Transcending Boundaries: Alchemical Translation in Contemporary Art for Interspecies Connection and Communication

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Contents

Abstract

This research explores the intersection of art, alchemy, science, technologies, and philosophy in the context of environmental concerns, interspecies connections, and communication. Grounded in the principles of new materialisms (vibrant matter), the study focuses on the concept of alchemical translation — a transformative process that reveals the expressive nature of materials. Investigating the historical development of alchemy and its motives, the research examines its close connection to contemporary concepts of vitalism and interconnectivity. Furthermore, the research shows how alchemy can enrich translation studies to bridge gaps in nonhuman communication. Alchemical translation contributes to awareness and new relationships with other entities. Case studies of contemporary artists illustrate the power of this process in challenging human exceptionalism and fostering sustainable coexistence.

1. Introduction

In an era characterized by technological entanglements and ecological destruction, it becomes increasingly evident how our existence is closely interwoven with a history that reaches beyond the limits of human language and perception. Our world consists of various life forms and seemingly inert matter, each possessing unique sensory dimension, rules, and agencies. However, these often go overlooked, as developments of climate change, mass extinctions, geological exploitation, and the general silencing of all other beings prove. These issues are strongly connected to the call of a non-hierarchical relationship with more-than-human-worlds. Various scholars, artists, and art projects, partly in collaboration with scientists, are dealing with these issues and looking for methods and ways to make these existing, but mostly invisible connections tangible, moving away from human exceptionalism. Human exceptionalism, which evolved from colonial formations, "violently evacuates the liveliness and sentience of the more-than-human world around us."[1] It has facilitated the ruthless exploitation of both nature and people.[2] To overcome these anthropocentric realities, a fundamental step entails the

[1] Natasha Myers, "How to Grow Livable Worlds: Ten (not-so-Easy) Steps for Life in the Planthroposcene," *ABC Religion and Ethics, Australia Broadcasting Corporation* (January 7, 2017), https://www.abc.net.au/religion/natasha-myers-how-to-grow-liveable-worlds:-ten-not-so-easy-step/11906548.
[2] Michael Cronin, *Eco-Translation. Translation and Ecology in the Age of the Anthropocene* (London: Routledge, 2016), 68.

decolonization of our human sensorium,[3] moving away from visual perception, and approaching nonhuman entities as sentient, communicative, and expressive entities, whether organic or not. Artists are using technologies, especially from the life sciences, in order to translate matters inherent movements and expressions, highlighting and making visible existing connections between different worlds for a non-hierarchical living on planet Earth.

At the foundation of considering non-hierarchical and nonhuman communication and connections to animals, plants but also to stones and metals, lies the notion that all matter, alive or inert, contains a kind of vibrant vitalism. These diverse forms and manifestations exist with us in complex assemblages, shaping interdependent ecosystems. This vibrant matter is expressive even if not visible at first sight or by common human perception at all. The contemporary discipline of new materialisms, for instance, deals with matter's vitalism, a kind of force and vitality that all matter possesses. Vibrant or vital materialism, as a philosophical perspective and theory, challenges traditional distinctions between life and matter, human, and nonhuman, and emphasizes the agency, vitality, and interconnectedness of all entities and processes within the world.[4] At its core, vital materialism rejects anthropocentric and biocentric viewpoints and promotes an ecological sensibility including contributions of both human and nonhuman forces: "The image of dead or thoroughly instrumentalized matter feeds human hubris and our earth-destroying fantasies of conquest and consumption."[5] However, the idea of liveliness in matter is not as 'new' as it might seem. Already in antiquity, philosophers were reasoning about life, its growth, and vital aspects in nature and matter. These philosophers were also practitioners of experiments, using various substances and observing these processes, which earned them the name 'proto-alchemists.' Centuries later, early modern alchemists studied matter and life, without a solely material purpose.[6] Besides dealing with mining and metallurgy, many were also interested in the development of the human soul in relation to the experimental work. Alchemy's practitioners assumed that "the same vital principles underlay the workings of life and the processes of matter. Early modern alchemy was thus a material

[3] Loredana Polezzi, "Translation," in *Transnational Modern Languages. A Handbook*, ed. Jennifer Burns and Derek Duncan (Liverpool: University Press, 2022), 309, https://doi.org/10.2307/j.ctv2fjwpw7.38; For example, Birgit Schneider states, humans have lost their sensorium to sense e.g., climate change: "Interestingly, during the nineteenth century, the definition of climate was still grounded on emotional perceptions" ("Entangled Trees and Arboreal Networks of Sensitive Environments," *Zeitschrift für Medien- und Kulturforschung* 9, no. 1 (2018): 107, http://dx.doi.org/10.25969/mediarep/18690).

[4] Diana Coole and Samantha Frost, ed., *New Materialisms. Ontology, Agency, and Politics* (Durham/London: Duke University Press, 2010).

[5] Jane Bennett, *Vibrant Matter: A Political Ecology of Things* (Durham/London: Duke University Press, 2010), ix.

[6] Urszula Szulakowska, *Alchemy in Contemporary Art (*London/New York: Routledge, 2016), 17.

science and a life science at once."[7] Alchemy can therefore be described as a (minor) science[8] and "as a study of life itself."[9]

Throughout history, alchemists as well as artists strive to imitate, translate, and represent these vibrant processes of living nature.[10] This close connection between art and alchemy has never been lost. Artists, themselves working like alchemists, reveal expressive processes in materials through the procedural, translational nature of their work. They recognize in this expressive energy the possibility of translating materials' unique 'language,' i.e., symbols, signs, and other forms of expressions. They explore and use technologies to make these hidden communicative structures visible and tangible. (Alchemical) artists manipulate matter and connect substances that otherwise did not belong together, experimenting with unseen and intuitive phenomena. They apply new technologies to transform and translate one form, e.g., nonhuman expressions, into other modes of perception, thereby changing the human way of sensing and perceiving. This mediation of sensory knowledge through the translation of the sensorium can create diverse effects and affects and build new relationships to different, alien entities. Thus, also concepts in translation studies have to consider how "to cover the different forms of communication and signifying systems in the natural and physical world."[11] Alchemical notions and especially a form of alchemical translation, as I will define and argue, can be a helpful contribution to the discourse of interspecies communication. Thinking and translating alchemically involves becoming conscious, creating awareness, changing perception, and genuinely seeking to understand and care about the worlds and language of the nonhuman.

The best-known aim of alchemists was to produce valuable metals such as gold from mixing other materials, consisting of the 'prima materia,' e.g., blood, lead, or sperm. The process of gold-making is considered here as a metaphysical and metaphorical goal, as it can be seen as a way of producing value where there was none (perceived) before.[12] Alchemists believed in a spiritual or mystical aspect in their work, considering the transformation of base metals into

[7] Ku-ming Chang, "Alchemy as Studies of Life and Matter. Reconsidering the Place of Vitalism in Early Modern Chymistry," *Isis* 102, no. 2 (2011): 323, https://doi.org/10.1086/660141.
[8] Sjoerd van Tuinen, *The Philosophy of Mannerism. From Aesthetics to Modal Metaphysics* (London/New York/Dublin: Bloomsbury, 2022), 135.
[9] Chang, "Alchemy as Studies of Life," 323.
[10] The questions about who is producing the best imitation sparked a huge debate between the two arts. More about this topic in: William Royall Newman, *Promethean Ambitions. Alchemy and the Quest to Perfect Nature* (Chicago: The University of Chicago Press, 2004).
[11] Cronin, *Eco-Translation*, 113.
[12] One example of the connection of alchemy and creating value in relation to an interspecies connection is composting, where strict procedures and alchemical processes like transformation and transmutation can be discovered, which creates nourishing soil from unusable waste. However, the focus here will be less on composting.

gold as symbolic for spiritual enlightenment and purification. The process of refinement and transformation in the laboratory was seen as parallel to the inner transformation of the alchemist. In defending and defeating the art of alchemy, it was said that this craft is able of "perverting nature, perfecting nature, and creating nature anew,"[13] which led to a constant debate with artists as to who was better at fulfilling their work in this sense.

Alchemy is a proto-scientific and philosophical tradition that sought to understand the nature of matter and the self and seeks to transform and transmute both matter and self into more 'valuable' and conscious states. It is this value we must recognize in all other entities. This property of alchemy, as well as the qualities of transforming and transmuting, creating knowledge and even a form of wisdom, the close work with the expressiveness of all matter, its ability to change perception, and especially its connection to traditions of interpreting and decoding symbols and signs, are the reasons why I intend to introduce the concept of alchemical translation. I propose the concept of alchemical translation as an artistic form which can be characterized by its qualities of deciphering complex signs, changing nonhuman sensing and affect, creating awareness, and new forms of knowledge, leading to new relationships to the nonhuman. I state that artists are using alchemical translation to make material processes visible and to translate them into different forms and possibilities of perception, appealing to our sentient selves and the connection to our sentient environment. This form of translation can make human exceptionalism crumble.

1.1. Research Questions

As I expand into this intersection of alchemy, hybrid art forms, and interspecies connection, intriguing questions arise, which I will answer in this thesis. As organic and inorganic matter is able to communicate, as diverse scholars emphasize, it is possible and necessary to translate. The term Michael Cronin, Professor for Translation Studies, suggests, 'eco-translation,' is rather focused on the question of *what* should be translated, considering whole ecosystems. However, the question of 'what' is being translated here must be expanded, as we are not really dealing with a human form of language, but with signs, symbols, and traces, which alchemy, as I will show, can decipher. Furthermore, alchemy brings processuality into the discussion, answering the questions of *how* we can translate more-than-human entities. This leads to the question of why and how does framing translation as alchemical make interspecies connection and communication possible? How do contemporary artists leverage the principles of

[13] Newman, *Promethean Ambitions*, 3.

alchemical translation processes within hybrid art to explore and advocate for sustainable coexistence and interspecies connections in times of technologies and collaborations with scientists? How is this engagement able to foster a renewed awareness of interconnectedness, particularly in the face of pressing environmental concerns? I argue that in contemporary art, the theme of alchemy has lost none of its power, emphasizing the translation of the invisible into the perceivable through new sensory experiences to create awareness for these entities and shift human consciousness. Furthermore, my claim here is that implementing alchemical processes and notions in translation can generate a change in the perception of time through a mediated and transformed way of sensing. Alchemy applies specific procedures and rules in actual experiments with materials, which makes it a "workable processes,"[14] bridging the gap between human and nonhuman. This can lead translation and sensing away from human centered thought.

Studies in the field of alchemy, its concepts, and history are currently flourishing, as an increasing number of researchers are delving into a broad array of subjects within it. Some scholars focus on conventional aspects such as alchemy's connections to material theory, medicine, or philosophy, while others utilize tools from fields like art, religion, and archaeology to uncover new perspectives. This interdisciplinary approach not only enhances the exploration of alchemy's historical context but also has ramifications for areas such as science.[15] Scholars see in the combination of art, the history of science, technology, and environmental issues a great opportunity to change perceptions towards the nonhuman. However, alchemical concepts have not yet been explored in relation to theories of translation and have hardly been considered for communication.

To answer my research questions and to point out the specific outcomes of these combinations, it is necessary to form a new theorization and conceptualization of alchemy's qualities and processes in relation to its historical development and overlapping disciplines, as well as to examine these processes in art. This leads me into a realm where alchemy serve as a source of inspiration for the artists working in the realm of hybrid art, using diverse materials, organic and inorganic, considering both as alive and thus expressive. Therefore, my thesis will focus on the interaction of art, alchemy, science, philosophy, and technologies,[16] with themes

[14] Lawrence M. Principe, "Alchemy Restored," *Isis* 102, no. 2 (June 2011): 310, https://doi.org/10.1086/660139.
[15] Tara E. Nummedal, "Words and Works in the History of Alchemy," *Isis* 102, no. 2 (June 2011): 330, https://doi.org/10.1086/660142.
[16] Technologies are not seen here as something different from natural worlds, but as an extension of 'nature', after Nicole C. Karafyllis: "'Nature', then, is no longer the other of 'technology' but its earlier and later stage, when reading 'technology' from a historical-biographical perspective" ("Endogenous Design of Biofacts. Tissues and Networks in Bio Art and Life Science," in *sk-Interfaces. Exploding Borders - Creating Membranes in Art, Technology and Society*, ed. Jens Hauser (Liverpool: University Press, 2008), 49.

related to the sensorial perception, interspecies communication, elemental powers, imagination, and intuition. I will work with different case studies, consisting of the artists Oscar Santillán with *Treelemma* (2023) and *Antibeing* (2022), Evelina Domnitch and Dmitry Gelfand with *Camera Lucida* (2003) and *Lemniscate Cascade* (2022), Sarah Schönfeld with *All You Can Feel* (2014) and *Alien Linguistic Lab* (2017), and Heather Barnett with *In Visible Substance* (2014), who all show a collaboration of art and scientific inquiry. I will show how these artists and their projects perform alchemical translation processes and create new linkages between the materialities of bodies.

1.2. Motives

Alchemy is a philosophy and science that has developed diverse motives and ideas over the centuries of its existence. In the following section, I will address the themes which are most relevant to my work, such as transformation and transmutation, the involvement and change of the human sensorium, moving away from a human centered thought. Alchemy, especially when implementing its concepts to translation studies, can create awareness and a special form of knowledge through its engagement with experiments and procedures on the one hand, and philosophical, intuitive, and metaphysical aspects on the other. It reconciles micro- and macrocosms and makes visible the hidden structures of life.

Alchemists unified focus is "on the analysis, synthesis, transformation, and production of material substances."[17] Although this practical alchemy is about the transformation of matter, changing and moving elements, the processes are also linked to the transformation of the human being: "Laboratory process was believed to purify both the chemical materials and the alchemist himself, along with his environment."[18] Alchemy's two best-known practices and concepts are transformation and transmutation of matter. Transformation refers to a significant change in form, appearance, nature, and character of matter. Transmutation, in turn specifically refers to the act or process of changing one element, substance or the soul into something new. The alchemical transformation step of nigredo (blackening/blackness) symbolizes the death of the transforming matter, as well as of the old self in, for example, Carl Gustav Jung's psychological conceptualization of alchemy.[19] From the state of nigredo, a new 'self' emerges which holds a "constructive, creative relationship with the world."[20] These transmutation processes, which

[17] Principe, "Alchemy Restored," 306.
[18] Szulakowska, *Alchemy in Contemporary Art*, 1.
[19] Daniel Anderson, "The Alchemy of Play," *Psychological Perspectives. A Quarterly Journal of Jungian Thought* 61, no. 2 (April 2018): 251, 252, https://doi.org/10.1080/00332925.2018.1461506.
[20] Anderson, "Alchemy of Play," 255.

alchemists and artists make visible, can be seen as a form of translation of elemental powers, as, it was, for example, the case with the human body. The body's inner movements became decipherable with the advent of molecular biology and the discovery of DNA: "Scientists increasingly employed linguistic tropes and communication models to describe the cell's molecular organization. […] Chemical reactions were considered to be transcriptions and translations, in a network of stored information."[21] As these chemical reactions are also visible in other organic and in inorganic matter, a translation of these processes must be possible.

When matter is transformed and transmuted, normally a technological medium is used through which we can observe and perceive these processes, for instance, a distillation apparatus, a microscope, a camera, or digital technologies such as A.I. The technological medium therefore shifts, changes, i.e., translates the chemical processes, as, for example, in the conversion of inner processes of pulses to audible media to make these hidden structures visible. These technologies' position of being 'in-between,' makes them the ideal mediator for a nonhierarchical translation process, like a third, more neutral party between human and 'nature.' This in-betweenness of technologies can bridge gaps of perception and bring opposite worlds together.

Translation becomes an important issue when thinking about the connection and communication to other species. Combining alchemical motives with plant life, Natasha Myers, a scholar for anthropology, science, and environmental studies, argues, "liveable worlds need people who know how to talk to the plants."[22] Thus, we would need to vegetalise our sensorium, which means to develop and extend our synesthetic sensorium by trying to understand and adapt the ways in which nonhuman entities are sensing the world.[23] In relation to technologies, art, and the human sensorium, Ksenia Fedorova, a scholar for visual cultures, philosophy, science and technology studies, adjusts and tests another alchemical motive to alter human senses: the homunculus – an artificially created humanoid being. She demonstrates that the homunculus can be seen as a metaphor for how science and technology alter and extend the human sensorium. This form of 'homunculization' means to detune our traditional sensorium, and to expand and extend the physiological sensorium apparatuses.[24] Similar processes are evident in

[21] Suzanne Anker, Susan Lindee, Edward A. Shanken, and Dorothy Nelkin, "Technogenesis: Aesthetic Dimensions of Art and Biotechnology," in *Altering nature*. Vol. I: Concepts of 'Nature' and 'the Natural' in Biotechnology Debates, ed. B.A. Lustig, B.A. Brody, and G. P. McKenny (New York: Springer, 2008), 283, https://doi.org/10.1007/978-1-4020-6921-5_6.
[22] Myers, "How to Grow."
[23] Myers, "How to Grow."
[24] Ksenia Fedorova, "Aesthetics of the 'Homunculus' of Science: Artistic Approach to Physiological Research in New Anthropology," to be published in *Wahrnehmungskräfte – Kräfte wahrnehmen. Dynamiken der Sinne in Wissenschaft, Kunst und Literatur*, ed. Frank Fehrenbach, Laura Isengard, Gerd Mathias Micheluzzi and Cornelia Zumbusch (Berlin: De Gruyter, 2024), 178, 182.

the concept of alchemical translation, but it strongly emphasizes to renew the bond with the nonhuman, shifting translation away from human centered thought. To connect with different species and nature means to transform known anthropogenic structures and to create new forms of alignment. To be able to transform human sensory it needs playful elements, deconstructing common knowledge, from where, in a second step, it can be reconstructed from anew.

Alchemy can be seen as a method and mindset, which animates objects and adds playful elements into thinking and sensing. Myers introduces 'forgetting as a practice,' which can create an openness towards the nonhuman and can change our conventional ideas about the living and non-living worlds. "To do this you need to forget your best training: forget what you thought 'nature' was; forget how you thought life 'worked'; and forget, too, the naturalizing tropes that made you believe that living beings 'work' like machines."[25] From this state new knowledge can be created. In alchemy, it is a knowledge that involves new sensory perceptions, but also a change in perceiving time and (geo)history through the material work. This knowledge evolves into wisdom in the sense how art historian and philosopher Nora Vaage defines it. Wisdom is a form of knowing "linked to experience and moments of inspiration."[26]

Translation is in itself a process that gives value to the translated element by creating attention. Alchemy can enrich this discourse as it, on the one hand, literally transforms base metals into valuable ones, ideally gold (chrysopoeia), and, on the other, it creates both attention and awareness. It is a deeper form of awareness that is needed to create new communicative connections to nonhuman worlds. Artworks and experiments can stimulate this awareness in activating our intuition, imagination, and speculation, where one can only guess the upcoming result and meaning.

1.3. Hybrid Art

Hybrid art involves the fusion of multiple artistic mediums and techniques, often combining traditional art forms with scientific or technological elements.[27] As do artists, scholars, and alchemists, I will not differentiate between biological and nonbiological matter, as both forms are considered vibrant and expressive. I consider "life not as property of organic creatures but as something that erupts in-between the creations in which it is implicated and explicated,

[25] Myers, "How to Grow."
[26] Nora Vaage, "Wisdom in Artistic Research. An Alternative to the Discourse of Art as Knowledge Production," in *Dialogues between Artistic Research and Science and Technology Studies*, ed. H.A. Borgdorff, P. Peters, and T. Pinch (London/New York: Routledge, 2020), 65, https://doi.org/10.4324/9780429438875.
[27] This artform is also referred to as 'technological art,' art and science, 'media art' or 'digital art.' Though, I decided to work with the term 'hybrid art' as it stresses its hybridity between technological use and inorganic and organic matter.

across many modes."[28] Artists dealing with matter and experimentation inform their work through sciences like biology, physics, or chemistry. Scientists who traditionally work with inert matter recognize that there is indeed liveliness to discover and to describe, implementing biological tropes into work of physics and chemistry. Artworks dealing with these topics are blending the sciences, which results in dynamic artworks that bridge the gap between physical, technological, and intuitive realms. Traditional art supplies like paint, canvas, metal, or clay are combined with technological components, forming a hybridity. Artists in this field are exploring a diverse range of materiality as alchemists did, experimenting with matter, form, technologies, bodies, growth, and change. Combining traditional and unconventional materials, these artists forge new forms of artistic expression that bridge gaps between the perceptible and material reality. It encourages recipients to interact with art in new and often more interactive ways, establishing a connection, affect, and communicative participation to the shown creations as well as to the technologies and materialities in use.

