, eds., 2007. *Origins and Ends of the Mind: Philosophical Essays on Psychoanalysis*. Leuven: Leuven University Press, pp.135-148.
- Basu, P., 2023. Coloniality and collecting: extractivism and the production of knowledge – materials and material culture (Abstract). Exhibition: *We Build Our Languages Out Of Rocks – Transpositional Geologies: transposition 512*. Lecture Intervention, 25 Mai 2023, 1630h. Bonn: Museum of Mineralogy of the University Bonn, Germany.
- Césaire, A., 1973. *Poetry and Knowledge*. In: *Lyric and Dramatic Poetry 1946-82*. Translated from French by Clayton Eshleman, Annette Smith, 1990. Charlottesville: The University Press of Virginia.
- Dana, J. D., 1837. *System of Mineralogy*. New York: John Wiley & Sons, Inc..
- Derrida, J., 1982 (1972). *Margins of Philosophy*. Translated from French by A., Bass. Sussex: The Harvester Press, University of Chicago, 1-27.
- _____, 1989. *Force of Law: The “Mystical Foundation of Authority”*. Translated from French by M. Quaintance. *Cardozo Law Review* 11, 920-1045.
- _____, 1992 (1991). *Given Time*. Translated from French by P. Kamuf. Chicago: University of Chicago Press.
- _____, 1997 (1967). *Of grammatology*. Translated from French by C.G. Spivak. Baltimore: The Johns Hopkins University Press.
- Drechsler, H., 1966. *Südwestafrika unter deutscher Kolonialherrschaft: Die großen Landgesellschaften und Minengesellschaften (1885-1914)*. Stuttgart: Franz Steiner Verlag.
- Du Bois, W. E. B., 2007 (1903). *The Souls of Black Folk*. New York: Oxford University Press.
- Dussel, E. D., 1992. *The Invention of the Americas: Eclipse of “the Other” and the Myth of Modernity*. Translated by M. D. Barber, 1995. New York: Continuum.
- _____, 1993. *Eurocentrism and Modernity (Introduction to the Frankfurt Lectures)*. *boundary 2*, 20(3): pp. 65-76.
- _____, 1996. *The Underside of Modernity: Apel, Ricoeur, Rorty, Taylor, and the Philosophy of Liberation*. Translated by E. Mendieta. New Jersey: Humanities Press International.
- _____, 1997. *The architectonic of the ethics of liberation: On material ethics and formal moralities*. *Philosophy & Social Criticism*. 23(3). pp. 1-35.
- _____, 2000. *Europe, Modernity, and Eurocentrism*. *Nepantla: Views from South*. 1(3). pp. 465-478.

- _____, 2002. World-System and “Trans”-Modernity. *Nepantla: Views from South*. 3(2). pp. 221-244.
- Fritscher, B., 2012. Making objects move: On minerals and their dealers in 19th century Germany. *Journal of History of Science and Technology*, Spring Issue, 84-105.
- Eder, K., 1988. *The Social construction of nature: a sociology of ecological enlightenment*. Translated from English by M. Ritter, 1996. London: Sage.
- Glissant, É., 1969. *Poetic Intention*. Translated from French by N. Stephens, A. Malena, 2010. Callicoon: Nightboat Books.
- _____, 1981. *Caribbean Discourse: Selected Essays*. Translated from French by J. M. Dash, 1999. Charlottesville: University of Virginia Press.
- _____, 1990. *Poetics of Relation*. Translated by B. Wing, 1997. Ann Arbor: The University of Michigan Press.
- Glissant, E., Diawara, M., 2011. One World in Relation: Édouard Glissant in Conversation with Manthia Diawara. *Journal of Contemporary African Art*, 28(1), pp.5–18.
- Grosz, E., 1999. The Time of Violence; Deconstruction and Value. *College Literature*, 26(1). pp.8-18.
- _____, 2008 (2020). *Chaos, Territory, Art – Deleuze and the Framing of the Earth*. New York: Columbia University Press.
