

PRINTING OCHRE: A RESEARCH PRACTICE IN MAPPING COLOUR

Elpitha Tsoutsounakis

Knowledge about country should be learned, but abstract truth is not the actual end of learning. Learning—knowing the truth about place—is a way to refashion bodies and landscapes into mutually obligated bodies. Elizabeth Povinelli

INTRODUCTION

The discipline of geology was relatively new at the start of the United States Geological Survey (USGS) in the late 1800s, but through the organisation of an efficient government bureau and the voice of its printed page, it became a dominant perspective in the way generations of citizens relate to and view the natural world, human and nonhuman, life and nonlife. I choose to position my press in direct opposition to the maintenance of these dualisms. I will argue the critical role of print in facilitating USGS domination of terrestrial beings in a practical sense, yet beyond the methods and reach of publication, I believe the products of the USGS mediate our understanding of and relation to these beings. Instead, design practices can be directed towards changing attitudes and understanding between humans and nonhumans. Monika Bakke argues for the importance of artistic endeavours in addressing our collective futurity:

Drawing on both life's mineral origins and its key role in shaping mineral species, artists are turning to technoscience in order to develop, outside expert circles, better understanding of physical, chemical, and biological environments, not just of the geological past but also those to come in the future. ... Yet, their methodologies are specific to art which offers creative ontological and ethical contributions to public debate. (2017, p. 43)

I am developing a design research paradigm relating to ochre as an epistemic tool for human and nonhuman intersubjectivity and ontological reconciliation or reunification between life and nonlife. I model my practice after a simplification of the USGS: to survey (observe, describe, collect) and to report (archive, document, record), with some critical variance in method and outcomes.

To fuel its imperialist desire and perpetuate the myth of infinite growth and progress, the United States government had to mediate existing conditions in the American West, where Indigenous people resisted the violent dispossession of their ancestral territories and the so-called wildness of the wilderness was still “untamed” and “unknown”. Beyond the obvious instruments of the military and science in the field, the printing press became a critical tool in this mediation via the division of human and nonhuman and the distinction between life and nonlife.

The decades of debate in Congress that led to the establishment of the survey enforced the dualism of human vs. nonhuman in the so-called American landscape. Colonial politicians, scholars, officers, and citizens spent so much time arguing about who would observe and document the nonhuman beings surrounding them that they never considered a potential alternative relationship to these cohabitants of Earth. At the time, the United States was busy with its violent colonial occupation of the North American continent. It was especially ignorant of the Indigenous realities and knowledge systems that maintained relationship and reciprocity instead of control and manipulation. “American” success depended on the erasure of these world views deemed threatening to the colonial epistemologies scaffolding the nation. While a full elaboration of this entanglement is beyond the scope of this paper, I focus here on the role of print as the mechanism by which it was accomplished, inspiring potential uses of print practice as alternatives today.

Expanding beyond human vs. nonhuman relations, those who believed in the absolute distinction between “bio” and “geo” or life and nonlife made several concerted efforts to remove biology and its subtopics from the domain of the survey in its early years. Elizabeth Povinelli elaborates on this distinction in her concept of geontopower as a mode of governance in settler late liberalism (2017, p. 35):

The sovereign people of geontopower are

those who abide by the fundamental separation of Life and Nonlife with all the subsequent implications of this separation on intentionality, vulnerability, and ethical implication. That is, what is sovereign is the division of Life and Nonlife as the fundamental ground of the governance of difference and markets.

While the USGS today has expanded to include the biological sciences, the strategies of geontopower continue. I imagine the tactic of 'divide and conquer' (human vs. nonhuman, life vs. nonlife) was subconscious as the USGS mediated the terrestrial beings that stood in the way of the so-called progress of the United States. Initially, I understood the USGS as a precedent for process surveys and reports, but examined through Povinelli's geontological lens, I have come to understand the USGS as a method of geontopower. The products of the USGS as an archive are a key method to its control and legacy in supporting human vs. nature dualisms.