As technologies are also part of our material world and are part of our everyday lives, and thus, also part of our ecosystems, we are dependent on them. It is part of our ecological consciousness. This is why technologies should and cannot be excluded in thinking of sustainability and interspecies communication. This co-evolution of technical expertise and humans, or other animated matter, has been given various names, including 'cyborg,' which describes, after Donna Haraway, Professor Emerita in the history of consciousness and Feminist Studies, an alteration of bodies through technological devices, resulting in a post-human status.[29] These technologies can include various mediums, such as artificial intelligences, computer-generated graphics, digital painting, or interactive installations. The technologies of interest here are emerging from the life sciences, where the interfaces and commonalities between the laboratory and the art workplace become more apparent. The combination of contemporary technologies and (living) matter in art becomes "an original lens on the history and nature of (psycho- and neuro-) physiological research."[30] Nonetheless, it can be expanded and connected to metaphysical and metaphorical realms, as well as to issues of interspecies communication.

The fact that these technologies of the sciences are increasingly making their way into the world of art is also not too surprising when looking at the history of art and (the minor-science)

[28] Van Tuinen, *Philosophy of Mannerism*, 134, 135.
[29] Donna Haraway, "A Cyborg Manifesto: Science, Technology, and Socialist-Feminism in the Late Twentieth Century," in *Simians, Cyborgs and Women: The Reinvention of Nature* (New York; Routledge, 1991), 3, https://www.jstor.org/stable/10.5749/j.ctt1b7x5f6.
[30] Fedorova, "Aesthetics of Homunculus," 167.

alchemy, with their close relationship of making processes visible and thus understandable. Already in antiquity, alchemy has inspired various artists to make experiments perceivable on a more artistic level. However, this knowledge is characterized by inaccessibility, which contributes significantly to the perception of alchemy's hard-to-understand language and procedures. Art is a method to translate these processes into something perceivable and thus more understandable.

The fusion of technologies with matter and alchemical procedures not only produces new art forms, but also reflects the nature of art itself. Just as alchemists strove to accelerate, assist, or even enhance the processes of nature, and thus elucidate processes in nature for humans, contemporary artists seek to transform human constructs into transformative reflections on our relationship with the natural world. Verena Kuni reveals that the terminologies used in hybrid art, alchemy and the sciences seem to be very similar:

> Insbesondere in der Kunst mit elektronischen Medien und ihren Deutungshorizonten können eine Reihe dieser Aspekte zusammenfinden, wie neben einer einschlägigen Verortung der Arbeiten und der ihnen inhärenten Ästhetik des Erscheinens und Verschwindens auch das Vokabular der medientheoretischen Diskurse verrät, in dem Begriffe wie „Virtualität", „Scheinwelt", „Aura" und „Avatare", „Interaktivität" und „Immersion" eine zentrale Rolle spielen.[31]

This convergence makes me think: To what extent does alchemical discourse in hybrid art expand the viewer's perception of a shared ecosystem and their role within it?

Artistic methods of raising questions, utilizing material means, and creating aesthetic sensorial experiences can effectively contribute to communication with nonhuman worlds and create a public dialogue around these complex topics. As the artworks emphasize sensorial experiences, they can make observers conscious of how their perception is at work, paying attention to normally unnoticed (inner) reactions, and to deepen the understanding of the significance at the material level. This is particularly relevant when examining artworks that deal with intuitive and speculative topics, as they encourage viewers to engage with the material on both sensory and intellectual, or metaphorical levels. The use of artistic methods to cultivate aesthetic-sensory experiences can not only be an effective way to communicate science, but

[31] Verena Kuni, "Der Künstler als 'Magier' und 'Alchemist' im Spannungsfeld von Produktion und Rezeption Aspekte der Auseinandersetzung mit okkulten Traditionen in der europäischen Kunstgeschichte nach 1945. Eine vergleichende Fokusstudie – ausgehend von Joseph Beuys," (PhD diss., University of Marburg, 2004), 112.

also to stimulate public discourse on science, matter and humans, creating new foundations for communicating with nonhuman worlds.

1.4. Theoretical Background

The theoretical foundation of this research contains the concept of vital materialism, specifically political theorist, and philosopher Jane Bennet's notion of 'vibrant matter,' which underscores the vitality of all matter and the interconnectedness that binds every element within the cosmic fabric. Vibrant matter rejects anthropocentrism and biocentrism, focusing on dynamic interactions and collaborations among diverse elements called 'assemblages,' which collectively generate effects and affects.[32] I align with Bennett's notion, and consider matter as vibrant and agentic, and I will thus reject the traditional distinctions between life and matter, human, and nonhuman, organic and inorganic. Vibrant matter can enhance nonhuman perspectives for a more environmentally conscious public.[33] As already mentioned, the concept of Bennett's vibrant matter and alchemy are sharing fascinating connections that stem from their shared focus on the interconnectedness of the material world. Alchemy, associated with the quest to transmute metals into valuable ones, resonates with vibrant matter's emphasis on the transformative potential of matter. Both perspectives challenge the notion of fixed categories and instead highlight the dynamic nature of materials and their capacity to undergo profound changes. In alchemy, substances were believed to possess hidden qualities and vital forces that could be released through various processes. Similarly, vibrant matter emphasizes that all entities, organic and inorganic, possess inherent agency and affective power, contributing to a web of interconnected forces. Both concepts challenge dualistic frameworks and invite to see the world as a complex network of interactions, where transformation, intuition, and knowledge production are inherent qualities. In this sense, vibrant matter and alchemy mutually recognize the profound capacities and hidden potentials of matter.

I will associate with a second non-anthropocentric theory, which also ties back to the concept of vibrant matter – Haraway's paradigm of interspecies connections. This theory advocates for breaking down the boundaries between humans and other species. Haraway characterizes the diverse ecosystems as dynamic, interdependent systems of living and non-living – an ever-changing assemblage of biological, geological, and technological components that continually evolve and adapt to shifting conditions: "Human nature is an interspecies relationship."[34] To

[32] Bennett, *Vibrant Matter*, 34, 61.
[33] Bennett, *Vibrant Matter*, 111.
[34] Donna Haraway, *When Species Meet* (Minneapolis: University of Minnesota Press, 2008), 19.

understand this in its full scope is to distance oneself from a human exceptionalism and to recognize other forms of life and non-life as dependent, equal, and communicative.

I will introduce and apply several other theories and concepts, drawing from not only the realms of new materialisms and interspecies connection but are also from contemporary theories of alchemy. This includes, for example, the already mentioned concept of 'homunculization' by Fedorova, or notions by psychologist Daniel Anderson on alchemy and play, who characterizes both as dynamic, flexible structures of the psyche. Furthermore, philosopher Sjoerd van Tuinen's conceptualization of alchemy's modality and its relation to crafting will play an important role. Considering crafting in relation to alchemy and its technological supporters underlines the concept of 'technê,' which describes both theoretical understanding and practical skills. In relation to translation studies, biologist and philosopher Jakob Johan Uexküll's notion of 'biosemiotics' and especially its further development by Cronin with 'eco-translation' are relevant. In addition, I align with Vaage and her theorization of wisdom, I will, however, strengthen the concept with Indigenous notions and elaborations on knowledge.

1.5. Methodology and Approach

My thesis will be interdisciplinary in nature, exploring various fields and methodologies. An iconographic analysis is fundamental to the analysis of art. This analytical approach involves deciphering motives, techniques, symbolic meaning, and the observer's experience woven into the artworks. By exploring different layers of meaning within the artworks, I can uncover narratives of liveliness, expressivity, transformation, and transmutation, as well as interconnectedness, and sustainability. Furthermore, a formalistic analysis will be applied, as it focuses on color, texture, and composition. These visual elements contribute to the meaning of the artwork and the experience of its aesthetics.

To translate alchemically and to engage in communication requires intuition and speculation in order to envision such a radical change in the material world. Intuition and speculation within the alchemical realm entail experimental and hypothetical thinking to understand the deeper meanings encoded in matter. Alchemists engage in intuitive methods, contemplating the nature of existence, the cosmos, and the interplay between material and spiritual aspects. Intuition can be seen as a channel for accessing hidden knowledge and wisdom beyond the rational mind, trusting in a more imaginative and perceptive way of experience. These approaches in the context of art and its practice explore and envision possibilities, alternative futures, and different ways of thinking, knowing, and being. They encourage critical reflection on the

current situation and challenge conventional perspectives, such as human exceptionalism. The artworks that integrate and evoke in their recipients these aspects can involve complex and interconnected relationships of bodies and technologies and explore themes that unfold unpredictable ways. One of my objectives is to discover these speculative and intuitive moments and movements in artworks dealing with the liveliness of matter and their translation into something perceivable.

As previously mentioned, the intersection of science, art, and alchemy evokes a lively interest in academic research. However, certain aspects and issues have not yet been thoroughly examined, particularly concerning alchemy's potential to offer valuable contributions to the discourse of translation studies and nonhuman communication. To ensure a comprehensive overview and to highlight these research gaps, as well as to grasp developments and motives of alchemy, I will give an overview of its history in Chapter two. This historical overview will be juxtaposed to and extended with contemporary notions and related themes. The interconnected nature of alchemy, new materialisms, ecological concerns, and interspecies connection will be revealed through a demonstration of their shared concerns. In Chapter three, I will bring these fields into dialogue and formulate a new conceptualization of translation informed by alchemical motives and procedures. For this reason, an exploration of theories and concepts in translation studies will be undertaken to enrich the discourse and to lead it away from anthropocentric viewpoints. In Chapter four, an analysis of the selected artworks is conducted, employing alchemical translation as a concept and framework. Through this approach, I aim to answer the outlined research questions. Various artworks and artists will be examined to explore how aspects of alchemical translation processes are implemented, promoting new ways of communication and living-together with other entities. The conclusion will summarize the results.

2. The History of Alchemy and Contemporary Concepts

Alchemy was already known before antiquity and was a topic discussed by academics, philosophers, and scientists, either condemning or praising it. It encompasses several different areas, such us chemical technology, like pigment creation, but it also intersects with early modern pharmacology (chymiatria), chrysopoeia (the creation of gold) and philosophical thought.[35] William R. Newman, Professor for History and Philosophy of Science, dedicates his work to various alchemical concepts and shows that alchemy served as a significant framework for discussing the boundary between art and nature. He delves into various aspects of alchemy's historical and philosophical debates, offering a comprehensive exploration of its evolution and significance. From medieval manuscripts to the symbol-laden works of Modernity, alchemy created a path for discovery that transcended conventional boundaries, common rules, and perception. Hence, alchemy had a profound connection with art leaving a permanent mark on the world of this close discipline, in being a source for new artistic developments and for political expressions. Both alchemy and visual art are closely related, as Newman explains: "Alchemists and visual artists were in an immediate sense rivals in the business of re-creating nature, even if the former claimed to replicate a natural product while the latter were engaged in its representation."[36] This specific debate between alchemy and art will not be explored in detail here, but I would like to point out that the two have many similarities in their quest to animate things, to draw attention to 'things' by working on and with them, to experiment with various materials, altering them as well as the human being, knowing no boundaries.

The extent to which alchemy has engaged people's minds is evident in the various literary and scholarly publications on the subject. For example, UK based researcher Adam McLean has published several books and articles on alchemy and supports the Bibliotheca Philosophica Hermetica (Embassy of the Free Mind) in Amsterdam. He created an eclectic website of alchemy.[37] The website has collected, among other things, an incredible amount of visual material. In order to develop a better sense and awareness of the alchemical themes in contemporary art, it is essential to explore the rich visual material of alchemy's history. Furthermore, books and essays can be found, where, for example, alchemical processes are applied to explore 'magical attractions' in Johann Wolfgang Goethe's *Elective Affinities* by Jeremy Adle in 1987. Books are published about spiritual alchemy, which are related to e.g.,

[35] William Royall Newman, "The Problem of Alchemy," *The New Atlantis*, no. 44 (Winter 2015): 67, https://www.jstor.org/stable/43551427.
[36] Newman, *Promethean Ambitions*, 8.
[37] "Alchemy Website," Alchemy Website, accessed December 13, 2023, https://www.alchemywebsite.com/index.html.

the psychology of Carl Gustav Jung. One can find material about the Rosicrucian, about famous alchemists like John Dee, Paracelsus, Michael Maier, Robert Fludd, Albertus Magnus, and Avicenna, or about alchemy's link to todays' chemistry.[38] This wide range of topics demonstrates how alchemy can be made effective for diverse fields and disciplines and shows its great potential to be a changing force when thinking about nonhuman connections and communication.

The history of alchemy is old and intricate, revealing complexity when looking at the different influences and interpretations of specific alchemical themes and developments. In the following parts, I will direct the focus to key motives and historical changes in alchemy's history, from antiquity to the present day. Firstly, I will show how philosophers and so-called 'proto-alchemists' developed vitalist concepts in antiquity. In the late Middle Ages, these discourses were continued and expanded, and precise theories of transformation and transmutation were developed. After introducing key motives, I will focus on similar but contemporary concepts, such as new materialisms, juxtaposing them with alchemical ones. In the second section, the notion of homunculus will be examined in detail, with Paracelsus' contribution playing a particularly important role. Paracelsus also brought aspects of healing into the alchemical discourse, which is also contrasted here with contemporary concepts such as art historian Edward Shanken's 'Technoshamanism.' The structures of micro-and macrocosmic relations in the Renaissance are presented in the third section, where alchemy developed further as a hermetic tradition. Here, I will also address alchemy's separation from the newly named chemistry. The fourth section shows how alchemy found access to ecological topics and became of interest for the life sciences. The final section demonstrates how alchemy is influential as a concept today and how its qualities are related to those of composting and photosynthesis.

2.1. Tracing Lively Matter in Ancient Philosophy and New Materialisms

In Egyptian antiquity (until around 200 B.C.E.) (proto-)alchemy was still a "simple technology,"[39] working with metals, stones, glass, and dyes. Between 200 B.C.E. and 100 C.E., the Egyptian technical recipes were mixed with ideas of 'sympathies' and 'antipathies' between different materials and substances.[40] 400 years later, the antique historian Zosimos saw a kind

[38] "Alchemy Website," Bibliography, accessed December 13, 2023, https://www.alchemywebsite.com/bibliog.html.
[39] Newman, *Promethean Ambitions*, 25.
[40] Newman, *Promethean Ambitions*, 28.

of ‘spirit’ or ‘pneuma’ in all these substances, giving them their activity and color, but above all, describing their liveliness. To characterize the process life, the word ‘phusis’ was used, which means to “puff, blow, or swell up.”[41] Different empirical traditions are applied to gain a comprehensive understanding of the processes involved. It includes careful observation of the interactions between different materials and substances, as well as experimentation, attempting to understand matter’s affinities and repulsions. However, also metaphysical concepts contribute in interpreting the inherent properties of the substances, delving into unseen forces that govern their behavior. These terms of growth describe a process of change and morphing, when things are set in motion and enter into strange conjunctions with other materialities. Aristotle coined the term ‘entelecheia,’ which describes a power that moves all things.[42] In the end of the nineteenth century, the term was further developed by philosopher Hans Driesch:

> The goal of Driesch’s laboratory work, and the reason for his strict adherence to the protocols of empirical science, was not simply to gain a more subtle understanding of the dynamic chemical and physical properties of the organism but also to better discern what animated the machine.[43]

This is entelechy – “the non-mechanical agent responsible for the phenomena of life.”[44] Entelechy is the animating principle of life and is thus connected to the idea of a soul. However, as Bennett points out, “soul vitalism is, in short, more anthropocentric, and hierarchical than critical vitalism. Its cosmos is a morally ranked Creation at the top of which God has placed his most vital creature, Man.”[45]

When ‘entelechia’ was the principle of life, the four ‘humors,’ blood, phlegm, yellow bile, and black bile, were the chemical substances and systems that regulated human behaviors. The Greek doctor Aelius Galenus (around 200 AD), who worked with diverse theories by Aristotle, contributed to the idea of the four humors doctrine, stating that the humors are responsible for character traits. He developed the temperaments of Melancholy, Choleric, Phlegmatic, and Sanguine. In the ninth century, Arabic authors added different planets to the humors, e.g., Melancholic was connected to Saturn. The idea of an interconnected micro- and macrocosm

[41] Bennett, *Vibrant Matter*, 118.
[42] Chang, “Alchemy as Studies of Life,” 326.
[43] Bennett, *Vibrant Matter*, 71.
[44] Bennett, *Vibrant Matter*, 71.
[45] Bennett, *Vibrant Matter*, 87, 88.

has already been formulated here and will continue to play an important role in later developments in alchemy's history.[46]

In Europe, there was a period of silence regarding the development and study of alchemy, and it was not until the twelfth and thirteenth centuries, when a larger number of alchemical texts were translated from Arabic into Latin, that the Western Middle Ages could form their own opinions on the subject.[47] Alchemy became the 'ars magna' (the 'Great Art'), which is specifically associated with the work of the medieval philosopher, theologian, and writer Ramon Llull (around 1232–1316).[48] He used the term 'ars magna' to refer to his method of combining different symbols and letters in a systematic way to represent and generate knowledge, combining alchemical and metaphorical ideas.[49]

In medieval and early modern times, alchemy is shaping the debate regarding the boundaries of natural science and technology, (practical) chemistry, as well as the moral and ontological limits of human endeavor. Alchemical processes involve the quest for transmutation, seeking to transform base metals into gold and discover the philosopher's stone – a substance that could create and sustain life. These aspects are also visible in contemporary biotechnological discussions on, for example, cloning, which are conflicted with ethical issues and questions of human limitations.[50]

Regarding alchemical processes, the greatest discussion was the issue of a genuine, alchemical transmutation.[51] Transformation and transmutation encompass significant changes in the form or character of a substance, leading to a new state or condition. In chemical transformation processes, seven steps were necessary to successfully transmute matter: calcination, dissolution, separation, conjunction, fermentation, distillation, and coagulation. These processes refer to the process of changing one element or substance into another, commonly associated with the alchemical practice of turning base metals into valuable ones, such as gold. Though, transformation and transmutation can also apply to various aspects of life including personal growth. While alchemy's claim of transmuting species was historically met with skepticism, the belief in the philosopher stone, which is said to perform true transmutations, remains a key concept of alchemy.

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[46] Paul Demont, "Der antike Melancholiebegriff: von der Krankheit zum Temperament," in *Melancholie. Genie und Wahnsinn in der Kunst*, ed. Jean Clair (Berlin/Paris: Hatje Cantz Verlag, 2006), 34–38.
[47] Newman, *Promethean Ambitions*, 35.
[48] Michela Pereira, "Lullian Alchemy: Aspects and Problems of the Corpus of Alchemical Works Attributed to Ramon Llull (XIV-XVII centuries)," *Catalan Review* IV, no. 1–2 (1990): 46, https://raco.cat/index.php/CatalanReview/article/view/309917.
[49] Bethany Nowviskie, "Ludic Algorithms," in *Pastplay. Teaching and Learning History with Technology*, ed. Kevin Kee (Michigan: University of Michigan Press, 2014), 163, https://doi.org/10.3998/dh.12544152.0001.001.
[50] Newman, *Promethean Ambitions*, 53.
[51] Newman, *Promethean Ambitions*, 9.

The philosopher's stone is assumed to transform base metals into gold and grant immortality to its owner. It is a substance sought after by alchemists throughout history. The process of creating the philosopher's stone is shrouded in mystical and symbolic language, often described as a highly intricate and advanced scientific, but "workable processes."[52] One of the initial steps to create this substance involves a step called 'nigredo' – the purification of the prima materia. The prima materia represents the fundamental substance from which all things are believed to originate.[53] In this first stage, the materials and the soul have been separated from the base matter, and in the last, they are metamorphized and reunited again.[54] The culmination of these processes results in the creation of a white crystalline liquid known as the quintessence.[55] This quintessence is the highest possible form, where spirit and matter merge into a singular substance, representing the philosopher's stone. In alchemical symbolism, the philosopher's stone was often depicted as a hermaphrodite, the merging of man and woman, sol and luna, king and queen – a chemical wedding, representing the unification and reconciliation of contrasting elements.

Since alchemy always pushed the boundaries of ethics and religion, it was already in the 1270s, that it began to fall into discredit and prohibitions were issued. Around 100 years later, Pope John XXII condemned alchemy, arguing that transmutation is impossible, and alchemists are therefore frauds. Alchemy was increasingly condemned, censored, and portrayed as dangerous to conduct.[56] Despite this condemnation, debates about alchemy and alchemical experiments continued, seeking to grasp matters inherent qualities of liveness.