- _____, 2011. *Becoming Undone Darwinian Reflections on Life, Politics, and Art*. Durham, London: Duke University Press.
- Haraway, D., 1988. Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective. *Feminist Studies*, 14 (3), pp. 575-599.
- Hearth, S., 2021. The “World’s Greatest Mineral Location”: Hai||om, Ndonga, Herero, and the Early Colonial Histories of Tsumeb, Namibia. *Earth Sciences History*, 40 (2), pp.433-460.
- Hearth, S., Robbins, C. 2022. Mineral displays as embodiments of geological thought and colonial invisibility. *Journal of Natural Science Collections*. 10. pp.3-17.
- Hill, C. R., Ashipala, S. N., 2022. ‘Follow the Yellowcake Road’: Historical Geographies of Namibian Uranium from the Rössing Mine. Paper forthcoming.
- Hill, C. R., 2023. *Critical Earth: Uranium and the Namib in the Nuclear Imagination. Lecture Intervention* for the exhibition: *We Build Our Languages Out Of Rocks – Transpositional Geologies: transposition 792*. 07 June 2023, 1630h. Bonn: Museum of Mineralogy of the University Bonn, Germany.
- Imalwa-Nangolo, E. S. U., Kaluwapa, P. S., Gramlich, N., 2023. German colonialism, environmental injustice, and ecological reparation: The case of Tsumeb. *Lecture Intervention* for the exhibition: *We Build Our Languages Out Of Rocks – Transpositional Geologies: transposition 495*. Presentation and Round-Table, 27 April 2023, 1630h. Bonn: Museum of Mineralogy of the University Bonn, Germany.
- Klare, M.T., 2012. *The Race for What’s Left: The Global Scramble for the World’s Last Resources*. New York: Metropolitan Books.
- Last, A., 2015. Fruit of the cyclone: Undoing geopolitics through geopoetics. *Geoforum*, 64, pp.56-64.
- Maier, H., 2020. Circulations: Colonial geology, the Prussian State Geological Institute and the South West African copper (1850-1919). *Journal of Namibian Studies: History Politics Culture*, 28, pp. 39-63.
- Mandarino, J. A., 1998. The new IMA nomenclature: a summary for mineralogists. *The Canadian Mineralogist*, 36(3), 905-908.

- Mason, R. and Sayner, J., 2019. Bringing museal silence into focus: eight ways of thinking about silence in museums. *International Journal of Heritage Studies*, 26 (1), pp. 5-20.
- Mignolo, W., 2000. *Local Histories/Global Designs: Coloniality, Subaltern Knowledges, and Border Thinking*. New Jersey: Princeton University Press.
- _____, 2011. *The Darker Side of Western Modernity: Global Futures, Decolonial Options*. Durham and London: Duke University Press.
- Mignolo, W., Walsh, C. E., 2018. *On Decoloniality: Concepts, Analytics, and Praxis*. Durham and London: Duke University Press.
- Nickel, E.H., Mandarino, J.A., 1987. Procedures involving the IMA Commission on New Minerals and Mineral Names and guidelines on mineral nomenclature. *American Mineralogist*, 72, 1031-1042.
- Nickel, E. H., Nichols, M. C., 1991. Mineralogical Record, special publication no. 2: The Strunz mineralogical tables. *Mineralogical Record*.
- Nickel, E. H., 1995. The IMA Commission on New Minerals and Mineral Names: procedures and guidelines on mineral nomenclature. *The Canadian Mineralogist*, 33(2), 219-230.
- O'Kane, P., 2023. A Non-Violent Explosion in the Taxonomic Schloss: Toward a Neobaroque. In: Mikloweit, S. ed., 2024. *We Build Our Languages Out Of Rocks: Transpositional Geologies*. Berlin: Kerber Verlag. (forthcoming)
- Quijano, A., Ennis, M., 2000. Coloniality of Power, Eurocentrism, and Latin America. *Nepantla, Views from South*, 1(3), pp.533-580.
- Quijano, A., 2007. Coloniality and Modernity/Rationality. *Cultural Studies* 21(2-3), pp. 168-178.