2.0 PRINT MEDIATES EARTH MATTER

The power and authority of the printing press facilitated the ontological determination of the American West by the USGS. Understanding the role of the survey and its publications is the first step to challenging its version of the world through alternative practices. It is also worth clarifying who exercises geontopower, according to Povinelli:

Life and Nonlife and the Human and the Nonhuman are abstractions and distractions from the fact that humans did not create this problem. Rather, a specific mode of human society did, and even there, specific classes and races and regions of humans. ... the antagonism shifts and the protagonists are neither humans and other biological, meteorological, and geological forces, nor Life and Nonlife. The antagonism is between version forms of human life-worlds and their different effects on the given world. (2016, p. 12)

The USGS and Government Publishing Office (GPO) have created a particular life-world that has secured a dominant view of the given world as a resource to be claimed.

2.1 TO SURVEY; USGS

The modern USGS has become an agency of broad scientific endeavour, but its original focus was on creating accurate maps of the United States and effectively managing 'resources'. The USGS was created by an act of the United States Congress on 3 March 1879 (20 Stat. L., 394-395). Before its formal establishment, a drawn-out debate in Congress combined several existing survey efforts. In addition to "exploration parties" dispatched by the War Department, five federal surveys were in operation before 1879: the Coast and Geodetic Survey, the Geological Exploration of the Fortieth Parallel directed by Clarence King, the Geological and Geographical Survey of the Territories directed by Dr F.V. Hayden, the Geographical Survey West of the One Hundredth Meridian directed by Captain George M. Wheeler, and the Geographical and Geological Survey of the Rocky Mountain Region directed by Major

J. W. Powell (USGS Bull. 227, 1904, pp. 9-10).

The newly established survey commenced with the task of “classification of the public lands and examination of the Geological Structure, mineral resources and products of the national domain” (20 Stat. L., 394-395). Initial debates questioned what exactly the “national domain” referred to: the designated “public lands” or the entirety of the land mass within the boundaries of the United States (Manning, 1967, p. 66).

Several ideas established in that early vision for the USGS have influenced current notions of nonhuman and nonlife. The explicitly stated objective to “classify and examine” upholds the human vs. nonhuman dualism¹ that positions humans as dominant over and separate from nature. The reference to “mineral resources and products of the national domain” establishes a precedent understanding of the nonlife geological phenomena and nonhuman terrestrial beings as mere resources that exist for the economic benefit of the human citizens of the United States. The USGS further espoused the benefits of its operation to the public as offering valuable knowledge and supporting the economic interest of a developing nation. By doing so, it maintained the authority to define our national relationship to terrestrial beings as ‘raw material and resource’. The USGS as an epistemic practice could not have achieved the influence it did without the power to print and publish its assertions.

2.2 TO REPORT; USGS + GPO

It is unlike any other department of Government service. For ships you can wait; for guns you can generally wait; and, ordinarily, you are in no special hurry for the various munitions of war; but you cannot be deprived of your printing for a single day without serious embarrassment and loss of time.”
 Congressman Gurley on the creation of the GPO, 1860
 (Harrison, 2010, p. XII).

In the early evolution of the survey, printing and publishing became integral to its operation. In 1894, the fifth branch of the USGS was established as the Publications Branch. It was composed of an Editorial Division (Textual Publications, Geologic Maps, and Topographic Maps), a Division of Illustrations, and a Division of Engraving and Printing (Jaussaud, 1999, p. 44). The Publication Branch had the third highest number of employees in the survey at the turn of the twentieth century: 85 people dedicated to printing and engraving, surpassed only by the Hydro-economics Reclamation Service with 187 and the Geology and Paleontology Division with 87 employees (USGS Bull. 227, 1904, p. 13).

The USGS produced hundreds of professional papers and reports, the editions and distribution of which were a regular topic of discussion dictating the allocation of resources. The original act outlining the USGS provided that all reports were printed in editions of 3,000 copies and traded with a broad network of partners. The USGS also maintained a



Figure 1

¹ I refer to dualisms here as outlined by the scholar Val Plumwood in *Feminism and the Mastery of Nature*. Plumwood delineates five aspects of the structure of dualisms: 1. backgrounding, 2. radical exclusion, 3. incorporation, 4. instrumentalism, and 5. homogenization or stereotyping (Plumwood, 1993, pp. 47-53). The USGS accomplishes all five of these structures in its mediation of nonhuman and nonlife.