Contemporary scholars have drawn attention to connections of life and matter in their publications, such as historian Pamela Smith's examination of vitalist motivations in chemical practices of alchemist and apothecary Johann Rudolph Glauber (1604–1650).[57] Scholars specializing in new materialisms, which emerged in the early twenty-first century, acknowledge that academics and philosophers in antiquity and all their successors had a profound understanding of matter and its inherent quality of vitality. It is, however, surprising that few scholars have extensively explored comparable concepts within the realm of alchemy. Further exploration into alchemical knowledge can contribute to new perspectives and enhance our understanding, facilitating connections with nonhuman worlds. Yet, new materialisms provide

[52] Principe, "Alchemy Restored," 310.
[53] Szulakowska, *Alchemy in Contemporary Art*, 191.
[54] Szulakowska, *Alchemy in Contemporary Art*, 21.
[55] Szulakowska, *Alchemy in Contemporary Art*, 189.
[56] Newman, *Promethean Ambitions*, 83.
[57] Pamela H. Smith, *The Body of the Artisan: Art and Experience in the Scientific Revolution* (Chicago: University of Chicago Press, 2004), 153.

a suitable foundation for my thesis, as the theories disrupt the dominance of only human worlds, emphasizing often overlooked material realities. New materialists' perspective posits that everything, from the smallest particle to the grandest ecosystem, is composed of physicochemical processes, defying reduction to mere inertia or predictability.[58] It stresses the self-organizing properties inherent in matter, whether manifested in "tumbleweeds, animal species, the planetary ecosystems, global weather patterns", or even social phenomena like new movements, health, crime, and economics.[59]

Bennett's conceptualization of vibrant matter rejects anthropocentrism and emphasizes the contribution of nonhuman entities in our world. This might lead to a treatment which is "more careful, more strategical, more ecological."[60] She questions what can change if matter would actually be perceived as alive: "How would political responses to public problems change were we to take seriously the vitality of (nonhuman) bodies?"[61] This question cannot be answered, yet, but it is clear that we need more perspectives to allow nonhuman worlds to have a voice. Isabelle Stengers, who researches the philosophy of science, stresses that (al)chemists would not only "operate chemical transformations. They harness the power of diverse, selected 'agents,' but those agents operate on their own, specific terms."[62] Translation and communication with these nonhuman worlds mean to understand the specific terms and to make agency visible, which can change how we perceive and interact with these other worlds. Vibrant matter as well as alchemy are blurring the ontological boundaries between the living and non-living. Alchemy shares many characteristics with Bennett's vibrant matter, even though it is barely mentioned. It becomes apparent that the field of new materialisms is not that 'new,' considering that alchemy has similar notions of vitalism. Alchemy can, however, contribute with qualities of an empirical and conceptual tool. It examines metaphysical aspects to explore the fundamental nature of reality, addressing questions about what exists and the nature of existence itself. Furthermore, examining the history of alchemy could give insights into the longstanding political and social forces and factors that led to its condemnation and censorship and help evaluate how novel approaches might face rejection and challenges.

Alchemy is a discipline of 'in-betweenness.' It can be related to both scientific methods and philosophy and art and therefore also to creative and intuitive methods. It can trace, translate,

[58] Diana Coole and Samantha Frost Coole, "Introducing the New Materialisms," in *New Materialisms*, 9, 10.
[59] Coole and Frost, "New Materialisms," 3, 14.
[60] Bennett, *Vibrant Matter*, 18.
[61] Bennett, *Vibrant Matter*, viii.
[62] Isabelle Stengers, "Receiving the Gift: Earthly Events, Chemical Invariants and Elemental Powers," in *Reactivating Elements. Chemistry, Ecology, Practice*, ed. Dimitris Papadopoulos, Maria Puig de la Bellacasa, and Natasha Myers (Durham/London: Duke University Press, 2021), 22, https://doi.org/10.1515/9781478021674-003.

and express things, and in turn 'hide' this knowledge behind symbolism, so that human perceptual boundaries must be transcended to be able to understand. The focus is no longer on the differences between the disciplines of art and alchemy, as in the old debates about representation, but on their interdisciplinary similarities.

2.2. Homunculi, Healing, and the Interconnectedness of Matter

The evolution of the homunculus in alchemy, from Paracelsus to modern interpretations, reflects a fascinating journey intertwined with art, science, and questions about the boundaries of life and matter. Fedorova's concept of 'homunculization' adds a contemporary layer, connecting art and scientific research. Vitalist alchemy in early modern times further develops and enriches the discourse, exploring the intricate relationship between human and 'other.'

The Swiss doctor and natural philosopher Paracelsus (1493–1541) was deeply involved in alchemy, its medical application, the creation of the philosopher' stone, and homunculi. He offers a recipe for the creation of a homunculus in his treatise *De rerum naturae* (1537).[63] The homunculus revolves around the idea of creating a miniature humanoid artificial being, often within the confines of an alchemical flask.[64] Newmann calls the creation of homunculi "one of the most fecund areas of speculation about artificial human life."[65] The creation of homunculi typically involved matter from human semen or a mixture of semen and other substances.[66] Mary Baine Campbell, a researcher of the history of science and early modern literature, sheds light on the respective relevance of male and female elements in the creation of the homunculus and its connection to Christian theology, particularly to the metamorphosis that is believed to occur during the Christian sacrament of the Eucharist. According to the doctrine of transubstantiation, the bread and wine used in the sacrament undergo a change in substance, while retaining the appearances of bread and wine.[67]

In the seventeenth century, in the German book *Chymical Wedding of Christian Rosenkreutz* (1616) by Johann Valentin Andreae, the production of homunculi is an allegory for spiritual regeneration. Even later, especially through Goethe's *Faust II* (1832), the homunculus "stands for the eternally complicated relations between the material and the immaterial, body and

[63] Mary Baine Campbell, "Artificial Man: Alchemy, Transubstantiation, and the Homunculus," *Republics of Letters: A Journal for the Study of Knowledge, Politics, and the Arts* 1, no. 2 (April 2010): 5, https://arcade.stanford.edu/rofl/artificial-men-alchemy-transubstantiation-and-homunculus.
[64] Newman, *Promethean Ambitions*, 6; Fedorova, "Aesthetics of Homunculus," 168.
[65] Newman, *Promethean Ambitions*, 171.
[66] Newman. *Promethean Ambitions*, 184.
[67] Campbell, "Artificial Man," 9.

spirit,"[68] and "symbolized man's creative power and knowledge of hidden secrets."[69] The idea of an artificial created man is also a topic in Marry Shelly's *Frankenstein* (1818), where the artificial man, created by scientist Victor Frankenstein, is a sentient creature endowed with immense physical strength and a profound sense of loneliness and existential despair. In Gustav Meyrink's *Der Golem* (1915), which draws inspiration from Jewish folklore, the artificial being is a creature molded from clay and animated through poetic words. While the explicit connection to alchemy has faded in the modern world of bioengineering and genetic advancements, the fascination with creating life artificially, such as ectogenesis, remains a captivating aspect of human imagination and biotechnological scientific exploration.[70]

Fedorova concept of 'homunculization' marks an expansion and extension of the human sensorium apparatus through technological means. She explores the intersection of contemporary art with scientific research, emphasizing the materiality of perception and the ways in which artists engage with diverse sensory experiences. She combines this notion with epistemological questions, modern science, and art: "The key questions for them [creators of artificial life] were about the ontological and epistemological status of these externalized and abstracted 'forms of life' – knowledge about bodies separated from the bodies themselves."[71] The homunculus "can be seen as our own 'other,' our spiritual and bodily potential that science tries to understand through its simulations, a version of ourselves that we don't fully know yet."[72] This is why the homunculus can "reflect to us our own behavior and allegedly offer additional knowledge."[73] This form of 'othering' is an abstraction a form to make empirical observations visible. This involves creating a symbolic or conceptual separation. In empirical observation, objectivity is crucial, and 'othering' aids in achieving this by creating a perceptual distance between the observer and the observed. It shows how a system works and can thus be seen as a form of translation. For human related observation, the concept of 'homunculization' yields various insides. It can open the possibility to perceive a part of yourself 'outside' and changed from yourself, but which is still part of you, even if it has been abstracted so far that one no longer fully recognizes the connection to the abstraction. It shows how much 'other' there is in humans themselves and, conversely, can show how much of us is present in the 'other,' nonhuman thing.

[68] Fedorova, "Aesthetics of Homunculus," 190.
[69] Newman, *Promethean Ambitions*, 199.
[70] Robert Zwijnenberg, "Biotechnology, Human Dignity and the Importance of Art," *Rethinking 'Nature', Rivista di filosofia fondata da Vittorio Sainati* XXXIV, no. 1 (2014): 135.
[71] Fedorova, "Aesthetics of Homunculus," 189.
[72] Fedorova, "Aesthetics of Homunculus," 190.
[73] Fedorova, "Aesthetics of Homunculus," 168.

Paracelsus was not only an alchemist and philosopher, but above all a doctor, who focused on medical applications of alchemical techniques, known as chymical medicine.[74] This demonstrates that aspects of healing were also part of alchemical thought and practice. Alchemical concepts and processes can still provide aspects and strategies for healing processes, which are needed for ill and suffering worlds on planet Earth**.** Shanken, for instance, uses occult traditions related to alchemy for his exploration of the intersection of art and technology, expanding consciousness and fostering love, which is known as: shamanism. In the mid-1990s, the concept of 'technoshamanism' emerged, drawing inspiration from shamanic traditions worldwide. It combines ancient Indigenous shamanic technologies and plant medicine rituals with postindustrial technologies. Shanken has studied artworks that combine technology, environmental issues, and practices of healing, developing the concept of 'technoshamanism': "I take technoshamanism to join shamanic technologies with postindustrial technologies […] all in the service of healing and sustaining life."[75] Technoshamanism is viewed as a methodology for producing knowledge, as shamanistic practices can bridge diverse knowledge domains and enhance art's potential for a greater awareness of interbeing.[76] Dimitris Papadopoulos, Professor in Science and Technology Studies, mentions alchemical ideas by Paracelsus in connection to today's ecological imageries and shows the necessity of learning "to move through the soils" and to work with matter "to create lasting environments."[77] He explains that Paracelsus "believed in the existence of sentient beings, elemental spirits that are made of and live within the elements of earth, water, air, and fire. […] These liminal supporters of Gaia inhabit worlds that are not possible for humans to relate to directly, says Paracelsus."[78]

To this point of alchemy's history, it can be said that there are diverse theories on vibrant, living matter and related notions to find ways to sense and communicate with these entities, and to start a process of healing together. But alchemy is also engaged in empirical practices such as the experimentation with materials and observation to understand the transformation of substances and to gain material knowledge of how the world works.

[74] Newman, *Promethean Ambitions*, 107.
[75] Edward A. Shanken, "Notes on Art and Healing: Shamanism, New Media, and Technoshamanism," *Iris* 1, no. 4 (August 2023): 1, https://doi.org/10.33552/IOJASS.2023.01.000520.
[76] Shanken, "Art and Healing," 2.
[77] Dimitris Papadopoulos, "Chemicals, Ecology, and Reparative Justice," in *Reactivating Elements*, 61, https://doi.org/10.1515/9781478021674-004.
[78] Papadopoulos, "Chemicals, Ecology, and Justice," 61.

2.3. The Renaissance: Alchemical Imagery and the Knowledge of the Cosmos

Alchemy's philosophy in the Renaissance, rooted in paracelsian systems, forms a hybrid belief system blending pagan and Christian elements. This framework envisioned the human being as a mirror of the universal cosmic order. In the fifteenth century, alchemical imagery and symbolism reached its first peak, as numerous alchemical texts with complex symbolic systems were translated, expanded, adjusted, and renewed.

The hermetic principle of correspondence encompasses a profound understanding of the interconnectedness between the microcosm, represented by the human body, and the macrocosm, which signifies the planets, universe, or the gods. To be able to perceive the relationships between microcosm and macrocosm, it needs what Paracelsus called a principle of knowledge in the human soul – the "Licht der Natur."[79] It reveals the connection between humans, other living beings, stars, metals, and their chemical elements.[80] This light of the nature is a form of vital energy animating all these worlds. Ku-Ming Chang, scholar of history and philology, states that theories of vitalism are inherent in the micro-macrocosm theorem and can be seen as an "immanent vitalism, [which] presumed a principle of life that was intrinsic to matter."[81] In this worldview, knowledge is attained through a deep empathetic connection with the world, emphasizing gnosis over rational logic.[82] Paracelsus contributed to this perspective by positing that one's individual behavior and identity are shaped by the essence of a thing rather than its appearance, leading to the idea that one actualizes different aspects of oneself by aligning with corresponding aspects of the universe.[83] This interconnectedness underscores the notion that the individual and the cosmos are inextricably linked, with actions on one level resonating on the other, echoing the Hermetic adage 'as above, so below.' This micro-macrocosmic perspective reveals the deep-seated belief in a holistic interdependence of all elements, with celestial bodies being as influential within the individual as they are outside of them.[84] It suggests that patterns observed in one realm reflect patterns in others. This concept can also be extended to the even smaller worlds: microbes, bacteria, or even atoms become a nano-cosmos with which we are also irrevocably connected, although we may not be able to directly see or perceive it. This notion of interdependences is nowadays visible in quantum physics, where the notion of 'entanglement' refers to a phenomenon of correlating particles and

[79] Antoine Faivre, *Esoterik im Überblick. Geheime Geschichte des abendländischen Denkens*, trans. Peter Schmidt and Rolf Wintermeyer (Freiburg/Basel/Wien: Herder Spektrum, 2000), 66.
[80] Faivre, *Esoterik im Überblick*, 66.
[81] Chang, "Alchemy as Studies of Life," 324.
[82] Szulakowska, *Alchemy in Contemporary Art*, 184.
[83] Newman, *Promethean Ambitions*, 217.
[84] Faivre, *Esoterik im Überblick*, 66.

where the state of one particle instantaneously influences the state of another, regardless of the distance between them. This principle of quantum entanglement and the non-local nature of quantum phenomena align with the idea that elements, even at the microcosmic level, are deeply interconnected.[85]

The hermetic principle of correspondence stems from a foundational alchemical and hermetic text named *The Emerald Tablet*, attributed to the god-like and fortune-telling Hermes Trismegistus.[86] It was in the Middle Ages translated from Arabic into Latin and was, for example, in the fifteenth and sixteenth century further embellished with various pictorial symbols. This treatise is considered a concise guide to alchemical and spiritual transformation. The author, Hermes Trismegistus, is revered as a source of wisdom and a messenger between the divine and human realms. Hermeticism is derived from Hermes Trismegistus and is characterized by syncretism, the blending of different religious and philosophical traditions. Central to hermeticism is the pursuit of hidden knowledge that is believed to lead to spiritual enlightenment and a deeper understanding of the cosmos. This knowledge is often transmitted through symbolic and metaphorical language.[87] In the *Corpus Hermeticum*, another treatise attributed to Hermes Trismegistus and translated in the 1460s, are different chemical processes outlined, such as the distillation and the separation of volatile spirits from material dregs.[88] In the *Rosarium Philosophorum*, a thirteenth century alchemical treatise attributed to doctor and theologist Arnaldus de Villanova, published in 1550, is written partly in poetry and partly in prose. The alchemical processes and substances are illustrated by taking the roles of characters from the Bible, ancient mythology, or the medieval romance of chivalry. The processes were also depicted by a chemical marriage of sol and luna, accompanied by all kind of other creatures.[89]

These images were used for chemical processes and connected to physiological and psychological ones. One image could have several meanings, which meant that a clear translation of the processes was never entirely unambiguous: “Image and material coincide in

[85] Nóra Sofia Izsó, “The New Paradigm in The Light of Ancient Hermetic Teachings,” *World Futures* 74, no. 3 (March 2018): 205, https://doi.org/10.1080/02604027.2018.1444002.
[86] Theodore C Skeat and Eric G. Turner, “An Oracle of Hermes Trismegistos at Saqqâra,” *The Journal of Egyptian Archaeology* 54, no. 1 (August 1968): 203, https://doi.org/10.1177/030751336805400; Hermes Trismegistus, or Hermes the Thrice Greatest, is an amalgamation of the Greek god Hermes, and the Egyptian god of wisdom, Thoth.
[87] Chiara Crisciani, “Hermeticism and Alchemy: The Case of Ludovico Lazzarelli,” *Early Science and Medicine* 5, no. 2 (2000): 151, https://www.jstor.org/stable/4130473.
[88] Szulakowska, *Alchemy in Contemporary Art*, 13.
[89] Jennifer M. Rampling, “A Secret Language: The Ripley Scrolls,” in *Art and Alchemy: The Mystery of Transformation*, ed. Dedo von Kerssenbrock-Krosigk, Beat Wismer, Sven Dupré, and Anita Hachmann (Düsseldorf: Hirmer/Museum Kunstpalast, 2014), 39.

a system of opaque signs, traces of cosmic themes, that can be combined in endless variation."[90] Alchemists such as Heinrich Khunrath, Michael Maier, or Robert Fludd incorporated elaborate illustrations in their works, using them as tools for private meditation to achieve a closer union with both God and nature.[91] German philosopher Athanasius Kircher (1602–1680) believed that experimenting with matter would reveal truth, as Egyptian natural philosophers promised.[92] As matter is able to unhide this wisdom, so are the words which are transformed from prose into verse. For Kircher, poetry was a divine form of art and an expression of prophetic words of godly realms.[93] Furthermore, artists and sculptors, such as mannerist sculptor Bernard Palissy (1510–1580), worked with alchemical concepts and ideas. He explains how to channel life into clay and "brought together making, knowing, and sensing and regarded ceramics as a new medium for philosophical inquiry into terrestrial and organic processes by which minerals, plants, and animals are born, die, and fuse their immortal traces into rock."[94] These processes create "a strictly 'speculative knowledge.'"[95] In the same century, the *Chymical Wedding of Christian Rosencreutz* was published, a text which is until now famous for its rich alchemical symbolism. Its author Johann Valentin Andreae focuses especially on the production of homunculi, which becomes an allegory of spiritual development and enhancement.[96]

It becomes clear, that the focus during the fifteenth and sixteenth century is on spiritual improvement and growth, which is achieved through the work with the materials as well as through insights into their metaphysical, divine realms. In this sense, alchemy is a philosophy of what Sjoerd van Tuinen discusses as 'modal metaphysics,' which is not construed as theoretical philosophy but as a relational practice, a harmonization of theory and practice. In this view, forces do not exist independently but only in interaction with other forces.[97] The status and modes of these forces are "nothing but what will be; it is pure 'advent." The modality of "passing between being and becoming,"[98] is the potential through which a thing becomes what it is.

[90] Van Tuinen, *Philosophy of Mannerism*, 136.
[91] Szulakowska, *Alchemy in Contemporary Art*, 11.
[92] Ingrid D. Rowland, "Poetry and Prophecy in the Encyclopedic System of Athanasius Kircher," *Bruniana & Campanelliana* 11, no. 2 (2005): 514, https://www.jstor.org/stable/24334091.
[93] Rowland, "Poetry and Prophecy," 509; Darren Wershler, Lori Emerson and Jussi Parikka, for example, point out that also "science and poetry have always been entangled" (*The Lab Book. Situated in Practice in Media Studies* (Minneapolis/London: University of Minnesota Press, 2021), 8).
[94] Van Tuinen, *Philosophy of Mannerism*, 136.
[95] Van Tuinen, *Philosophy of Mannerism*, 136.
[96] Newman, *Promethean Ambitions*, 234.
[97] Van Tuinen, *Philosophy of Mannerism*, 99.
[98] Van Tuinen, *Philosophy of Mannerism*, 11.