- Schnorbus, H., 2000. *Die Gesellichte der Otavi Minen AG 1900-2000: Ein ereignisreiches Jahrhundert*. Eschborn: Otavi Minen AG.
- Schwab, M. ed., 2018. *Transpositions: Aesthetico-Epistemic Operators in Artistic Research*. Leuven: Leuven University Press.
- Scott, D., 2000 *The Re-enchantment of Humanism: An Interview with Sylvia Wynter*. *Small Axe* 8, pp.119–207.
- Spivak, G. C., 1988. Can the Subaltern Speak? In: C. Nelson & L. Grossberg, eds., *Marxism and the Interpretation of Culture*. Baltimore: University of Illinois Press.
- Strunz, H., 1941. *Mineralogische Tabellen zur Bestimmung der wichtigsten Mineralien*. Stuttgart: E. Schweizerbart'sche Verlagsbuchhandlung.
- Strunz, H., Klein, C., 1977. *Mineralogische Tabellen*. Stuttgart: E. Schweizerbart'sche Verlagsbuchhandlung.
- Strunz, H., Nickel, E. H., 2001. *Strunz mineralogical tables: Chemical-structural mineral classification system*. 9th ed. Stuttgart: E. Schweizerbart'sche.
- Veltmeyer, H., Petras, J., 2014. *The New Extractivism: A Post-Neoliberal Development Model or Imperialism of the Twenty-First Century?* London: Zed Books.
- Wallace, M., 2013. *A History of Namibia: From the Beginning to 1990*. New York: Oxford University Press.
- Wynter, S., 1989. Beyond the World of Man: Glissant and the New Discourse of the Antilles. *World Literature Today*, 63(4), pp.637-648.
- _____, 1995. 1492: A New World View. In: Race, Discourse, and the Origin of the Americas. Hyatt, V. L., Netteford, R., eds., 1995. Washington: Smithsonian Institution Press.
- _____, 1997. Columbus, the Ocean Blue, and Fables That Stir the Mind: To Reinvent the Study of Letters. In: *Poetics of the Americas: Race, Founding, and Textuality*. Cowan, B., Humphries, J., eds.. Baton Rouge: Louisiana State University Press, pp.141-163.

- _____, 2003. Unsettling the Coloniality of Being/Power/Truth/Freedom: Towards the Human, After Man, Its Overrepresentation – An Argument. *The New Centennial Review*, Volume 3(3), pp.257-337.
- _____, 2006 The Ceremony Must Be Found: After Humanism. *Textual Practice*, 20(3), pp.397-441.
- Wynter, S., McKittrick, K., 2007. Unparalleled Catastrophe for Our Species? Or, to Give Humanness a Different Future: Conversations. In: McKittrick, K., ed., 2015. *Sylvia Wynter: On Being Human as Praxis*. Durham: Duke University Press.
- Yusoff, K., 2013. Geologic Life: Prehistory, Climate, Futures in the Anthropocene. *Environment and Planning D: Society and Space*, 31(5), 779-795.
- _____, 2015. Geologic subjects: nonhuman origins, geomorphic aesthetics and the art of becoming inhuman. *Cultural Geographies*, 22(3), 383-407.
- _____, 2018. *A Billion Black Anthropocenes or None*. Minnesota: University of Minnesota Press.
- _____, 2019. Geological Realism: On the beach of geologic time. *Social Text*, 37(1(138)), 1-26.
- _____, 2020. Geo-Logics: Natural Resources as Necropolitics. [video online] Available at: <<https://www.youtube.com/watch?v=QM8B-XZG8OQ>> [Accessed 20 November 2020].
- _____, 2021a. The Inhumanities. *Annals of the American Association of Geographers*, 111:3, pp.663-676 .
- _____, 2021b. Mine as Paradigm. *E-flux Journal* [online] Available at <<https://www.e-flux.com/architecture/survivance/381867/mine-as-paradigm/>> [Accessed 17 January 2023]