Figure titles and information

Figure 1: Image of USGS reports, by the author

library of the materials and documents they received in trade, creating a robust research and reference collection for the organisation (USGS Bull. 227, 1904, pp. 21-22). So far, I have generated creative works that are a direct impression of the many reports and professional papers published on specific sites².

These documents list the Government Printing Office on the title page, but further research is needed on the process of collaboration among the USGS, its Publication Branch, and the GPO. The GPO is located in Washington, DC. Established in 1861, it operates all printing and publication activities of the United States government. I find the GPO to be significant in two ways: first and foremost, as the method by which USGS materials were produced, and second, as the method by which the USGS was established through acts of Congress.

While the USGS was formally ratified in 1879, efforts towards its creation began as early as 1865, just five years after the GPO began operations. The documented history of the process contains regular mention of documents, letters, reports, and congressional bills that would have been printed by the GPO. In a letter dated 7 March 1879, J.W. Powell tried to persuade Congressman James A. Garfield to support his candidacy for Survey Director by calling his rival, Dr. Hayden, “a charlatan who has bought his way to fame with Government money and unlimited access to the Government Printing Office” (Manning, 1967, p. 57). I find it compelling that the GPO is explicitly identified as a source of advantage, power, and influence and continue to search the archives for additional references in the records of both institutions to elaborate my argument of the mediation channels affecting our natural domain.

3. OCHRE BODIES IN PRINT PARALLELS

In my research practice, printing becomes a performance and a ritual combining the agency of ochre with the power and authority of print. These methods embody an alternative to the colonial capitalist mapping and surveying practices of the USGS and GPO that I describe above. I am generating an ontology of ochre (pigment, material, nonhuman, nonlife) in relationship with the human that allows iron to become more than an anonymous resource for capitalist progress. My current project, “Unknown Prospect”, is an iterative atlas of mining sites and their geological memory. As a printer with a background in architecture, I am interested in maps and atlases as products of information, communication, and world-making.

3.1 OCHRE

The term ‘ochre’ has several meanings: a colour, a material, a yellow or a red. Ochres are mineral pigments, yet I also conceive of ochre as a terrestrial being, with the memory of iron throughout geological time. Many traditions call additional natural pigments ‘ochre’, but I am interested in iron oxides specifically. They can be found everywhere, as iron is the most common element on Earth by mass and the fourth most abundant element in the Earth’s crust.



Figure 2

² The publications of the USGS are available for download as PDFs via the USGS publication archive online, and I have sourced multiple physical copies from various used booksellers.

Figure 2: Ochre pigments spilled onto a page in a USGS report, by the author

Iron originated in ancient stars across the universe and exploded in supernovas to become the dust that formed the Earth 4.5 billion years ago.³ Iron was not always red; before the Great Oxygenation Event, it was held in solution in great green oceans feeding bacteria that survived on the abundant element. Over millions of years, these early terrestrial beings slowly excreted oxygen, which combined with iron to form iron oxide. In waters across the planet, early earthly iron turned from one hue to its complement. This iron oxide fell to the ocean floor to create the banded iron formations and ore deposits that ambitious miners seek to extract the world over. Iron oxides took on multiple forms as they affected the course of human existence.

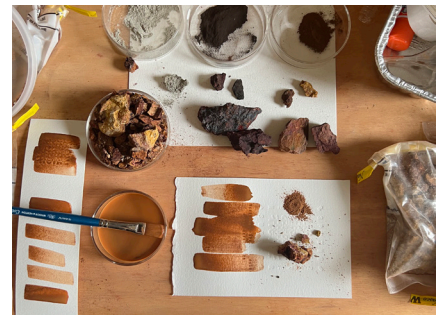


Figure 3

3.2 HUMAN vs. NONHUMAN; LIFE vs. NONLIFE

Scholars across disciplines maintain that human evolution has unfolded with the development of ochre as a material, technological, spiritual and cultural agent. I would go further, however, to argue that we have evolved as humans with nonhuman ochre from a common mineral ancestor born of ancient stellar corpses. I believe ochre is more than a material that has been manipulated by humans; instead, it has enacted its agency on the history of our planet. The printed page, whether a map, atlas, pamphlet or codex, mediates geological and nonlife matter.