In the eighteenth century, alchemy underwent a kind of encapsulation, as a result of which it was held in even greater disrepute. Scholar for the history of science Lawrence Principe offers valuable insights into the historical trajectory of alchemy and its relation and evolvement with the field of chemistry from the eighteenth century onwards.[99] The new field of chemistry had moved away from alchemies ridiculous sounding goal of producing gold, and alchemical practices became more associated with esoteric and occult traditions. Alchemy was treated as the leprous 'other' in contrast to chemistry.[100] Principe stresses that "they [the field of chemistry] *needed* alchemy to be 'something other,' something in opposition to which modern, rational, experimental science could define itself and upon which they could in turn define themselves."[101] Thus, also perspectives regarding vitalism change here and more mechanical concepts were introduced: "The soul knew biological purposes and goals, while matter followed mechanical laws blindly."[102] This drew a boundary between 'lifeless' matter and the living being, and no vitalist would reclaim the inorganic world as part of their territory, until the development of new materialisms.[103]

Separated from the 'true' science, alchemy saw a resurgence within secret societies.[104] Though, also scientist, like Isaac Newton, Locke and Leibniz are fascinated by transmutation processes, and believed in chrysopoeia.[105] Newton, too, saw vibrant and vitalists aspects in metals, as they are supposed to vegetate and grow in the soil, "being changed over time from one substance into another."[106] In German Romanticism, natural philosophy developed further with Goethe, F. W. J. Schelling, or Friedrich Hegel making nature in a spiritual way to their focus.[107] The view of nature prevailed as a decipherable text, full of corresponding, symbolic implications.

2.4. Alchemy's Resurgence: Interweaving Art, Ecology, and Spiritualism

At the beginning of the twentieth century, artists began to include alchemical themes in their works combined with magic, witchcraft, eastern philosophy, Indigenous shamanism, ecological

[99] Principe and Newman throughout their work suggest the term 'chymistry,' which refers "to the entire subject before its separation into alchemy and chemistry in the early eighteenth century" ("Alchemy Restored," 306).
[100] Principe, "Alchemy Restored," 312.
[101] Principe, "Alchemy Restored," 312.
[102] Chang, "Alchemy as Studies of Life," 327.
[103] Chang, "Alchemy as Studies of Life," 328.
[104] Principe, "Alchemy Restored," 307.
[105] In the development of chemistry and the hard sciences, these historical facts of Newtons' involvement in alchemy were either played down or completely ignored.
[106] Newman, "The Problem of Alchemy," 69.
[107] Faivre, *Esoterik im Überblick*, 100.

themes, and spiritualism, whereby the latter became of interest for psychological inquiries. Over time, universities and researchers recognized that alchemy played a far more important historical and epistemological role and harbored more applicable concepts than previously thought.

Historian of sciences started to recognize it as a part of natural philosophy, including a diverse range of theories and practices like scholastic, paracelsian, neoplatonic, mechanistic, and vitalistic elements.[108] In the life sciences in the 1950s, James Watson called DNA 'the most golden of molecules,' making a connection to alchemy's notion and quest for chrysopoeia. DNA takes on a metaphorical meaning and is often compared to gold symbolizing immortality and the transmutation of the profane, i.e., of regular, non-transcendent aspects of life, the basic building blocks of existence, into something sacred and valuable. Gold and DNA are supposed to have magical powers and both are immortal and powerful.[109] The discovery of DNA thus seemed to fulfill alchemy's promise: to capture 'life itself.'

Artists of the early twentieth century considered themselves to be a kind of "esoteric adept, radiating exceptional moral authority on the basis of his unique creative powers,"[110] using abstract forms to express their spirituality. Art and cultural historian Urzula Szulakowska shows how active the alchemical discourse was especially in the Surrealist movement, which was related to political issues of gender, perception, and psychology.[111] The Surrealists sought to transmute the whole world into spiritual gold, blending their artistic endeavors with Marxist ideas for a profound intellectual and psychological revolution within the political and social context.[112] This fusion continued with artists like Marcel Duchamp, who embarked on an artistic journey heavily influenced by alchemy, focusing on word transformation and symbolic forms.

In the development of Psychology, especially Carl Gustav Jung worked with alchemical and esoteric imaginary and also deserves a place among the scholars who would create themselves alchemical images, as in Jung's *The Red Book*, written between 1914 and 1930, published in 2009. In alchemy he saw the dynamic, flexible structures of the psyche.[113] Jung stated that alchemy would reveal the psyche's deep structures, and the alchemical transformation steps are

[108] Principe, "Alchemy Restored," 309, 310.
[109] Anker et al., "Technogenesis," 279.
[110] Szulakowska, *Alchemy in Contemporary Art*, 2.
[111] Although there are points of connection between alchemy and other occult trajectories, as shamanism, magic, or astrology, Szulakowska does not seems to distinguish clear enough between them. As a result, it is not always entirely apparent which ideas are actually alchemical and which are, for instance, more astrological. However, she shows the evolution of alchemy throughout history and mentions a wide range of artists, from Europe, but also from America, Czech Republic and Poland, artists from Britian and Scotland, or Australia.
[112] Szulakowska, *Alchemy in Contemporary Art*, 26.
[113] Anderson, "Alchemy of Play," 241.

processes "by which the psyche realizes its highest potential."[114] Of the seven steps of alchemical transmutation, it can be said that the first five (calcination, dissolution, separation, conjunction, and putrefaction) have to do with a kind of detachment and a reversal of polarity. Especially putrefaction was connected to dissolving and death,[115] where the old self decays, and the authentic self begins to emerge. The two last steps of inner transmutation (distillation and coagulation) describe a reconstruction and solidification of the new 'self,' where all polarities are unified. While this is achieved through the actual work with the substances, these substances, as well as the perceiver go together through these states in a collaborative exchange. In the full transmutation, a state of connection and consciousness is achieved, for which Jung uses the expression 'mystical participation,' where subject and object are not differentiated anymore.[116]

In the 1950s and 1960s, the hermetic tradition influenced many artists forming their own hermetic texts informed by the past.[117] Artist Joseph Beuys, for instance, redirected his formation of alchemy towards historical and ecological crises, spotlighting the environmental catastrophe caused by capitalist exploitation of natural resources.[118] Beuys viewed his art as a spiritual activity and actively engaged in actions related to spiritual birth and death. This is, for example, exemplified in his 'Coyote' performance (1974), utilizing materials like fat to explore Anthroposophy, and portraying art as an ongoing reflection of societal changes.[119] Scholar of media and visual culture Birgit Schneider calls Beuys' 'hare' performance (1965) a playful exchange of sender and receiver, where he changes the flow of communication through whispering.[120] This act can be seen as the establishment of an interspecies communication between Beuys and the hare, whereby the gold on Beuys' head symbolized the all-encompassing, cosmic forces through which one can reach the highest states.[121] Moving beyond the European context, Australian artists like Brett Whiteley and Janet Laurence employed mixed-media collages and practical chemistry to express their belief in art's political function and its innate power to transform society positively, aligning art with the holistic science of

[114] Anderson, "Alchemy of Play," 241.
[115] Szulakowska, *Alchemy in Contemporary Art*, 150.
[116] Anderson, "Alchemy of Play," 244.
[117] Szulakowska, *Alchemy in Contemporary Art*, 64.
[118] Szulakowska, *Alchemy in Contemporary Art*, 57.
[119] Szulakowska, *Alchemy in Contemporary Art*, 68.
[120] Schneider, "Entangled Trees," 117; Anna Kérchy, "Chimeric Visions. Posthuman Somaesthetics and Interspecies Communication in Contemporary Humanimal Body Art Performances," *Hungarian Journal of English and American Studies (HJEAS)* 26, no. 2. (Fall 2020): 403, https://ojs.lib.unideb.hu/hjeas/article/view/8696.
[121] Kérchy, "Chimeric Visions," 400.

alchemy as a metaphor for Australian ecology.[122] Additionally, American artists drew inspiration from Zen Buddhism, Taoism, Native American religion and culture, marking a shift in artistic and spiritual influences. Nevertheless, alchemy did not become an integral part of American culture due to historical and cultural differences.[123]

Some decades later and in relation to the evolving field of ecology, the formalization and development of the discipline of interspecies connection evolved in parallel with the broader fields of animal studies, animal ethics, and environmental philosophy. The 1970s and 1980s saw the emergence of animal rights and welfare movements, which laid the foundation for academic inquiries into the human-animal relationship. As a result, universities and institutions began offering courses and programs focused on animal studies, ethics, and related subjects.[124]

Until the nineteenth century, climate knowledge was still based on emotions, as it "derived as a result of very distinct but equally valuable epistemic cultures of sensing: sentiments, impressions, feelings, observations, and technical measurements."[125] Schneider questions if it is possible to reach a mindset again where humans can sense climate change or sense the environmental crisis.[126] Bennett suggests to make a discursive shift from "environmentalism to vital materialism [to] enhance the prospects for a more sustainability-oriented public."[127] Environmentalism would have raised some helpful political questions, but occluded question of "how can humans become more attentive to the public activities, affects, and effects of nonhumans?"[128] It becomes visible that in these contemporary discussions of the nonhuman a relation is made to sensing, awareness, and communication. In some cases, alchemy is being explored, less concerned with a soul vitalism or spirituality, but with a stronger focus on the scientific, chemical, and biological processes of matter, and on the procedures needed to make these processes visible. Climate change and mass extinction are nowadays key topics, prompting academics, artists, and scientists to explore new ways of sensing, connecting, and communication with the nonhuman.

[122] Szulakowska, *Alchemy in Contemporary Art*, 113.
[123] Szulakowska, *Alchemy in Contemporary Art*, 57.
[124] Erin O'Donnell and Julia Talbot-Jones, "Creating Legal Rights for Rivers: Lessons from Australia, New Zealand, and India," *Ecology and Society* 23, no. 1 (March 2018): n.p. https://doi.org/10.5751/ES-09854-230107.
[125] Schneider, "Entangled Trees," 108.
[126] Schneider, "Entangled Trees," 108.
[127] Bennett, *Vibrant Matter*, 111.
[128] Bennett, *Vibrant Matter*, 111.

2.5. Alchemy in the 21st Century: Composting, Photosynthesis and Hybrid Art

In the twenty-first century, alchemical themes persist and are used in different contexts and different forms. Alchemy is conceptualized for biological processes, as well as for non-biological ones, although the focus is clearly on the first, which is related to the development of the life sciences. In relation to concepts of interspecies connection and ecological questions, alchemy's transmutational forces and metaphorical implications are connected to composting and the creation of valuable soil, or to photosynthesis, whereby the products are labeled as the 'new gold.' Artists are working with these themes and combine their aesthetics with scientific methods to create value and to form deep awareness of the processes and the sensory perception of these metamorphoses.

The conceptualization of interspecies connection and communication evolves from questions of environment and nonhuman worlds and involves developing empathy towards these different entities, as well as acknowledging their agency and capacity for communication in their own ways. Several other topics and related ideas of academic scholarship, such as ecology, microbiology, biotechnology, or food science are centered around the concept of interspecies connection. A key figure in the field is Haraway, coining the term Chthulucene,[129] as other concepts such as the Anthropocene or the Capitalocene would separate nature and society.[130] The Chthulucene "must collect up the trash of the Anthropocene, the exterminism of the Capitalocene, and chipping and shredding and layering like a mad gardener, make a much hotter compost pile for still possible pasts, presents, and futures."[131] In her books and articles, Haraway regularly refers to composting, to the interaction of entities and the heat generated during the transformation of quasi-garbage into valuable soil: "I compost my soul in this hot pile. The worms are not human; their undulating bodies in gest and reach, and their feces fertilize worlds. Their tentacles make string figures."[132] Here, the whole world becomes a compost pile, where humans become humus, "not Homo, not anthropos; we are compost, not

[129] For the Chthulucene and for the call of a new order of living together on one shared Earth, more scholars and artists developed different terms to think possible futures, for example, the 'natural contract' from 1995 by French philosopher Michel Serres (Michel Serres, The Natural Contract), or recent development as the Symbioscene ("BioArt Lab," BioArt Lab Project, accessed December 20, 2023, www.bioartlab.com/), Antimundo (Oscar Santillán, "Studio Antimundo," accessed December 15, 2023, https://antimundo.org/intro), or the Planthroposcene (Myers, e.g., in "How to Grow").

[130] Donna J. Haraway, "Tentacular Thinking: Anthropocene, Capitalocene, Chthulucene," *e-flux Journal*, no. 75 (September 2016), 5, www.e-flux.com/journal/75/67125/tentacular-thinking-anthropocene-capitalocene-chthulucene/.

[131] Haraway, "Tentacular Thinking," 13.

[132] Donna, Haraway, *Staying with the Trouble: Making Kin in the Chthulucene* (Durham/London: Duke University Press, 2016), 34, 35.

posthuman."[133] Composting mirrors the alchemical process of transmutation, as it involves the decay and consequently a transmutation of matter into something more valuable. After DNA, soil is proposed as the new gold.

By linking composting with alchemy, artist Claire Pentecost describes these transmutative processes that both practices share. It requires the circulation and collaboration of various substances, living and non-living, that set the chemical processes in motion and create a valuable substance. She uses alchemy also more metaphorically in relation to the crafting of gold, emphasizing that fertile (nourishing) earth is the result of successful composting; this kind of earth nourishes the world, for without it, life is not possible. Pentecost therefore proposes a new currency based on living soil. The installation *Soil-Erg* (2012, exhibited on the dOCUMENTA13) shows discs and stacks of rusted ingots that stand for both the value of soil and the connection to context and place, because earth "is completely impractical to circulate it. It is heavy, and, because of the loose structure required of good soil, it falls apart. It only makes sense when located in a place."[134]

In drawing attention and awareness towards plants and their valuable product, breathable air, Myers understands the process of photosynthesis as a "kind of alchemical, cosmic mattering."[135] She explores alchemical notions of transformation and transmutation, the creation of life, as well as of the micro-macrocosm-concept: "They [plants] reach out across the cosmos, drawing the energy of the sun into their tissues so that they can work their terrestrial magic. Pulling matter out of thin air, plants must be understood as world-making conjurers. They teach us the most nuanced lessons about matter and *mattering*."[136] Myers sees alchemy as this transformative, creative force, which can reveal and encourage our interconnectivity. In collaboration with dance artist and filmmaker Ayelen Liberona, Myer produced a series of video installations called *Alchemical Cinema* (2017), which are part of an art collaboration called *Becoming Sensor*: "Becoming Sensor invites you to explore how non-Indigenous people can become allies to Indigenous resurgence by experimenting with ways to detune the settler common sense that informs conventional ideas about the living world."[137] The project aims to develop protocols for understanding and connecting with the natural world, particularly the

[133] Haraway, *Staying with Trouble*, 55; Interestingly, already Paracelsus refers to composting in the description of his alchemical processes. He uses, as Newman explains, the term "venter equinus, a technical term in alchemy for decaying dung used as a heat source, to mean any source of low, incubating heat." (*Promethean Ambitions*, 205).
[134] Claire Pentecost, *Notes from the Underground/Notizen aus dem Untergrund. 100 Notes, 100 Thoughts: Documenta Series 061* (Ostfildern: Hatje Cantz; Bilingual Edition, 2012), 7.
[135] Myers, "How to Grow."
[136] Myers, "How to Grow."
[137] "Becoming Sensor," Becoming Sensor, accessed December 14, 2023, https://becomingsensor.com.

ancient and urban lands in Toronto. The created images of the experiences with these lands, *Alchemical Cinema*, are combining visual and kinesthetic elements to redefine ecological relationships and human understanding of the living world. The project delves into ways of detuning the colonial common sense to better align with Indigenous ways of knowing and relating to the land. It reflects the history of the land, considering the remnants of oak savannahs and their significance to Indigenous people. In another alchemy related approach, Myers in collaboration with Papadopoulos, and Maria Puig de la Bellacasa highlight political facets and aspect of alchemy in relation to critical ecological debates. They show how ecological components become intricately linked with control, colonialism, racial disparities, and resource-driven production, while searching for alternatives routes to avoid this exploitation. They see the necessity to learn and think with the elements, and to "wake up the alchemical, creative agencies of the cosmos and resist efforts to enclose them as resource and commodity."[138]

From the 1990s onward, an increasing number of artists began actively participating in exploring scientific and biotechnological domains.[139] Art historian and theorist Ingeborg Reichle stresses that the humanities need to focus their attention on the production of images in the context of science. In the last three decades a shift towards visualism in knowledge production becomes apparent, with scientific simulations and visualization playing a crucial role in shaping our understanding of the world. Scientific images are not mere illustrations, but complex representations shaped by culture and epistemological contexts. She claims to open up the 'black box' of image production in science through interdisciplinary collaboration between sciences and humanities. Furthermore, the challenges extend to the need for new concepts and methods in visual studies, as traditional categories may be less applicable to modern scientific images.[140]

Artist Suzanne Anker, Edward Shanken, sociologists Susan Lindee and Dorothy Nelkin emphasize how art nowadays has incorporated non-traditional materials, such as urine, excrement, blood, or semen, and how contemporary artists are, for instance, increasingly incorporating DNA into their work. Contemporary artists working with genetic sciences would "continue modern art's directive of exploring and making visible the invisible."[141] These artists, just as alchemists, show the hidden processes of movement, liveliness, and unperceivable

[138] Dimitris Papadopoulos, Maria Puig de la Bellacasa, and Natasha Myers, "Introduction. Elements: From Cosmology to Episteme and Back," in *Reactivating Elements*, 12, https://doi.org/10.1515/9781478021674-002.
[139] Anker et al., "Technogenesis," 284.
[140] Ingeborg Reichle, "Images in Art and Science and the Quest for a New Image Science," *Leonardo* 48, no. 1 (2015): 74, 75, https://doi.org/10.1162/LEON_a_00902.
[141] Anker et al., "Technogenesis," 284.

perceptions. Alchemy is a concept interwoven with aspects of seeing all matter as lively agents, of transformative processes, of actual chemical changes or change of self. It creates non-hierarchical relationships between micro- and macrocosms, making the invisible, hidden processes visible.

Many academic and nonacademic fields, concepts and theories that are dealing with new materialisms, interspecies connection, art, sciences, and ecology refer to alchemy. In many cases a historical reference is made, or alchemy is used either metaphysically and philosophically or related to empirical inquiries. However, alchemy, as a philosophical minor-science, has much more potential when examining its qualities in regard to its diversity, dynamics, processuality, mastery of transformation, transmutation, and deciphering, its creation of awareness towards nonhuman worlds, bringing species, seen as the 'other,' together and uniting opposing forces. When we connect with other species, it often leads to a changed understanding of ourselves and our place in the natural world. Viewing nonhuman communication through the lens of alchemy can provide insights into the transformational nature of our relationships and connections with other species. Alchemical processes and procedures in art with scientific base create a sense of imagination, speculation, wonder, and a commitment to personal and collective growth. To provide a better framework for the effects of these transmutation processes, I introduce concepts of translation in the following chapter. I will show how alchemy can function as a translation practice, transforming and transmuting worlds and making them accessible.

3. Translating Elemental Powers

According to the biblical story 'The Tower of Babel,' humanity had a single language and could communicate with one another. As a result of humanity's hubris in building a tower that could reach God, their languages became muddled. In making references to these biblical times, the dream of a perfect, unified language reappears throughout time.[142] Nevertheless, linguistic pluralism emphasizes the value of diversity,[143] which is why there should be better translation techniques rather than a search for a single, all-encompassing language.

Historically, western thought has lacked a traditional discourse on translation often overlooking its significance. This omission can be attributed to ethnocentrism, where foreign languages were considered 'barbarous.'[144] Another reason might be that translators, as alchemists were accused of being fraudsters. Translators were seen as untrustworthy, often "associated with the Italian saying 'traduttore traditore' (translator traitor)."[145] Because translation was seen as an inaccurate act, "both its process and its products can only be forms of betrayal."[146] However, Anthony Pym, scholar for translation studies, highlights how translation became a subject of serious thought during the Renaissance and later in German Romanticism, with, for instance, thinkers like Friedrich Schlegel, who delved into the idea of 'the other' in translation and how to treat this otherness.[147] We would have an ethical obligation to the non-I, with whom we enter into a union in the act of translation, which requires an openness to the unfamiliar and unknown.[148] This involves taking responsibility for the 'other' through translating and narrating.[149]

Generally, when speaking about translation it is defined as the process of converting written or spoken text from one language into another, while preserving the meaning and intent of the original content. It involves linguistic and cultural adaptation to ensure effective communication across language barriers. It is a means of cultural exchange and exchange of

[142] Polezzi, for example, reminds of today's myth of English as a 'lingua franca.' ("Translation," 307).
[143] Richard Kearney, "Paul Ricoeur and the Hermeneutics of Translation," Research in Phenomenology 37, no. 2 (2007): 150, https://doi.org/10.1163/156916407X185610.
[144] Anthony Pym, "Philosophy and Translation," in *A Companion to Translation Studies*, ed. Piotr Kuhiwczak and Karin Littau (Clevedon/Buffalo/Toronto: Multilingual Matters LTD, 2007), 25, https://doi.org/10.21832/9781853599583-004; In the last decades, the translation industry is booming: In 2012, Common Sense Advisory estimated the translation service industry's size at $33.5 billion. The U.S. Bureau of Statistics predicted a 42% increase in the translation industry between 2010 and 2020. However, these numbers solely apply to traditional language and human communication. (Cronin, *Eco-Translation*, 22).
[145] Duncan Large, "Translation and Philosophy," *Translation in Company. The Cambridge Handbook of Translation*, ed. Kirsten Malmkjær (Cambridge: Cambridge University Press, 2022), 266, https://doi.org/10.1017/9781108616119.014.
[146] Polezzi, "Translation," 305.
[147] Pym, "Philosophy and Translation," 27.
[148] Pym, "Philosophy and Translation," 37; Kearney, "Paul Ricoeur," 151.
[149] Kearney, "Paul Ricoeur," 155.

meaning.[150] Viewed in a broader context, translation, not strictly confined to linguistic considerations, yields more possibilities. It can be a process of converting or adapting something from one form, system, or context into another while maintaining its essence or core principles. This concept extends beyond linguistic translation and can include the conversion of ideas or practices. Professor for Literature and Translation Duncan Large affirms that translation is not merely a linguistic task, but a form of knowledge, an existential endeavor, a mode of perceiving the world, which would demand animation by philosophical concepts.[151] However, the problem with translation studies currently is that they "share this commitment to human exceptionalism as the unique focus of its attention."[152] Human exceptionalism brought along the idea that "language is what defines humans, what makes them unique,"[153] which is contested throughout this thesis.

In the following section, I will show that alchemy consists of these animating, ideas, being a minor-science as well as a modal philosophy. In the field of translation study, alchemy can maintain diversity while bridging a gap of perception and understanding to the nonhuman. Alchemical translation can overcome differences of completely distinct languages systems, between linguistic ones and systems of processuality, signs, and traces. Alchemical translation transmutes common modes of perception into unknown states, and triggers affects and emotions, ascribing attention, awareness, and value to what is translated. This form of translation brings opposites together, human and nonhuman worlds, and unifies them without merging them into a homogeneous mass but retaining a form of subjectivity. I argue that seeing translation as an alchemical procedure and process can enrich the approach to nonhumans and facilitate the visibility of expressivity, agency, and sentience. It is not a form of translation of a specific language as humans understand it, but a more sensitive, (non-linguistic), living form of expression. Alchemical translation makes visible theoretical thinking and practice, always in change, growth, and in the making. It is a modality of passing and becoming. Alchemical translation reveals the qualitative properties of matter and of their changing states. The translations are always ambiguous, pointing in one direction and creating a direct link to their origins, but completely changed. This is a knowledge that can be called wisdom, consisting of experience and intuition.

[150] Krishna Regmi, Jennie Naidoo, and Paul Pilkington, "Understanding the Processes of Translation and Transliteration in Qualitative Research," *Sage Journals* 9, no 2 (2010): 16, https://doi.org/10.1177/160940691000900103.
[151] Large, "Translation and Philosophy," 268.
[152] Cronin, *Eco-Translation*, 74.
[153] Cronin, *Eco-Translation*, 73.

Translation studies in relation to nonhuman worlds must go beyond mere meaning. In the alchemical translation, it is about embodying the physicality of expressivity, where language can not only be seen as an expression but as an impression. This can be related to Film and Media Studies scholar Mary Ann Doane's conceptualization of indexical signs. She explains that indexical signs are important because they provide direct evidence of the world around us and can help to shape our understanding of reality.[154] The exploration of alchemical translation will show that the language used is one of indexical signs and traces with a direct material reality. These signs include the creation of alternative associations, often accompanied by uncertainty and a space of emergence. As mentioned in Chapter two, alchemy was seen as the key to decipher symbolic language, where many symbols have more than only one meaning, which are full of this uncertainty and in turn, also creates it. Alchemical translation of nonhuman worlds involves making information and knowledge accessible and comprehensible across different systems, various contexts, and forms of life.[155]

In this sense, alchemy becomes a part of what Cronin terms 'eco-translation.' It is a form of translation that addresses translational thinking and practice that engage with the challenges of human made environmental change.[156] Translation and climate change are both deeply involved with the human and the nonhuman, as both are "preoccupied with questions of human, non-human and interspecies connectivity (and vulnerability)."[157] Indigenous approaches in sensing and knowledge creation, for example, can be seen as important components in perceiving ecology and the environment as an exchange between organic and inorganic entities in a close affective relationship.[158] Furthermore, also the field of material science knows the value of matter and materials, which play an important role in various sectors such as construction, design, and industry. Material science involves the study of the properties and applications of materials, which have led to huge developments of technologies and materials. However, the ecological crisis stems from exploiting natural resources by these industries, through the extraction of raw materials, which generates waste and pollution. These areas lack

[154] Mary Ann Doane, "Indexicality: Trace and Sign: Introduction," *Journal of Feminist Cultural Studies* 18, no. 1 (2007): 2, https://doi.org/10.1215/10407391-2006-020.
[155] Barbara Heinisch, "Knowledge Translation and its Interrelation with Usability and Accessibility. Biocultural Diversity Translated by Means of Technology and Language—The Case of Citizen Science Contributing to the Sustainable Development Goals," *Sustainability* 13, no. 1 (December 2020): 1–27, https://doi.org/10.3390/su13010054.
[156] Cronin, *Eco-Translation*, 2.
[157] Davina Höll, and Nefise Kahraman, "Translating (with) the Non-Human: Health, Risks and Affect," posted on 31 August 2023 at *The Polyphony*, https://thepolyphony.org/2023/08/31/translation-medhums-non-human/.
[158] Kierin Mackenzie, Willington Siabato, Femke Reitsma and Christophe Claramunt, "Spatio-Temporal Visualisation and Data Exploration of Traditional Ecological Knowledge/Indigenous Knowledge," *Conservation & Society* 15, no. 1 (2017): 42, 43, https://doi.org/10.4103/0972-4923.201391.

sustainable practices and have no reason to pay attention towards the needs of the materials they work with.[159]

The organic and inorganic 'others' require attention as marginalized groups of the exploited non-translated and non-heard.[160] The goal is to give other species, substances, and assemblages a language that offers emancipation with own agencies, freedom from what leads to inequality, and justice for the struggle and suffering of exploitation.[161] We must invent creative interventions for new code systems to translate nonhuman expressivity, to create an empathetic communication, and to move towards the 'posthuman.'[162]

I will first show how the human body has been made into a measurable and therefore translatable entity. I then present developments in the field of translation of nonhuman worlds, after which I illustrate the procedural nature of both alchemy and translation. This section will also highlight the role of technological means in translation processes. In the following part, the characteristics of my proposed concept of alchemical translation will be presented in detail. Finally, I will discuss the role of art in these theorizations.

3.1. Deciphering the Human Body: Translating Bio-Processes

In alchemy, the human body, its components, and the soul were seen as images of macrocosmic structures, whereby the human being also becomes a medium that carries the divine secrets of the macrocosm within it. These secrets could be deciphered by observing and examining the body's own processes, sacred signs, and symbols. When looking at translation in a non-linguistic way nowadays, it is used to explain, describe, and make visible movements and changes in the human body through biofeedback technologies. The signals of bodies are seen as expressive, communicative modes. Vision, hearing, olfaction, taste, and haptics, as well as

[159] Cronin, for example, points out issues with the sustainability of technologies in connection to translation. Metals get extracted and huge sources of energy are needed to make the technologies work. In a normal desktop tower computer, dangerous metals can be found: "Aluminium, Antimony (hazardous), Arsenic (hazardous), Bismuth, Cadmium (hazardous), Chromium, Copper, Ferrite, Gold, Indium, Lead (hazardous), Nickel, Platinum, Steel, Silver, Tin and Zinc" (*Eco-Translation*, 96). They suggest that we have to move from a 'high-tech' to a 'low-tech' translation practice. As opposed to high-tech devices that contain a range of hazardous metals, low-tech practices focus on reducing the use of such materials in communication tools and devices. They also aim to reduce electronic waste by promoting repair, reusing, and recycling of communication equipment (*Eco-Translation*, 102).

[160] This form of marginalization is also to be observed in the history of translation. In the medieval era has been a hierarchical order of languages, which placed 'divine' languages at the top, e.g., Hebrew, Greek, or Arabic, and excluded languages of lower hierarchies, e.g., vernacular or spoken patois (Pym, "Philosophy and Translation," 26).

[161] Rachel Zollinger, Mariko Oyama Thomas, Hollis Moore, and Kaitlin Bryson, "Lichenizing Pedagogy: Art Explorations in More than-Human Performance and Practice," *Research in Arts & Education 2022*, no. 1 (2022): 27, https://doi.org/10.54916/rae.116995.

[162] Cronin, *Eco-Translation*, 8.

purely inner processes, like visceral perception, can be called "languages' of the body."[163] The British Physiological Society witnessed the first technology that measured electrical activity of the human brain in 1934. They saw on a screen the enlarged projected image of a moving needle, drawing waves, which would change when the brains' owner would close his eyes or solve math-problems.[164] Flora Lysen, scholar in the cultural analysis of science and media, calls the language used a metamorphically one, but points out the dangers of recursive loops in machine-organism translations. The metaphors used would often be too 'easy going.'[165] She takes up a transposed perspective in analyzing the collaboration of technologies and bodies, forming own assemblages. Lysen coins the term 'brainmedia,' and conceptualizes it as "organic/technical/media/cultural assemblages, i.e., as the material-discussive assemblages that configure the 'live brain."[166] The idea of a transposed perspective stresses that "nothing was ever 'natural' or 'other,"[167] and resembles alchemy's notion of the connectivity between human and nonhuman.

Especially with the discovery of DNA, the human body is increasingly perceived as a decipherable text and system of information. For the bodies cell's, scientists employ "linguistic tropes and communication models to describe the cell's molecular organization."[168] Anker et al. for example, refer to the activity of the gene, where "chemical reactions were considered to be transcriptions and translations in a network of stored information."[169] Or biologist, philosopher, and animal behavior scholar Jakob von Uexküll concludes "that every living cell is a machine operator that perceives and produces and therefore possesses its own particular (specific) perceptive signs and impulses […]."[170] This non-linguistic idea of translation uses correlations and "analogies – more dynamic and fluid connections that depend on a more complex network of associative links."[171] Bennett argues that (re)finding the inner processes and experiences of the inner human body could be the beginning and turn to discover miracles of expression in all other substances and things, too.[172]

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[163] Fedorova, "Aesthetics of Homunculus," 176.
[164] Flora Lysen, *Brainmedia. One Hundred Years of Performing Live Brains, 1920–2020* (London/New York/Dublin: Bloomsbury, 2022), 11.
[165] Lysen, *Brainmedia*, 19.
[166] Lysen, *Brainmedia*, 20.
[167] Lysen, *Brainmedia*, 19.
[168] Anker et al., "Technogenesis," 283.
[169] Anker et al., "Technogenesis," 283.
[170] Jakob Johann Uexküll, *A Foray into the Worlds of Animals and Humans. With a Theory of Meaning*, trans. by Joseph D. O'Neil (Minneapolis/London: Minnesota Press, 2010), 47.
[171] Ksenia Fedorova, "Neurointerfaces, Mental Imagery and Sensory Translation in Art and Science in the Digital Age," in *Invisibility in Visual and Material Culture*, ed. Asbjørn Grønstad, Øyvind Vågnes and Palgrave McMillan (London: Palgrave Macmillan, 2019), 5, https://doi.org/10.1007/978-3-030-16291-7_5.
[172] Bennett, *Vibrant Matter*, 5.

3.2. Beyond Words: Understanding the 'Language' of Nonhumans

In the history and development of ecology and animal studies, biology started to become interested in the communication with other species, especially with pets or animals that are considered to be intelligent, such as apes, dolphins, crows, or elephants. But even here, animals are normally not spoken to, and this even though we have "entered the sixth mass extinction of plants and species in the last 500 million years."[173] Cronin argues, "the concept of translation has been remarkably absent from reflections on animal communication just as animal and human-animal communication have been signally missing from debates around translation."[174] Uexküll was an early pioneer of the field of 'biosemiotics' in the 1930s. Biosemiotics is an interdisciplinary field that explores the semiotic aspects of living organisms and their environments. Uexküll declares the perception and communication of organisms as a necessary part of being in the world, which is not limited to human beings. Therefore, biology must account for nonhuman perceptions.[175] Uexküll stresses that the phenomenon of language is a group phenomenon "that records signs older than and more time-tested than any individual human, we must boggle at the bewildering possibilities of potential biocommunication systems of an estimated extant ten to thirty million species, trading signs with each other and across species boundaries."[176] Cronin illustrates that nonhuman languages can have many different forms, as "mathematics, cosmic physics, molecular chemistry or marine biology."[177] For example, elephants can feel the vibration of the ground when another herd is approaching, allowing for a form of 'seismic communication.' Or dogs can hear sounds at frequencies imperceptible to humans, while bats and dolphins employ sonar perception to detect and classify moving objects from a distance. These variations in sensory receptors across species grant unique communication capabilities to each, which are not universally accessible.[178] Moreover, plants, lichen and especially fungi and their own language and expressivity gained some attention in science and art, communicating through a network system underground. For instance, Helena Sederholm, scholar in Art Education, acknowledges that the exchange between biological science and the humanities is active and that "bryophytes, lichen, and fungi have been seen as active and communicative organisms."[179] It seems that translation studies

[173] Cronin, *Eco-Translation*, 67.
[174] Cronin, *Eco-Translation*, 72.
[175] Dorion Sagan, "Introduction. Umwelt after Uexküll," in *A Foray into the Worlds of Animals and Humans. With a Theory of Meaning*, 3.
[176] Sagan, "Introduction," 23.
[177] Cronin, *Eco-Translation*, 71.
[178] Cronin, *Eco-Translation*, 81.
[179] Helena Sederholm, "Slow Life of Vegetal, Animal, and Some Composite Organisms," *Research in Arts and Education* 2022, no. 1 (May 2022): 1, https://doi.org/10.54916/rae.119452.

specifically, as Cronin points out, is lacking theories of nonhuman communication, whereby the arts, as Sederholm recognizes, found interest in plant life.[180]

Inorganic matter is probably the biggest loser in the communicative exchange, as much less attention is paid, because inert structures are not seen as expressive. However, "we are walking, talking minerals."[181] Professor for history and gender studies Michelle Murphy points at reasons for this ignorance: "The invisibility of our chemical surround is not a natural fact; it is an achievement. In other words, the invisibility of chemicals is due not only to the uncertain properties they have but, more profoundly, to concerted state and corporate efforts to prevent their technological perception."[182] Cultural anthropologist Joseph Dumit explains that substances have their own language, metaphors, and modes of perception, "though not ones that help save the world. Corporations can easily use the wiliness of substances, their queerness and nontranslatability, as a form of refusal to know, of denial and suppression."[183] If something seems to be not translatable, as in the case of matter's expression, it needs, as Cronin states "more translation not less."[184] It needs a "solicitude of understanding,"[185] while understanding, as political theorist Melissa Orlie phrases Nietzsche, "is a certain behavior of drives or instincts toward one another."[186] Thus, it is important that academics, artists, and scientist let the substances speak and translate their expressions.

Inorganic substances are carrier of agency, elemental power, and subjectivity. To allow the 'other' to be heard means to decolonialize translation, to move towards a post-colonial expression, and to create the possibility of "a voice for the oppressed."[187] In developing and advancing the idea of biosemiotics and to include inorganic entities in translation studies,

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[180] However, one pitfall of the translation of non-human entities might be anthropocentrism and an overly anthropomorphizing. Plant behaviorist Monica Gagliano criticizes technologies which make plants 'sing,' making us believe to hear the plants voice, which seem to create a connection between human and plant. "But the assignation of musical notes is entirely arbitrary, as these are not sounds being emitted by the plant. It is an approach she dismisses as 'immature' and 'anthropocentric" (Joanna Page, *Decolonizing Science in Latin American Art* (Chicago: University of Chicago Press, 2021), 143); However, Bennett, for instance, does not condemn anthropomorphism completely: "A touch of anthropomorphism, then, can catalyze a sensibility that finds a world filled not with ontologically distinct categories of beings (subjects and objects) but with variously composed materialities that form confederations. In revealing similarities across categorical divides and lighting up structural parallels between material forms in 'nature' and those in 'culture;' anthropomorphism can reveal isomorphisms" (*Vibrant Matter*, 99).

[181] Lyun Margulis and Dorion Sagan, *What Is Life?* (Berkeley: University of California Press, 2000), 50, quoted in Bennett, *Vibrant Matter*, 11.

[182] Michelle Murphy, "Reimagining Chemicals, With and Against Technoscience," in *Reactivating Elements*, 265, https://doi.org/10.1215/9781478021674-012.

[183] Joseph Dumit, "Substance as Method: Bromine, For Example," in *Reactivating Elements*, 101, https://doi.org/10.1515/9781478021674-006.

[184] Cronin, *Eco-Translation*, 17.

[185] Cronin, *Eco-Translation*, 71.

[186] Melissa Orlie, "Impersonal Matter," in *New Materialisms*, 127, https://doi.org/10.1215/9780822392996-005.

[187] Cronin, *Eco-Translation*, 5.

Cronin introduces concepts of 'intersemiotic translation,' and 'tradosphere.' Cronin's eco- or intersemiotic translation is the study of how signs and symbols are used to convey meaning in the context of the natural environment and ecological relationships. It explores ways in which communication occurs between living and non-living organisms. The focus is on understanding the role of signs, codes, and languages in conveying information and how different entities interpret and respond to these signals. The 'tradosphere' is "all translation systems on the planet,"[188] and is suggested to exchange the infosphere, to stress a non-anthropocentric form of communication."[189] The tradosphere is connected to the idea of 'deep history,' which Cronin modifies into the notion of 'deep geology,' emphasizing the importance of seemingly inert matter and its animated character.[190] In studying the (deep) past, we can learn and gain knowledge from "artefacts, fossils, vegetable remains, phonemes, and various forms of modern DNA."[191] They all inhabit information about the past, but they "resist an easy reading and must be interpreted with care."[192] This means that forms of translation studies and processes must be integrated into material sciences, physics, chemistry, engineering, and geology, which can become "a standard part of the exploration of the tradosphere."[193] Jussi Parikka, media theorist and cultural historian, explores the similar concept of 'geomedia,' which refers to the intersection of geography, media, and technology. He illustrates that geomedia explores the entanglement of media technologies with spatial and geographical dimensions. This concept expands the idea of 'medium' and introduces considerations of contemporary technologies in mediating with the environment.[194] In describing the deep connection of the human, with phenomena which are greater than us, Isabelle Stengers draws attention to what she terms 'earthly events,' or 'mysteries,' which are unlike miracles unexplainable and do not have to be explained. These mystic elemental powers are not under human control and follow their own agency.[195]

Alchemy can even further enrich and advance this discourse by offering a two folded way of approach. On the one hand, it is a modal philosophy of passing and becoming and is therefore working with signs and traces with diverse meaning. Alchemy has the ability to translate and unfold especially indexical signs, traces, and indices, as Doane formulates them. She opposes

[188] Cronin, *Eco-Translation*, 71.
[189] Cronin, *Eco-Translation*, 71.
[190] Cronin, *Eco-Translation*, 90.
[191] Cronin, *Eco-translation*, 10.
[192] Cronin, *Eco-Translation*, 10.
[193] Cronin, *Eco-Translation*, 91.
[194] Jussi Parikka, "Planetary Goodbyes: Post-History and Future Memories of an Ecological Past," in *Memory in Motion. Archives, Technology and the Social*, ed. Ina Blom, Trond Lundemo and Eivind Røssaak (Amsterdam: Amsterdam University Press, 217), 131, 138, https://doi.org/10.1515/9789048532063-007.
[195] Stengers, "Receiving the Gift," 30, 31.

indexical to iconic signs. Icon signs represent their objects by similarity or resemblance. The signifier bears a likeness or has a visual similarity to the signified. Diagrams, graphs, and models used in various scientific disciplines are iconic signs. Unlike icons, indexical signs "have no resemblance to their objects, which, nevertheless, directly cause them."[196] On the other hands, alchemy is also a minor-science working with scientific methods of experimentation, procedures, and protocols, and the direct experience of materiality.

Anthropocentric projections cannot be the way for communication with 'others,' especially when considering that organisms can sense completely different, or not at all. Alchemical translation can form the missing link and right path to approach this form of translation, moving away from an anthropomorphism and starting to transform and transmute this perception; so that we rather planthropomorphize, or metalmorphize, i.e., mattermorphize human perception. This involves refraining from projecting human attributes onto the 'other' entity and instead recognizing the inherent 'otherness' within oneself.