Povinelli gives the specific example of geological “respiration” that occurs in iron oxides. Put simply, when iron joins oxygen (inhales), it creates ochre, or what artist Heidi Gustafson calls “live iron” (Gustafson, 2022). When iron oxide is introduced to coal, it exhales carbon dioxide, producing iron and later steel. Iron is always in a state of becoming as it cycles through “geo” and “bio” in our terrestrial systems, becoming red, becoming blood, becoming rock, becoming dust. It moves effortlessly between human and nonhuman bodies and structures as a common element transcending the artificial divide between life and nonlife.

4. TO SURVEY OCHRES; “UNKNOWN PROSPECT”

My practice begins in the field, in active participation with terrestrial beings. Ochres occur in plural forms, from rock to the finest of clay dust, as solids or in solutions. I organise ochre as body, pigment, or swatch. I assemble raw materials or ‘ochre bodies’ from tailings piles or road cuts. Then I process them in my studio. When I grind them with a mortar and pestle, erosion is quickened and bodies are reduced to a pigment extension of iron. When pigment is swatched, that is, combined with a binder and applied to a substrate, its agency in hue is extended. These extensions offer additional dimensions to understand our worlds beyond cartesian limits, from the birth and death of ancient stars to the matter of the ground below our feet.

The surveys focus on sites of mining activity, past and present. I delve into the history and narratives associated with each location and continue to expand my knowledge and recognition of each place through my experience on the ground and my research in the archives. The bodies, pigments, and swatches are catalogued as a sampling of what the place is, not what riches it can provide.

The surveys focus on sites of mining activity, past and present. I

³ This original iron and the additional iron that our planet picks up from the surrounding universe as we hurl through space are critical elements to life on our planet in what scientists refer to as the ‘Iron Cycle’.

Figure 3: Ochre bodies, pigments and swatches on the studio workbench, by the author

delve into the history and narratives associated with each location and continue to expand my knowledge and recognition of each place through my experience on the ground and my research in the archives. The bodies, pigments, and swatches are catalogued as a sampling of what the place is, not what riches it can provide.

4.1 TO REPORT COLOUR; MAPPING THE OCHRE IMAGINARY

Artefacts that report and translate are generated with the assemblage of ochres from the survey. Maps are drawn containing the information learned and the physical ochres themselves that physically participate as material colour. Topics of the documents are derived from the cultural narratives and physical realities of the sites. I combine text with topographic data, images, archival photographs, and figures from assorted USGS publications. Mapping then becomes a performance, a practice of generating knowledge, beyond practical cartography, as Deleuze and Guattari admonish:

Make a map, not a tracing. ... What distinguishes the map from the tracing is that it is entirely oriented toward an experimentation in contact with the real. The map does not reproduce an unconscious closed in upon itself; it constructs the unconscious (1987, pp. 12-13).

I understand the precedent USGS maps as a tracing of the landscape that ascribes to a particular worldview or authority; I am mapping relationships through layering and associations that become plural and generative.

Currently, my method for applying ochres to prints is post-press using paints or pastels. I am interested in the multiplicity that emerges in the edition through the variation that occurs in the ochre applications, challenging traditional notions of competence found in consistency. Each print becomes a map, not a tracing. Varying methods of binding media also produce potentials parallel to the phenomena Barad describes when different apparatuses for measurement find light to be either particles or waves: "What we're talking about here is not simply some object reacting differently to different probings but being differently" (Barad, 2012, p. 6). In different binders and media, ochre is "being differently". Each print becomes an alternative dimension or reality mapped on the page.⁴

I am currently printing on a Vandercook No. 3 press using photo-polymer plates. I use various sources of information to generate plates with analogue drawings, GIS maps, digital photography, USGS data and images, and images generated by the scanning electron microscope. I am particularly interested in the layering and combination of many disparate sources of data and varying types of technology, from the analogue mortar and pestle to the advanced microscopes in the Utah Nanolab. Various methods are repeated in relationship to place (onsite), in geological time scales, and again in the lab or studio at the human pace of my hands and making. This practice of research through design in the field, in the studio, and on the lab or studio at