3.3. Alchemy and Translation: Crafting Knowledge

Alchemy and translation have similar qualities, for example, in their procedural nature to achieve the goal intended and their close connection to crafting and 'technê.' In 1989, John Biguenet and Rainer Schulte introduce a standard term to describe what translators do, which is to 'craft.'[197] In alchemy, there is, on the one hand, a corpus of sophisticated theories. But on the other, it is constituted through its processual and practical pursuit. Alchemy is deeply interrelated with arts and crafts, "that is, of the distillers, miners, goldsmiths, and apothecaries whose knowledge of waters, metals, and minerals, as well as the equipment and processes necessary to work with them."[198] It "names an enduring basic human impulse, the desire to do a job well for its own sake,"[199] and to become through practice more skilled. It resembles the act of translation which can be seen as a 'problem-solving activity' involving processes of conscious and unconscious learning and creative approaches, for whose technologies protocols and programming language are needed.[200]

[196] Mary Ann Doane, "The Indexical and the Concept of Medium Specificity," *differences* 18, no. 1 (2007): 133, https://doi.org/10.1215/10407391-2006-025.
[197] Cronin, *Eco-Translation*, 118.
[198] Nummedal, "Words and Works," 331; Nummedal declares that a refocus on alchemists' activities is the most "productive way to explore this alchemical marriage of words and works" ("Words and Works," 332).
[199] Cronin, *Eco-Translation*, 118.
[200] Cronin, *Eco-Translation*, 82, 119; Pym, "Philosophy and Translation," 44.

Both crafts, alchemy and translation, especially in combination, give possibilities to try out new technologies, techniques, and procedures (trial and error).[201] When obstacles occur, solutions must be found, and these limits must be overcome. Translation, because it transforms and transmutes one language or expression into something else, becomes an alchemical process, where knowledge becomes accessible through the 'workable process' with materials and assemblages. The crafting side of alchemy, with its glassblowers and ceramists, saw their creations as part of their own bodies, where 'creation' has a double meaning. It means both the act of creating and the result of this act, which emphasizes the ongoing, metamorphic operation.[202] In crafting it needs collective discipline, between production and exercise, where "to make is to practice."[203] However, alchemy is more than a craft, but a form of art, generating not only objects, but knowledge, ideas, concepts, and a higher value.

In this sense, alchemical translation as a form of craft and art involves both theoretical understanding and practical skills and can therefore create a form of knowledge, which can be termed 'technê.'[204] This term, which stems from ancient Greek philosophy, encompasses a broader meaning than our contemporary understanding of technologies. It "invokes the entire circle of 'art,' 'craftmanship' right up to 'knowledge' and 'science."[205] It is a kind of knowledge, where technologies have been introduced into the process of inquiry so that "the apparent gap between the theoretical and productive, between science and art, begins to converge into a technical-cum-epistemic practice."[206] 'Technê' is both theoretical and instrumental aided observation and experimentation. In relation to scientific inquiry, it "involves a bringing forth of 'natural' objects that may have pre-existing form but are nonetheless transformed through their coming into being in the laboratory."[207] The concept involves skilled craftmanship or artistry and involves unlike pure epistemic methods both theoretical and practical applications. This is a fitting description for understanding knowledge production in alchemical processes, especially in connection to translation.

Technologies and machines have always been the first instruments that people have consulted when something is not visible or tangible, so that it becomes perceivable and can create knowledge. Like the telescope in the seventeenth century, current technologies are also

[201] Cronin, *Eco-Translation*, 119
[202] Van Tuinen, *Philosophy of Mannerism*, 135.
[203] Van Tuinen, *Philosophy of Mannerism*, 148.
[204] Chad Wickman, "Technê,' and the Art of Scientific Inquiry," *Rhetoric Review* 31, no. 1 (2012): 23, 26, https://doi.org/10.1080/07350198.2012.630953.
[205] Dieter Mersch, "Meta/Dia. Two Different Approaches to the Medial Two Different Approaches to the Medial," *Cultural Studies* 30, no. 4 (2016): 9, 10, https://doi.org/10.1080/09502386.2016.1180751.
[206] Wickman, "Technê," 26.
[207] Wickman, "Technê," 25.

protheses for natural perception and as a direct extension of the senses.[208] These technologies, however, do not exchange the human part in the process. Even with the use of technologies in alchemical translation processes "there will always be a role for human translators to play, as the human experience is deep and nuanced and the authenticity of human translation will always more closely approximate truth than a machine replica ever could."[209] Scholar for reflexive translation studies Silvia Kadiu distinguishes between human and technological translation, in analyzing translations of, for instance, A.I.'s like Google Translate or Babelfish. Machine translation would rely on the "repetition of pre-existing codes,"[210] contrasting human translation, which is "a creative and reflexive practice, which "necessarily involves a comprehensive theory of language."[211]

In alchemical translation, the technological devices, which can be analogical and digital, develop into a form of hermaphroditical philosopher's stone. It can be described as an entity that reunites opposites (human vs. nonhuman) and is able to create the highest value possible: a form of awareness towards the forgotten ones, which can lead to interspecies exchange and communication. Thinking technologies as philosopher's stones can add value to more mechanical and product orientated notions of crafting, which evolves into valuable art. The technological instruments help matter to produce their marks, traces, and signs, and can later be manipulated.[212] Scholar of Cultural Studies Dieter Mersch claims it is "indispensable where we deal with signs, representations and translations as well as with processes of understanding, communication and memory,"[213] to have concepts of medium and mediality. Technologies can be seen as a medium of assistance, especially in the hand of artists, with their own forms of agency. These technologies as mediators occupy a space which is 'in-between,' a third party, which can thus negotiate between opposing positions. It is a collaboration of human, technology, and other matter. In Haraway's words: "We are all chimeras, theorized and fabricated hybrids of machine and organism; in short we are cyborgs."[214] This forms a creative space for interaction and learning.

However, as mentioned before, it is not about a linguistic or a clear translation. Barbara Agnese, scholar in the philosophy of languages, claims that "the language-game is so to say

[208] Ksenia Fedorova, *Tactics of Interfacing. Encoding Affect in Art and Technology* (Cambridge/ London: MIT Press, 2020), 119, https://doi.org/10.7551/mitpress/12544.001.0001.
[209] Höll and Kahraman, "Translating (with) the Non-Human."
[210] Silvia Kadiu, *Reflexive Translation Studies: Translation as Critical Reflection* (London: UCL Press, 201972.
[211] Kadiu, *Reflexive Translation Studies*, 72.
[212] Silvia Casini, *Giving Bodies Back to Data. Image Makers, Bricolage, and Reinvention in Magnetic Resonance Technology* (Cambridge/ London: The MIT Press: 2021), 1.
[213] Mersch, "Meta/Dia," 1.
[214] Haraway, "Cyborg Manifesto," 4.

something unpredictable."[215] This can be applied to artworks, where a sound or a feeling does first not necessarily mean something specific, but observers can engage with potential meanings, guessing, and imagining them.[216] Thus, topics of intuition and speculation will be of importance for the analysis of the artworks, as the full meaning is never really predictable. In what follows, I do not distinguish between machine and human translation, as I consider translation technologies as extensions of human abilities.

3.4. Alchemical Translation: Transmuting Matter, Perception, and Knowledge

Alchemy has a rich history with symbolic, poetic, and intuitive language**,** which enables practitioners to see in material processes a world and place of lives. It has helped practitioners to find and create a place in the material processes that generates knowledge about life and its growth. It also illustrates how each element has its own myriad of meanings and values. In an alchemical translation, as I will show in the first section, these meanings are primarily captured in indexical signs and traces, as already defined. The second section will show how an alchemical translation essentially transmutes the human sensorium, creating an intense form of attention. However, where translations can generate attention, as I show in the third section, alchemy can generate both attention and, above all, awareness towards perceptual processualities, to one's own sensory processes, and metamorphoses, and to the process of exchange between matter and self. This changes fundamentally how we perceive and receive a new form of knowledge, which can rather be seen as Indigenous knowledge or wisdom, as I discuss in the context of alchemical translation in the fourth section. Throughout the thesis, I will make aware of how thinking translation alchemical can take translation away from a human centered thought and bring opposites together (Fig. 1).

Alchemy as a hermetic and secret language can hold the key to decipher the secrets of the cosmos. Nowadays, we need this transformational key to make the hidden expressions of vibration, liveliness, and expressivity visible. Pym calls the task of translation, "to bring out those hidden meanings."[217] Specific alchemical processes, which were often related to processes of inner change and transformation, were shown in symbolic language, for example, a snake or dragon biting its tail. This snake is named Ouroboros and stands for the alchemical circulation of elements and their rebirth, but also shows the circular form of life, of creation,

[215] Barbara Agnese, "Philosophy as Translation," trans. by Claire-Anne Gormally, *SubStance* 44, no. 2/137 (2015): 20, https://www.jstor.org/stable/24540820.
[216] Fedorova, "Aesthetics of Homunculus," 187.
[217] Pym, "Philosophy and Translation," 28.

death, and renewal. It presents unity and the reconciliation of opposites and was used for self-reflection and self-discovery.[218] Moreover, metals are given planetary names, where the sun represents gold, and the moon stands for silver. Color changes in processes are referred to as nigredo (blackening), albedo (whitening), citrinitas (yellowing), or rubedo (reddening), with black usually representing the putrefaction of the alchemical prima materia. All these steps show phases of actual chemical work.[219] History scholar Jennifer Rampling points out, that "a single alchemical process or substance often had multiple valences simultaneously,"[220] and only instructed or wise people could decipher this language.[221]

The language of matter and materiality in the context of procedures, looking through the alchemical translation lens, as I will define it, are indexical signs. Indexicality is a crucial aspect of how we make meaning in the world and has important implications for our understanding of representation and reality. Doane suggests that indexicality challenges the notion of representation as a purely symbolic or abstract process, and instead emphasizes the role of physical reality in shaping our understanding of the world. By focusing on indexical signs and the indices and traces they carry, we can gain a more direct and unmediated understanding of reality, and this understanding can have important implications for how we think about representation, memory, and history.[222] An index is described as endless and can 'carry' the presence of its referent, even after the referent is no longer physically present. This means that indexical signs can function as traces of past events or experiences and can help us to understand the ways in which the past is existent in the present.[223] Traces and indices are components of indexicality, which can be, for example, "a footprint, a weathervane, thunder, the word 'this,' a pointing finger, and a photographic image."[224] In alchemical knowledge production through the act of translation, thinking their traces as indexical signs, supplement meaning and intention, as it seems to accommodate fullness and excessiveness of detail.[225] If we see the expressions and translations as indexical signs and traces, the 'otherness' of the 'other' is maintained and yet a kind of unity in translation and language is created, as these signs form new ways of

[218] Szulakowska, *Alchemy in Contemporary Art*, 50.
[219] Rampling, "A Secret Language," 40, 41.
[220] Nummedal, "Words and Works," 335.
[221] This language seems to be rather chaotic than an easy to learn language. Though, through work with the materials in combination with an intellectual engagement the alchemical translation tool can be discovered and bring order into this chaos. However, a bit of this chaotic state remains because what 'order' or 'chaos' means are also based on human ideologies. It should not be quest for a uniform mush, for a pre-Babylonian age, it is more about finding a system to discover order in chaos while preserving the 'chaos' (Rampling, "A Secret Language," 38).
[222] Doane, "Indexicality: Trace and Sign," 4.
[223] Doane, "The Indexical and Medium," 136, 138.
[224] Doane, "Indexicality: Trace and Sign," 3.
[225] Doane, "Indexicality: Trace and Sign," 2.

understanding. However, it is not enough to merely show what is hidden, but to further translate into different aesthetic and sensorial modes of perception. This can change one's own perceptual possibilities and create a deep empathetic awareness and connection.

Cronin in developing the concept of 'eco-translation' stresses the importance of attention in the translation act. To translate means to pay attention towards the translated beings, which in turn gives them a certain value. This is especially true in our society today, where 'attention' is one of the most important aspects of, for instance, advertisement. I align here with Cronin, who proposes an 'ecology of attention' in opposition to the 'economy of attention.' An ecology of attention stresses the interaction needed for attention; it is relational.[226] Attention always needs visibility. However, attention has a short lifespan and must evolve further to generate lasting effects and affects. Alchemy and alchemical translation create awareness, which is closely related to attention but can foster a deeper connection, making profound exchanges and change possible. The psychologists Nilli Lavie and Diane M. Beck, and cognitive neuroscientist Nikos Konstantinou argue that attention refers to the "allocation of limited-capacity mental resources to processing."[227] Whereby awareness indicates a form of "visual or perceptual awareness: the phenomenal experience related to perception that is accessible for report."[228] We must become aware of what we actually attend to. In alchemy, this can mean that attention is created through the work with materials, but its metaphysical and metaphorical qualities create awareness for details. After clinical psychologist Daniel Anderson, "alchemists themselves worked in a state of transitional awareness."[229] In order to carry out an experiment, we must be present and attentive, but in order to become aware of the exact processes and their significance, we must be conscious. Therefore, awareness allows for a more comprehensive and holistic understanding of the nonhuman world. Awareness involves also being open to a broader range of sensory inputs and experiences. Paying attention and becoming aware of the speech of the 'others' and previous invisible entities reveal that these entities have valuable things to offer.

Translation is often linked to creating something new, a process of transformation,[230] which directly reminds of alchemy's properties. Translation "is bound up with the transitional, with moving from one state to another."[231] When transformation is the act of translation, the making

[226] Cronin, *Eco-Translation*, 24.
[227] Nilli Lavie, Diane M. Beck, and Nikos Konstantinou, "Blinded by the Load," *Philosophical Transactions of the Royal Society B: Biological Sciences* 369, no. 1641 (May 2014): 1, https://doi.org/10.1098/rstb.2013.0205.
[228] Lavie, Beck, and Konstantinou, "Blinded by the Load," 1.
[229] Anderson, "Alchemy of Play," 246.
[230] Kadiu, *Reflexive Translation Studies*, 88.
[231] Cronin, *Eco-Translation*, 30.

visible invisible structures, transmutation can be considered as the actual change of perception and in effect how we perceive the world – a point where sensing becomes different, rather nonhuman. Through our senses, we make sense of the world, and as soon as focus is on the working of these senses, it reveals how our world is created through this perception, and thus, a change of our senses changes the sense of self, too. This full metamorphosis describes the alchemical translation. Cronin points out the connection between communication and sensing:

> The role played by discrete sensory receptors must be factored in so that we enlarge our sense of what it means to communicate and, by extension, what it means to translate. […] Differentiated theories of what translation implies in the age of the Anthropocene must naturally look to the physiological structures of perception and cognition in humans and non-humans.[232]

The alchemical translation makes visible the invisible inner workings of changing perception, as "whatever may seem unobservable and undetectable from one perspective (in one modality), can reveal itself in another way. This […] redefines the contours of what escapes not only visual representation, the invisible, but also perception more broadly, the unperceivable."[233] However, under the surface of the change of sensorial perception, another transmutation emerges 'below' that surface. Transmutation is what happens inside the bodies, where awareness, affect, and knowledge are created and focused on the translated entity. If humans have been able to perceive different, to sense how 'the other' senses, it can change human perception fundamentally. These new perceptions are typically less explored when we become aware of our environment and are therefore unfamiliar. They encompass, among others, auditory vibrations, visceral reactions, or an altered form of visuality.

To facilitate an openness for new sensory experiences, as different entities possess sensory abilities that humans lack, we need to disregard or letting go preconceived knowledge. This is described by the alchemical transformation steps after Jung. Of the seven steps of alchemical transmutation, it can be said that the first five steps (calcination, dissolution, separation, conjunction, and putrefaction) resemble artist Rachel Zollinger's suggestion that we must become 'unlearners' and transform our habits of being.[234] We must forget what we know about 'the other,' humans, languages, perception, and "what it means to be individual or in any kind of hierarchy, and [to] make new or simply forgotten relations of reverence with our earthly co-

[232] Cronin, *Eco-Translation*, 82.
[233] Fedorova, "Neurointerfaces, Imagery and Translation," 1.
[234] Zollinger, "Lichenizing Pedagogy," 26

habitants,"[235] to perceive and sense with nonhuman worlds. For unlearning it needs a profound inner change of awareness, engagement, and perception, involving an inner transmutation. The steps of distillation and coagulation create a new, changed 'self' in close, communicative relationship with the other entity. Communication produces presence so that it, "through its material elements, will 'touch' the bodies of the persons who are communicating."[236] This creates an affective, deep connection between one and the 'other' and moves away from human centered thought and relationships: "a body modification can influence the mind, leading to a new cultural, social, political, philosophical awareness."[237]

Moreover, alchemical translation creates knowledge that was previously inaccessible and can be seen as wisdom, as the knowledge created is one of experience and intuition. Barbara Bolt, scholar in art research, for example, explores the idea of knowledge derived from interacting with materials in the artistic context. Bolt contends that artists obtain valuable insights crucial for knowledge generation through their engagement with materials. She advocates for an artistic practice where the artist collaborates with materials, weather elements, and the force of gravity.[238] Gaining knowledge through the interaction with matter is an epistemological approach that alchemy always dealt with in the sense of 'technê,' combining theory with practical applications. Alchemical knowledge is not just about facts or information, but about a profound comprehension of the hidden workings of matter, the universe, and the self.

Both how the knowledge is gained and its characteristics have similarities with Indigenous or traditional ecological knowledge "that tend to privilege the more-than-human."[239] Indigenous knowledge could "prompt[s] us to move from sense-making to sense-sensing, displacing the centrality of Western reasoning."[240] Both Indigenous and alchemical knowledge systems emphasize the interconnectedness of all things, focusing on nature and natural processes; in both disciplines practices, protocols, or rituals play an important role. They recognize that the natural world, human beings, and the spiritual realm are deeply intertwined. Alchemical translation can unlock forms of Indigenous knowledge. However, the traditional

[235] Zollinger, "Lichenizing Pedagogy," 26.
[236] Jens Hauser, "Who's Afraid of the In-Between," in *sk-interfaces, Exploding Borders – Creating Membranes in Art, Technology and Society*, ed. Jens Hauser (Liverpool: University Press, 2008), 11.
[237] Pier Luigi Capucci, "New Perspectives on Nature and Life," *Technoetic Arts: A Journal of Speculative Research* 12, no. 2 & 3 (2014): 38, https://doi.org/10.1386/tear.12.2-3.375_1.
[238] Barbara Bolt, *Art Beyond Representation. The Performative Power of the Image* (London/New York/Dublin: Bloomsbury, 2022), 50, 51.
[239] Zollinger, "Lichenizing Pedagogy," 25.
[240] Cash Ahenakew, "Grafting Indigenous Ways of Knowing onto Non-Indigenous Ways of Being: The (Underestimated) Challenges of a Decolonial Imagination," *International Review of Qualitative Research* 9, no. 13 (2016): 336, 337. https://doi.org/10.1525/irqr.2016.9.3.323.

criteria for 'knowledge,' especially within the domain of artistic research, may be deemed unsuitable, leading to the consideration that the meaning-making of art transcends conventional knowledge and may align more closely with wisdom, as Vaage suggests.[241] The dichotomy between 'knowing that' and 'knowing how' underscores the importance of differentiating between types of knowledge. Notably, emotions are often marginalized in discussions about knowledge. Vaage introduces a hierarchy of knowledge modes in western society, positing a shift "from wisdom through knowledge to information."[242] She sees wisdom as a 'communicating' knowledge, which includes poetry, art, and other esoteric practices. Wisdom is seen as a traditional mode largely supplanted by scientific knowledge during the Enlightenment, though still prevalent in non-western societies. Wisdom, distinguished by experience, common sense, and emotional comprehension, transcends mere knowledge.[243] Interestingly, looking at alchemy's history, the knowledge gained is rather perceived as wisdom and the practitioners are seen as wise people. This wisdom is connected to the perception of movement and therefore time. Bennett states, this "invoke[s] a theory of relativity (of sorts): the stones, tables, technologies, words, and edibles that confront us as fixed are mobile, […] whose rate of speed and pace of change are slow compared to the duration and velocity of the human bodies participating in and perceiving them."[244] For this reason, dealing with the translation of vibrant matter reveals knowledge about the 'deep past,' about the semiotic system of materialities. These realities differ from human realties, they comprise timescales humans can hardly comprehend.[245] To think about the present and futures to come, it needs the merging of human history with the history of matter and life on the planet to produce a form of 'deep history.' The deep past can reveal what these assemblages and things had to endure, like weather changes, destruction through extraction, and relocation. Alchemical translation can reveal a whole history of colonialism and exploitation.[246]

[241] Vaage, "Wisdom in Artistic Research," 61.
[242] Vaage, "Wisdom in Artistic Research," 64.
[243] Vaage, "Wisdom in Artistic Research," 62, 63, 64, 65.
[244] Bennett, *Vibrant Matter*, 57.
[245] Myers argues that we need "to detune our colonial sensorium," as it evacuates the liveliness and sentience of the more-than-human worlds. Humans would need to learn how to talk to plants to "awaken the latent plant" in us. She suggests tuning into the different ways they do time, learn to follow their tempos and rhythm: "Pay attention to the ways they defy all-too-human notions of individuality, bodily integrity, subjectivity, and agency. Let the plants redefine what you mean by the terms 'sensing,' 'sensitivity' and 'sentience.' Let yourself be lured by their tropic turns, and you will soon acquire freshly vegetalised sensory dexterities" ("How to Grow").
[246] Mackenzie et al., "Spatio-Temporal Visualisation," 41, 52.

3.5. Art and Science: Concepts of Aesthetics and Inquiry

The arts have throughout the times added and aided alchemical thought and processes and contributed more generally speaking to scientific explorations. Art that engages with scientific concepts and conveys the inner workings of materials has emerged from unconventional investigations and inventive experiments. Artists translate these processes into sensory experiences through various means, including electronic and digital art, bio art, sculpture and installations, sound, and performance.[247] They transform and transmute material realities and expressions to make perceivable the unperceivable and to resist anthropocentric orders of attention, language, and translation. In this relation, hybrid art can be seen as a communication system, especially when employing and combining technological systems that make the translation processes possible.[248] In their creative endeavors, these artists are breaking down the distinctions between the natural and artificial, the real and the imaginary, and the domains of science and culture.

The intersection of art and science collaborations embodies a dynamic fusion of creativity and empirical inquiry, where the boundaries of the disciplines blur. This symbiotic relationship, which was also visible between the arts and alchemy, harnesses the power of artistic expression to communicate complex scientific concepts. Philosopher Nicole Karafyllis, in revealing the close relationship between science and art, shows how the term 'biofacticity' introduces growth as a fundamental aspect of identifying life, drawing parallels between the experiences of anticipation for growth shared by both the arts and sciences.[249] The social scientists Jane Calvert and Pablo Schyfter, for example, evaluate what science and technology studies (STS) can learn from art and design. Scientific thought and data serve as a base of inspiration for artists, offering unique perspectives that transcend tradition modes of presentation.[250] The scope of artistic research lies in its ability to explore freely across multiple domains, with outcomes communicating beyond words.[251] Unlike scientific research, artistic research encompasses inspiration, experience, and emotional expression, which helps to enact these ambiguities and complexities in order to bring them to light and provide room for discussion. Art in translating

[247] Regine Rapp, "On Mycohuman Performances: Fungi in Current Artistic Research," *Fungal Biol Biotechnol* 6, no. 22 (2019): 5, https://doi.org/10.1186/s40694-019-0085-6.
[248] Anker et al., "Technogenesis," 295.
[249] Karafyllis, "Endogenous Design of Biofacts," 46, 47; Karafyllis describes 'biofacts': "The word biofact still carries the connotation of technical interference with life to arrive at ends envisaged by a human designer, even if the act of interference leaves behind no traces. Biofacts can grow inside the lab or outside, challenging the very border of the laboratory ("Endogenous Design of Biofacts," 43).
[250] Jane Calvert and Pablo Schyfter, "What Can Science and Technology Studies Learn from Art and Design? Reflections on 'Synthetic Aesthetics," *Social Studies of Science* 47, no. 2 (2016): 63, https://doi.org/10.1177/0306312716678488.
[251] Vaage, "Wisdom in Artistic Research," 72, 73.

signs and traces of matter come up with new meaning and with new, more intuitive connections. The technologies or machines that are used to assist, make no difference in these intuitive approaches, because the translations always contain elements of uncertainty and ambiguity.[252] Furthermore, according to Robert Zwijnenberg, Professor Emeritus for Art and Science Studies, the sciences, especially biotechnologies, are testing ethical and aesthetic values concerning the human body and nature, but it also needs art as a perspective on these challenges.[253] Art employing biotechnological processes would "semiotically and somatically changes the relation between the artist, his or her displays, the recipient, and the socioeconomic context in which this art intervenes."[254]

These artistic translations often entail a change or transmutation from one sense into another, dimming one, or focusing on a sense that is normally less required in experiencing human worlds, which is described by Fedorova's concept of 'homunculization.' This sensory translation is perceivable through aesthetical means where art "inextricably links ethics and aesthetics."[255] Artworks using perceptual experiments can reshape human sensorium. Especially art exploring biology, physics, and chemistry translates these processes of substances into something aesthetically perceivable through different modes. Media studies scholar Jens Hauser, for instance, analyses 'bioart,' which incorporates biotechnology as a means of creative exploration and questions the primacy of the visual by engaging other sensory modes. He categorizes bioart into two distinct forms: one that utilizes biological metaphors and symbols to fuel discussions on biopolitical themes, often alongside conventional artistic techniques, and another that directly employs biotechnology, addressing thematic issues but not exclusively focusing on them.[256] As these sensory modes are so different from traditional perception and experience, the artworks and the worlds they are translating can be complex and disturbing, but especially ambiguous, which means that they do not necessarily convey just one meaning. No (machine) translation is perfect, yet, but there is experience, speculation, and intuition.[257] It is not about a perfect and fully clear translation, and not to be understood literally, i.e., not in a sense of 'normal' language, but as an imaginative process.[258] Nonhuman worlds

[252] Kadiu, *Reflexive Translation Studies*, 91.
[253] Zwijnenberg, "Biotechnology," xxiii.
[254] Jens Hauser, "Observations on an Art of Growing Interest. Toward a Phenomenological Approach to Art Involving Biotechnology," in *Tactical Biopolitics: Art, Activism, and Technoscience*, ed. Beatriz da Costa and Kavita Philip (Cambridge/London: The MIT Press, 2008): 84, https://doi.org/10.7551/mitpress/9780262042499.003.0006.
[255] Zwijnenberg, "Biotechnology," 141.
[256] Hauser, "Observations on Art," 84.
[257] The technological 'Babel fish' in the movie *The Hitchhiker's Guide to the Galaxy* (1978), makes 'perfect' translations, and can be seen as a goal we should be thriving for.
[258] Rampling, "A Secret Language," 38.

can appear chaotic and show unpredictable structures. Therefore, Cronin affirms that "only intuition and the imagination working through art allow humans […] to 'make contact with the ceaseless flux of being' and to renew their contact with the difficult, shifting mutability of experience."[259] Seeing translation as this intuitive alchemical procedure, knowledge and understanding is created in and through the act of the conversion into something aesthetic.

Art in collaboration with alchemical translation techniques is forming indexical signs of material realities, which become perceivable through their translation into changed modes of perception. Doane specifically mentions art using analogical forms of representation, such as photography. But as indexicality is associated with the analogical, it stands in contrast to digital technologies and media. The digital has no physical connection to the thing that has been transmitted or translated.[260] However, Doane also mentions digital images of suffering and pain, which would "point to the persistence and strength of an indexical imaginary even in the realm of digital photography."[261]

[259] Cronin, *Eco-Translation*, 34.
[260] Doane, "The Indexical and Medium," 130, 143.
[261] Doane, "Indexicality: Trace and Sign," 5.

4. Alchemical Translation in Contemporary Hybrid Art

The artists and their artworks I present and examine in this Chapter employ different approaches and aesthetic expressions. Despite their diversity, they share common questions, ideas, and aspirations. They use, for example almost unknown phenomena from physics to make the 'mysteries' of the origin of life and the world tangible, or artificial intelligences translate and weave words and patterns of nonhuman worlds into something that encompasses intuitive meanings which have similarities to human worlds of meaning and yet are very 'different.' The aesthetic imageries lead into unknown worlds of things as familiar and ordinary like pasta, or food in general. However, all artworks show that there is much more behind the actual things and beyond their representation, revealing through alchemical translation these unknown expressivities, communicative forces, and elementary powers that point to invisible worlds with their own rules and agencies. In this way, these artworks generate new or transmuted perception possibilities in the observer in making these elementary forces tangible. As the participants observe their altered sensorium in the process, the 'other' in the self becomes apparent, creating an affective connection to this 'other' inside and outside the body. The concept of alchemical translation helps to precisely recognize these processes.

The Chapter is divided into five groups, which constitute the aspects of alchemical translation: deciphering words and signs, transmuting human sensorium, creating awareness, generating an altered form of knowledge, as well as reconciling the 'other.' I will categorize the artworks accordingly. However, in all the chosen works, all these five aspects are detectable. The groups have thematical overlaps as the aspects of alchemical translation can hardly be seen separated.

4.1. Poetics and 'Hacking' Signs

4.1.1. A.I. Poetry: Translating the Silent Agony of Trees

The autumn wind,
blows through the
stream, the water
flows, and flows,
but it never comes …[262]

[262] "Treelemma," accessed December 15, 2023, https://www.treelemma.com/.

Oscar Santillán, who is an in the Netherlands and Ecuador based artist, supports the idea of interconnected realities rather than interpreting the natural world as unified and single. Santillán in collaboration with scientists from different institutions, for instance, from Leiden University's Biology Department (NL), or Maastricht University's Science and Technology Studies (NL), created studio 'Antimundo' to establish a place for "diverse beings to encounter the unknown."[263] Antimundo is a framework where science, fiction, and nonhuman viewpoints converge and interact. Santillán advocates for a decolonization of the senses to pave the way for Indigenous paths of sensing and knowing.

In the installation *Treelemma* (2023) by Santillán, "every time a forest burns a poetic obituary is written."[264] The poems are written by an artificial intelligence, where the digital blends with ecology. The A.I. receives real-time data of burning forests and, consequently, generates a poem, which becomes a visual animation. Each poem is then made into a NFT (non-fungible Token) and can be bought over the time span of one year.[265] Word by word and verse by verse appear on a dark screen, formed of floating, glowing particles, reminding of the sparks that set the forests on fire. The words are hard to grasp, as one disappears when another one is formed. Enjambments make the poem like a stream of words and remind the observers that there will always be more words coming. Time feels pressing while looking at the sparking verses (Fig. 2). The digital black panels on which the poems appear are embedded in earth by two iron rods, connecting the small computer screens to the surrounding plant life. The title of the installation exposes a precarious situation for the trees, a 'tree-lemma,' which is a dilemma but with only undesirable alternatives and paths. Though, considering the Greek meaning of 'dilemma,' which can be translated into 'double proposition,'[266] can help to see the situation as a chance for new negotiations and offerings. Therefore, the forests must speak, which Santillán's installation makes possible.

He explores a form of translation akin to the idea that translation is an act of transformation, often described as a poetic activity.[267] Alchemy teaches that experimenting with matter as well as forming and transforming language into poetic forms are possibilities to reveal truth. The poems by the burning forests, as it seems, show therefore the direct reality of the suffering trees,

[263] Santillán, "Antimundo."
[264] "Treelemma."
[265] 15% of the sales will be donated to different climate initiatives. Considering negative impacts of blockchains, Santillán and his team decided to use an energy-efficient option, which is the Ethereum blockchain. ("Treelemma."). Moreover, without going into this last aspect in detail, the similarity to Pentecost 'soil-erg' is worth noting, where the 'artistic' creation of something valuable is set into a human monetary system.
[266] "Dilemma," Online Etymology Dictionary, last modified October 13, 2021, https://www.etymonline.com/word/dilemma.
[267] Kadiu, *Reflexive Translation Studies*, 88.

the truth about their precarious situation. That the A.I. can promptly create a kind of 'truth' in the form of precise real-time data on burning forests raises the question of whether the same holds for an aesthetic or even poetic translation. Whose words are these in this interaction of burning forests, A.I., and artist? At least the translation seems to be performed by the A.I., which receives pure data of large forest fires, translate them into code, and then into poems. But, as Doane points out, digital media are devoid of materiality, they seem to be mathematical, almost pure abstractions, in which humans find little emotional value.[268] If the digital has no connection to a material reality, how can artificial intelligence be the right choice to translate the worlds and words of living, affective, and sensorial entities – the trees? If we imagine the A.I. in *Treelemma* as a digital mediator, as a kind of philosopher's stone that holds transmutation powers and might reveal the path to wisdom, it acquires a much stronger material presence, with its own characteristics, qualities, and possibilities. Santillán bridges this dilemma through the close connection between technology and nature. In *Treelemma*, the digital, visible entities – the screens, cables, and their metal mounts – are embedded in soil that is overgrown with plants (Fig. 3). The artist has given the digital a kind of materiality by at least visually connecting the digital with the plants. Furthermore, the sparking words that appear on the screen are reminiscent of the actual fires that burn the forests. This gives these digital poems more a quality of indexical signs. Therefore, it seems the trees around the panels would inform and transmit the information to the technological devices. Moreover, artificial intelligences, as much as they have their own agency, follow procedures and protocols that the artist considered promising. This collaboration blurs the boundaries between technology, human, and plant-life. Different entities communicate with and through each other. Humans, metals, plants, trees, and soil are forming a network.

According to Laurence Petit, scholar of contemporary British literature, it can be argued that digital media „have brought into sight the kind of universal language of which the avant-garde once dreamed,"[269] or other groupings that were in search of a lingua franca. In *Treelemma*, this language is one of pain, suffering, and guilt, as can be seen, for example, in the verses: "I give my last hope for you to find me again yet, I know you won't," or "I kill an ant and realize my three children have been watching."[270] They are words of death and decay – of nigredo. The poems have indeed the strength and persistence of indexical traces and signs as Doane asserts

[268] Doane, "The Indexical," 143.
[269] Laurence Petit, "Alchemy of the Word and the lmage: Towards a New 'Iconographics' of Postmodern Culture," *English Language Notes* 44, no. 2 (2006): 312, https://doi.org/10.1215/00138282-44.2.313.
[270] "Treelemma."

about digital images depicting violence and pain. In choosing a poetic form for the mode of translation strengthens the connection to indexicality, as poetry is in alchemy to be considered a language of truth.

Even though historian Ingrid Rowland argues the divine language of poetry cannot be created through technical means,[271] it is especially the mode of infinite and continuous variations of digital technologies, which seem to resemble poetic processes. Thinking this with alchemical translation in mind, it evolves into a prophetic language that needs unconventional techniques to became understandable. The order in which verses materialize, with one appearing, followed by another, and the intermittent disappearance and subsequent reappearance of specific verses, coupled with the persistent ambiguity in the formation of letters in the sparks, disrupts typical linear reading. It introduces a more chaotic 'reading' experience, where fragments of meaning are encountered individually, irrespective of their original place in the poem. This way of taking in information is reminiscent of prophecies conveyed in language that is not clear, neither in the sense of literal meaning nor in the sense of the 'normal' physiological reception of words. Cash Ahenakew, researcher in Indigenous Peoples' Well-Being, argues, "the task of poetic and metaphoric writing is to invite other senses to take part in the reading process."[272] Although looking at the poems involves the sense of sight, which is most commonly used by humans, it is altered here from reading to a form of wandering gaze, while perceiving the change of perception, as well as perceiving an altered form of time. The structures of appearance and disappearance of words are reminiscent of the alchemical modality of passing and becoming. It forms a kind of transitional consciousness, which changes into other forms.[273] The conventional vision and perception of the words are metamorphosized, allowing to perceive information differently, non-linear. The eyes tend to wander over the surface and are not fixated on a linear structure (as in 'normal' reading). It is more a form of searching, where the eyes only lightly touch the screen and the words. The blurred structures support this feeling of touch, of a haptic presence. The sparks from the burning ashes burn into the skin of the observer, by what new affective connections can be made.

Since the words are blurry and become partially illegible, also the meaning becomes harder to understand. It can be argued that this may represent a form of relative time, considering Indigenous spatio-temporal models that have a way "of depicting the underlying fuzzy and adaptable logic underneath."[274] Thus, two very different perceptions of time emerge. One

[271] Rowland, "Poetry and Prophecy," 509.
[272] Ahenakew, "Grafting Indigenous Ways," 333.
[273] Anderson, "Alchemy of Play," 246.
[274] Mackenzie et al., "Spatio-Temporal Visualisation," 54.

perception mode is that of 'real-time,' in which it is possible to observe how the received data is immediately processed by the A.I., which connects the observer directly with the actual disaster of burning forests. The other time is a relative, non-linear experience, due to both the blurred nature of the words and the non-linear movements of the eyes in search for meaning.

Considering the other aspects of an alchemical translation, *Treelemma* does create an emotional and ethical obligation towards the forests through which a union can be formed. One of the ethical functions of translation is a "creative retrieval of the betrayed promises of history."[275] Translating would allow to acknowledge our obligation to those who have passed away – be they humans or trees – and to provide them with a voice, unfolding the history of the forgotten and betrayed ones. The installation demands full attention if we want to follow the words and verses but creates awareness of the cruel situation to which the trees and other living beings are exposed, suffering under these fires. A transformed knowledge is conveyed, a kind of poetic, prophetic wisdom, which however, does not talk about future scenarios, but about the present, which is experienced in a state of constant change and regeneration. However, these are not experiences and regenerations of hope, but of destruction. It can be said, with Haraway's words:

> In urgent times, many of us are tempted to address trouble in terms of making an imagined future safe, of stopping something from happening that looms in the future, of clearing away the present and the past in order to make futures for coming generations. Staying with the trouble does not require such a relationship to times called the future. In fact, staying with the trouble requires learning to be truly present.[276]

Through alchemical translation, the hidden, invisible agonies of the trees become perceivable through the experience of an all-time-present and changed sensory modes from sight to touch. The installation by Santillán creates a transmutation of human perception and forms an affective connection to the trees in sharing an experience of pain. It reveals how technologies, humans, and plant life interact, creating poetic und aesthetic signs that convey this pain. It uncovers the betrayed promises that have been made time and again by makers of history and politicians. *Treelemma* makes us think with the trees and, as Papadopoulos, Puig de la Bellacasa, and Myers

[275] Kearney, "Paul Ricoeur," 157.
[276] Haraway, *Staying with the Trouble*, 1.

declare, awaken these alchemical, creative agents of the cosmos, refusing to be a mere resource.[277]

4.1.2. Chemical Portraits: Unveiling Inner and Outer Worlds

In the art installation *All You Can Feel* (2014), artist Sarah Schönfeld is experimenting with the intersection of photography and pharmacology.[278] The artwork involves placing liquified pharmaceuticals, synthetically produced body-own substances, and illegal drugs on the sensitive side of a photographic negative. Over the course of days and weeks, a chemical interaction occurs between the photo-emulsion and the substances, resulting in visible changes on the negative – an (al)chemical wedding (Fig. 4). The substances essentially "hack,"[279] as Schönfeld describes it, the traditional photographic process by attacking the surface of the negative and penetrating its structure. This chemical interaction creates unique patterns, textures, and alterations on the negative, capturing a visual representation of the substances themselves. The negative, transformed by the chemical interaction, is then enlarged in the darkroom to produce the final image. The alchemical translation consists here of the making visible of inner, unperceivable, and foreign aspects of human bodies such as our 'chemical-self.' It also extends to the substances themselves and to their and our connection to macrocosmic structures.

Schönfeld uses semi-organic materials, which are known to alchemists as prima materia, such as blood or other body liquids. In combining body substances with the photographic negative, the question arises as to what can be visually portrayed. Photography in itself bridges the gap between the signifier and the signified as a typical indexical sign, as Doane describes it. This is, however, taken a step further in *All You Can Feel*, as the substances have actually left their unique imprint on the sensitive photographic surface. The mode of the index of 'touch,' of physical contact, has become literal. These images become witnesses of past moments, a chemical past, which also has a temporal dimension. The artwork explores the boundaries of what can be visually portrayed through photography, pushing the limits of representation and reality. It blurs the lines between the self and the chemicals, which are interwoven with the self, but become own creative and aesthetic forces. In the human body, various chemical processes are constantly occurring, and elements and other compounds

[277] Papadopoulos, Maria Puig de la Bellacasa, and Myers, "Introduction," 12.
[278] Sarah Schönfeld, "All You Can Feel," accessed December 13, 2023, https://www.sarahschoenfeld.de/2022/03/05/all-you-can-feel/.
[279] Schönfeld, "All You Can Feel."

interact to maintain life and health. The 'photographs' create a visual dialogue about the impact of chemicals on the self and the intricate relationship between the chemical and visual aspects of our experiences. The result is a kind of portrait that goes beyond traditional photographic methods, revealing a fusion of chemical and visual expression.