⁴I have yet to experiment with incorporating the ochre pigments directly into ink for printing, mostly because of my fear of how the pigment particles themselves may affect my press. A solution to this that I hope to prototype soon is to hand-ink lockups when using ochre-tinted inks.

the human pace of my hands and making. This practice of research through design in the field, in the studio, and on press collapses the distance between the ancient iron sea bed and the modern steel press bed.

5. CONCLUSION

The printed outcomes of my research subvert the map as an object of authority and the survey as a ritual of determination to declare alternatives that uphold the relation between human and nonhuman, life and nonlife. So-called resources are materials made anonymous, supposedly pristine, unused and waiting to be claimed. Beyond surveying mineral resources for their market value, these works venture into the unknown prospect of complex historical narratives, human and more-than-human relations, and cultural dynamics underlying materials and products of design. What extra meaning happens when ochre is physically embedded, not just an abstract colour representing terrestrial origins and nonhuman agency? Design research and artistic practice offer alternatives to how print has mediated the nonhuman and nonlife so that, as artist Onya McCausland noted when talking about her ochre research, “we can do it again, a different way.”⁵

REFERENCES

- Barad, K. (2012) *What is the Measure of Nothingness? Infinity, Virtuality, Justice*. Germany: Hatje Cantz.
- Deleuze, G. and Guattari, F. (1987) *A Thousand Plateaus: Capitalism and Schizophrenia*. Minneapolis MN: University of Minnesota Press.
- Gustafson, H. (2022) ‘Heidi Gustafson Recounts How She Established an Archive of Hundreds of Samples of Humanity’s Oldest Art Material.’ Interviewed by Grace Ebert. *Colossal*. 7th June. Available at: <https://www.thisiscoolossal.com/interviews/heidi-gustafson/> (accessed: 14 June 2022)
- Harrison, J. L. (2010) *100 GPO Years 1861-1961 A history of United States Public Printing*. U.S. Government Printing Office: Washington D.C.
- Jaussaud, Renee M. (1999) *Inventory of the records of the United States Geological Survey, Record Group 57 in the National Archives, United States Geological Survey and National Archives and Records Administration*.
- Manning, T.G. (2014) *Government in science: the US Geological Survey, 1867–1894*. Kentucky: University of Kentucky Press.
- Povinelli, E. (2016) *Geontologies: A Requiem to Late Liberalism*. Durham and London: Duke University Press.
- Plumwood, V. (1993) *Feminism and the Mastery of Nature*. Routledge: London and New York.
- Rabbitt, Mary C. (1989) *The United States Geological Survey, 1879-1989*. (U.S. Geological Survey circular; 1050) Government Printing Office: Washington D.C.
- The Organic Act of the U.S. Geological Survey, U.S. Statutes at Large, v. 20, p. 394
- USGS Bulletin No. 227. *The United States Geological Survey its Origin, Development, Organization and Operations*. (1904) Government Printing Office: Washington D.C.

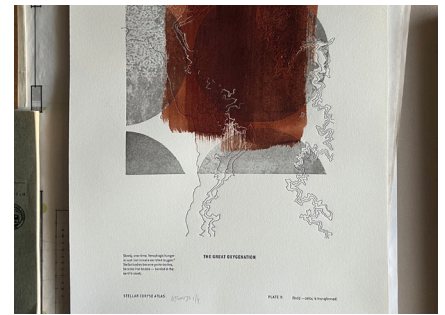


Figure 4

⁵ Onya made this comment in a lecture in February 2022 when talking about her ochre work at Six Bells Mine in South Wales

Figure 4: Plate II from the Stellar Corpse Atlas, by the author

AUTHOR

Elpitha Tsoutsounakis

unknownprospect.org

Instagram: @Elpitha

Elpitha Tsoutsounakis (she/her) is a Cretan-American designer, printer, and educator based in so-called Salt Lake City, Utah in the United States. She completed a Bachelor of Science in architecture at the University of Utah and a Master of Architecture at the University of Texas at Austin. She is an assistant professor and founding faculty in the Division of Multi-disciplinary Design at the University of Utah. Her scholarship combines community-based design research in “public lands” and rural places with creative practice in Ochres and more-than-human entanglements. She is the founder of the Field Studio Geontological Survey (FSGS), a research collective thinking with Ochre.

Copyright © 2023 Elpitha Tsoutsounakis

Presented at IMPACT 12 Conference, Bristol, The Printmakers' Voice, 21-25 September 2022 UK September 2022

This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY). The use, distribution or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.

IMAGE GALLERY



Figure titles and information

Figure 1: Image of USGS reports, by the author

Figure 2: Ochre pigments spilled onto a page in a USGS report, by the author

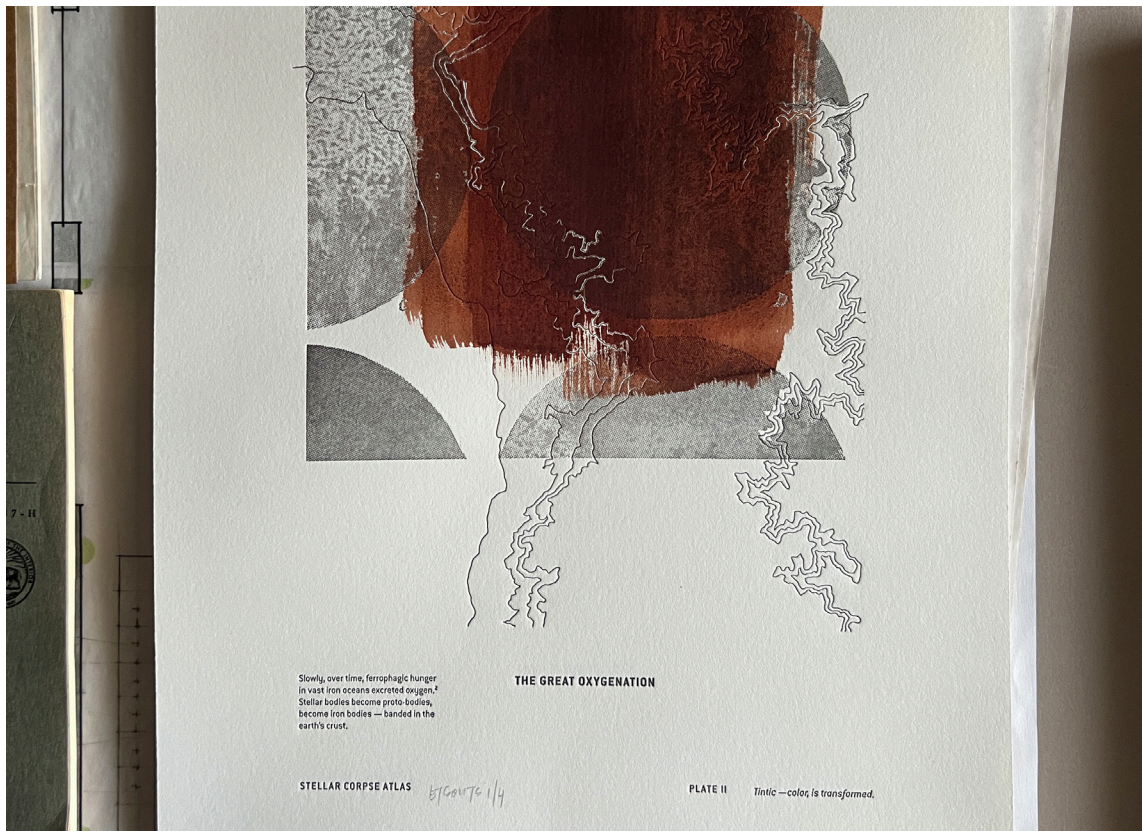


Figure 3: Ochre bodies, pigments and swatches on the studio workbench, by the author

Figure 4: Plate II from the Stellar Corpse Atlas, by the author