Photography can be seen as a medium that can give us specific truths about our outer appearance. However, since the mixture of substances leave their imprint here, we receive a portrait of our inner composition, which can be seen as a chemical portrait. These images portrait our 'chemical selves,' which are responsible for our desires and experiences and with which we try to explain our moods. Just as Galenus in ancient times pointed out that we are made up of four compounds that determine our lives, this knowledge continues to exist, has been expanded, and shows how there are countless chemical substances that are responsible for our moods, appetites, and aversions.

The ability to perceive our 'chemical selves' as portraits is also integral to the alchemical translation process of nigredo, or 'forgetting.' It forces us to let go of what it means to be a 'self' in the dichotomy of internal and external realms. This prompts a reconsideration of what a portrait constitutes, unveiling the idea that our individual, inner 'components' have their own agency and, in a way, determine the human being. It shows that these 'foreign' agencies are within us, and therefore, how 'alien' our own bodies are, which we do not fully understand and usually are not able to perceive. This is further reinforced by the fact that there are actually 'other,' non-bodily substances in the mixture, as in the case of (medical) drugs. These are foreign bodies that we put into our bodies to either promote health or alter consciousness. But often we do not perceive these substances as having their own agencies, even though they have such an impact on the body.[280] *All You Can Feel* changes this by giving the effects of the mixtures of substances a photographic medium through which they can express themselves anew.

The installation draws attention to how these chemical properties have their very own performative languages. In the alchemical translation, the substances show their mode of expression as an impression, which opens a space for interpretation and opens possibilities to assign new meaning to their signs and traces. The portrayed 'chemical selves' evolve into structures of planets, clouds, outlines of coastal areas, and entire land structures from a bird's eye view, like maps. Entire worlds open up in the compositions of the substances, bringing the hermetic principle of correspondence to mind. Just like the medieval alchemists would interpret

[280] This may be different in the case of psychedelic drugs, for example psychoactive mushrooms are said to have their own 'alien' agencies.

the properties of, for example, gold as the sun, or symbolic expressions for spiritual processes, one can read the abstract maps formed by chemical reactions as carriers of some mysterious information to be deciphered. Liquid opium on a photo negative, for example, evolves into a blue and icy looking planet in deep space (Fig. 5). Without knowing how Schönfeld's experiment was conducted, one could be under the impression that it is a photograph of a real planet. The combination of speed and mephedrone, which Schönfeld calls 'magic' due to its psychoactive properties, becomes an imaginative map with purple icy lakes and dense forests (Fig. 6). It shows the deeply interconnected structures of life and worlds. These worlds are properties of the mixtures of substances themself, as they immortalize their magical properties into the signs. It enables to imagen various worlds that might be invoked through these substances, although this would constitute a different kind of experiment.

The alchemical translation of the 'language' and expressivity of these substances show that they have individuality, creativity, as well as own agencies. The ability to perceive 'ourselves' as chemical entities can create a greater awareness of our inner processes and compositions and remind that we are indeed walking and talking minerals.[281] However, it also leads the consciousness towards the individuality of chemical substances, which create associations with macrocosmic as well as microcosmic structures and a knowledge that points beyond common thought. It may be a knowledge that can also be partially experienced when taking the respective drugs, but where the experience remains inside the body. In the art installation, these experiences are brought to the outside. It shows the elementary powers of these substances, which in alchemy represent entire planets and are in turn deities that are again connected to the human being. The full meaning behind the imprints by the substances remains ambiguous but gives glimpses of these other worlds and transforms consciousness.

4.2. Immersive Transmutations: Beyond Sight and Sound

Artists Evelina Domnitch and Dmitry Gelfand explore the landscape of physics and chemistry by creating immersive installations and performances that blend physical phenomena with unconventional philosophical approaches, among others, alchemy. They utilize recent scientific discoveries to explore questions of perception and concepts of life. Domnitch and Gelfand's installations exist as continuously evolving phenomena available for direct observation. These rarely witnessed occurrences take place right in front of the observers, significantly expanding

[281] Margulis and Sagan, *What Is Life?* 50, quoted in Bennett, *Vibrant Matter*, 11.

their sensory experience. This encounter enables the observer to transcend the artificial boundary between scientific phenomenon and one's perception.[282]

The artwork *Camera Lucida* (2003) by Domnitch and Gelfand involves a transparent chamber filled with water where sound waves are transformed into light through a phenomenon called sonoluminescence. The experiment reminds of alchemists who "characterize the prima materia as watery, chaotic, confusing, lowly, ubiquitous, and brimming with the potential necessary to produce the magical, transcendent, end product of the alchemical process, the philosopher's stone."[283] Looking at the installation of the glowing glass tank filled with water (Fig. 7), one might be able to assume a form of wonder in seeing the magical creation of light, just as the alchemist in Joseph Wright's painting "The Alchymist, in Search of the Philosopher's Stone, discovers Phosphorus" (1771/ 1795; Fig. 8).

In *Camera Lucida*, observers experience the transformation of sound into volatile and transient configurations of glowing and vibrant light structures. This light arises from within the imploding gas bubbles, but the exact energy amplification remains unexplained despite various theories. This shows the mysterious and magical qualities of the experiment, as it is a process that scientists cannot fully explain and has not been explored as a perceptual tool before. In the quest to delve into new areas of scientific inquiry, Domnitch and Gelfand experiment with matter, energy, and different technologies. In the first phase of experimentation, the artists did not use water, but "large amounts of xenon-infused sulfuric acid. The prospect, unsurprisingly, made laboratory scientists nervous: it sucks the water out of anything it touches (human tissue, beware)."[284] This was one of the reasons why initially scientists were reluctant to collaborate with the two artists. Another reason was that physicists, chemists, and sound engineers claimed sonoluminescence would not be visible for the eye. But with an intuition that this phenomenon can be made perceivable, they continued their project, without knowing what to expect.[285] The artists show that they perceive the performing sound wave as a living entity with a specific behavior and expression that can be translated.[286] It is, however, a chaotic state of waves and light explosions, which the artists seek to regulate.[287] It is not the 'normal' light that is at stake here: "In terms of duration, pressure and energy per molecule, ultrasonic

[282] Evelina Domnitch and Dmitry Gelfand, "Camera Lucida," accessed December 13, 2023. http://www.portablepalace.com/camera_lucida.html.
[283] Anderson, "Alchemy of Play," 251.
[284] Eric Smillie, "Vitriolic Artists Send Visitors on a Sulfuric Acid Trip," posted on March 24, 2008, https://www.wired.com/2008/03/pl-arts-12/.
[285] Evelina Domnitch, and Dmitry Gelfand, "Camera Lucida: A Three-Dimensional Sonochemical Observatory," *Leonardo* 37, no. 5 (2004): 392, https://doi.org/10.1162/0024094041955962.
[286] Domnitch and Gelfand, "Three-Dimensional Observatory," 391.
[287] Domnitch and Gelfand, "Three-Dimensional Observatory," 395.

irradiation behaves in a vastly different manner from traditional energy sources such as heat, light or ionizing radiation."[288] This means that the light this radiation produces is entirely different to perceive, it can be thus called a form of 'alien-light.' In their pursuit to make the phenomenon visible through aesthetical means, they replace the scientific endeavor for precise results, which are in the case of sonoluminescence barely to be found and approach the unknown with an impartiality and a willingness to do the impossible. They translate the waves into sounds, and at the same time transmute the way of the observer's perception of sight and hearing.

In the installation, the senses are highly engaged and heightened, since the phenomena can usually only be experienced in complete darkness. The observer is completely immersed in this darkness, the gaze fixated on the huge vessel filled with liquid. A high level of concentration and attention is required while the technological units emit their whirring sounds. The gaze, regarded as a silent and effective form of communication, transcends the limitations of spoken language. It is a nuanced and intricate way of conveying emotions and intentions. It can serve as a bridge between individuals of different worlds, fostering a connection that goes beyond linguistic barriers. The voice, as gender and body scholar Anna Kérchy argues, has been hierarchical appropriated and would endanger all form of communication.[289] In an installation by Marina Abramović, for example she forms a mutual, mesmerizing gaze with a donkey to establish a democratic interspecies bond (2010).[290] This kind of gaze is also needed in the installation *Camera Lucida* – a gaze of intense seeing, an interface between eye and 'alien' light, self and other, touching each other from outside-in. Then slowly, a sparkle becomes visible and small explosions of light appear. They look chaotic but seem to follow their own mysterious laws (Fig. 9). Because of their dynamic movements, they challenge traditional static representation of nature, inviting a bodily, energetic engagement with the visuals. *Camera Lucida* shows that waves are the inherent structures of all life: "from the 92 periodic elements to the resonant frequencies of one's bodily organs. Everything is made out of ceaselessly regenerative wave systems — any level of stasis is just a sensorial illusion generated by gaps in scale between inner and outer space-time."[291]

A classical music composition holds the sound source. It is interactive, as the viewer can start playing the composition by which the bubbles start to explode and start to shine. Changing

[288] Domnitch and Gelfand, "Three-Dimensional Observatory," 392.
[289] Kérchy, "Chimeric Visions," 404.
[290] Kérchy, "Chimeric Visions," 404.
[291] Domnitch and Gelfand, "Three-Dimensional Observatory," 394.

the direction of the transducers can create changing patterns of interference.[292] It forms a "delicate bio-chemi-physical interface,"[293] emphasizing the interconnectedness of these three aspects in the encounter. During the experience of the installation, the vibrations of the sound waves reach deep into the body. It involves feeling and seeing sound, where the visible becomes a condition for the invisible (the audible) and vice versa. The transformations of wave into something visible, therefore transmutes the observer's possibilities of perception, seeing in an altered way and perceiving phenomena that are not made for human eyes.

Camera Lucida makes the unseen visible and tangible by covering observers in darkness and slowly unfolding an incomprehensible mystery before them. It is reminiscent of Paracelsus' 'Light of Nature' – a principle of human knowledge and perception. This 'alien' light of nature requires intensive observation, revealing fascinating wave structures. These waves can be felt through vibrations in one's own body, resonating with the waves of the installation and creating a close connection between body and phenomenon.

4.3. Attention and Awareness: A Close-up at Food's Hidden Patterns and Paths

Heather Barnett is an artist and researcher who explores the intersections of art, science, and technology. She has worked on projects that involve collaborating with scientists, artists, participants, and organisms to create artworks and to explore human observations, understanding, and relationships with the world. Her works often utilize various technologies to observe and interact with nonhuman entities, fostering a sense of connection and engagement between humans and other species. She focuses on nonhuman intelligence, collective behavior, and distributed knowledge systems.[294]

As an artist in residence, Barnett has partnered with diverse institutions, including the L'Autre Pied Restaurant, a Michelin-starred restaurant in London in 2014. During this six-month period, she observed the dedicated team behind the scenes as they prepared and served world-class cuisine and created *In Visible Substance*. One part of the installation was to gain a unique perspective on the behavior of the staffs' bodies, wherefore the restaurant staff wore heart rate trackers during their busy shifts, collecting biometric data such as pulse rate and calories burned. Barnett used this data to create a series of artworks, called *Simultaneous*

[292] Domnitch and Gelfand, "Three-Dimensional Observatory," 393.
[293] Domnitch and Gelfand, "Camera Lucida."
[294] Schönfeld's projects include *The Realm*, an immersive interactive experience; *The Physarum Experiments*, an ongoing collaboration with intelligent slime molds; and an interdisciplinary series of biosocial experiments like *Nodes and Network* and *Crowd Control*.

Service, which visualize the heart rates of different staff members during the same shift. However, she also took a closer look at the main actor in the restaurant: the food, which represents the other part of the invisible substances in the title.

Barnett examined the food and materials of the kitchen, such as squid ink, red pepper, and beetroot puree, under a microscope, revealing structures and patterns that are normally not visible for the eye (Fig. 10). These experiments were then screen printed and hung in the restaurant. In a video about the installation, Barnett says she is "interested in systems and structures often hidden from view."[295] The food's inner structures become visible in the same way as the inner structures and changes of the tracked pulses of the restaurant staff during their performance, dealing with the food. The artist creates a transitional, alchemical form of conscious for the processes, where biological matter and technologies point towards the human energy that goes into the food making. Human energy, i.e., life, sustained, among others, by eating and drinking and by our metabolism, guides back into the prepared meals, revealing alchemy's ecosystem of bio-chemical processes in both humans and their food. Transitional awareness in context of alchemical translation makes it possible to register food's shifting states in a twofold sense: on the one hand, due to the preparation of the food and further processing by the body, and, on the other, of its origin and place, as food normally travels to reach their end customers.

Barnett's artworks are transforming and translating not only human data into data-portraits but transforming food into something that needs more attention and awareness. In alchemy, Paracelsus, for instance, proposed that an inner alchemist resides within the stomach. According to him, the alchemical process of separation corresponds to a type of digestion, wherein food undergoes synthesis, producing essential substances required by the body. The inner alchemist's failure could lead to the point where medicine is needed to aid the alchemist.[296] However, some mixtures were supposed to change human beings into immortal entities, as the philosopher's stone.[297]

However, eating and digesting are things we must deal with every day in order to survive, so mundane and yet essential to life. We usually do not pay much attention to our food, because we normally have it available in supermarkets or fast-food restaurant. Foods and drinks promise

[295] Heather Barnett, "In Visible Substance: L'Autre Pied Artist in Restaurant Film," documentary on Heather Barnett's project working in Restaurant L'Autre Pied (January 11, 2015), video, 00:52–00:55, https://www.youtube.com/watch?v=74T6Gbr2IdE&t=196.
[296] Georgiana D. Hedesa, "Alchemy, Potency, Imagination. Paracelsus's Theories of Poison," in *'It All Depends on the Dose.' Poisons and Medicines in European History*, ed. Ole Peter Grell, Andrew Cunningham and Jon Arrizabalaga (London/New York: Routledge, 2018), 85, http://library.oapen.org/handle/20.500.12657/29719.
[297] Artist Pentecost compares her alchemical composting process to the human gut, which "shares a radical intimacy with the bacterial process that has taken over my compost" (*Notes from Underground*, 5).

to provide all necessary nutrients, and eating while rushing to the next appointment is nothing unusual for many people. Seldom do we truly take the time to eat or reflect what we are eating, where the food originates, how it was crafted, and how it reaches us. While Slow-Food movements have endeavored to counteract this trend for decades, they are often not entirely suitable for everyday life.[298] However, Barnett's artworks transform attention into an awareness of the energy or life that has flown into the creation of the meals and gives more options to perceive food's characteristics and expressivity. In restaurants such as L'Autre Pied, food becomes the main actor, transforming into an aesthetic object in the form of meticulously prepared meals, where restaurant workers turn into artists and alchemists.

The microscopic observation adds a layer of intimacy and awareness, bringing us closer to the intricate processes in action. This shift in scale, transitioning from the macroscopic world to the microscopic, has the potential to enhance our comprehension of the intricate details and structures of nonhuman entities. This change in focus can encourage a more aware and conscious form of observation, altering how we prioritize and interpret visual information: "At the human scale we are reasonably sure that we can distinguish what is alive (plants, animals) and what is not (the paper on which these notes are printed), but at the microscopic scale the boundaries blur."[299]

The beetroot puree, the squid ink and the red pepper imprint their unique structures and language onto the surface, forming indexical signs. They become subjective actants with their own structures and movements, as seen in *All You Can Feel*. In Schönfeld's installation, the images refer to our 'chemical selves' as planets and clouds. This raises the question of where the structures and similarities of the signs and language of the food that Barnett has translated are leading. The beetroot puree, for example, has similarities to actual geographic maps, which can encourage to think about the origin of the food (Fig. 11). This edible matter can be experienced through a completely different medium, which opens new forms of interactivity.

The specific characteristics of maps make it possible to perceive images differently than usual, as they require a certain type of reading, which resembles rather alchemical concepts and consist of a more abstracted form of representation and language. In a similar vein to alchemy with its poetic language and to the sciences, a map employs an abstracted, symbolic language. A map is an object to walk through, to read, and to understand the other in relation to oneself. Maps provoke questions about one's own positioning and is an object to travel through as

[298] For more information: "Slow Food," Slow Food, accessed December 15, 2023, https://www.slowfood.com/about-us/.
[299] Capucci, "New Perspectives," 381.

through life. Every life can be mapped: places we are connected to, relationships we have had and continue to hold, general views of life, opinions, and beliefs – networks that stretch across the globe. Mapping was already thousands of years before a necessary tool to realize where we are in the world and to see where the others are and who they are. Maps would be like and unlike the territories they represent, and this forces us to discuss complex issues of similarity, difference as well as colonial forces that lead to these structures.[300] Maps give us the opportunity to "critically interrogate our locations, the identities and allegiances that inform how we live our lives,"[301] starting a process of decolonization. Alchemical concepts are also close to structures of weather maps, as they even entail the movement of chemical exchanges and formations. The fact that maps are typically reductions of large structures generates a perceptual contradiction in perspective, which is in *In Visible Substance* even enhanced because of the microscopic view. This blurs pre-formed perspectives of microscopic/microcosmic and macroscopic/macrocosmic entities. It creates an awareness, that points towards something that lies beyond of what we are looking at.

In the alchemical translation of edible matter into unique maps, a new transitional awareness is crafted, emphasizing the alchemical modality of passing and becoming. This unveils the circular path of energy carried by food and the creative, expressive power of these substances that shape worlds. Further questions arise here and ideas for further inquiries: Do differently cultured foods show different structures? Do pesticides change these patterns? Is there a visible difference between food that has traveled a long way or was produced locally? And maybe the next time we eat our salad or our puree, we can guess and speculate how this food would form its very own map.

4.4. The Knowledge and Wisdom of Life: An Intuitive Experience

The artists Domnitch and Gelfand might work mostly with 'inorganic' matter and technologies, but throughout their experiments and installations, they draw a connection from inorganic matter to structures, patterns, and behavior of organic life. The artists show that both categories entail vibrant, lively entities, which can be perceivable as such, can be translated, and which transfer knowledge or even a form of wisdom about micro- and macrocosm, humans, and nonhuman worlds. As wisdom is a form of knowledge consisting of experience and intuition, I will especially look at these aspects.

[300] Mark Quentin Gardiner, and Steven Engler, "Charting the Map Metaphor in Theories of Religion," *Religion (London. 1971)* 40, no. 1 (2010): 2, https://doi.org/10.1016/j.religion.2009.08.010.
[301] Bell Hooks, *Outlaw Culture: Resisting Representations* (New York: Routledge, 2006), 4.

In their installation *Lemniscate Cascade* (2022), the two artists go to the very beginning of the creation of life on Earth, which occurred in an exchange between light and soft matter, e.g., liquids, foams, gels, liquid crystals, flesh. Domnitch and Gelfand lead observers of their installation into a 'deep history' – to the creation of life, which took place at an almost unimaginable temporal distance. Observers experience this formation of life as evolving from inorganic matter: "life arose from non-living matter about four billion years ago."[302] The installation intuitively explores how this process could have occurred and on its appearance. It shows how a laser beam travels through a light-sensitive liquid crystal mirroring the process of life formation. In the process of passing the laser through the liquid, the laser and the crystal reshape and transform. In this re-enactment of the emergence of life on Earth, in which different materials are placed in dialogue, the laser beam actually reveals characteristics of microscopic life, as similar shapes and movements can be detected (Fig. 12).

The two artists perform the procedure of creating a 'homunculus,' creating life from inert matter and making this process a medium to engage with, revealing processes which are unknown to humans. When directed at specific angles, this penetrating light creates a large-scale projection of molecular interactions and fascinating non-linear optical phenomena, which resemble the dynamics of living cells. Only in the dialogue of the two media – light and matter – does this living image of microbe-like form emerge, captured in a video.

In *Lemniscate Cascade* observers encounter vibrating, twitching blobs of color that are constantly transformed (Fig. 13). It shows the liveliness of light and crystals, which would normally be perceived as inorganic. In a video on the artists' website, one can see a three colored circle, full of round, bubbly structures and the whole structure is pulsating like a heartbeat. The artists have underpinned the video with this inwardly invasive, dramatic pulsating sound that enhances the experience. The sound itself is created during the operation with the crystal, which creates a close connection between the 'talking' crystal and the physical bodies of the observer. This can trigger affect and emotions. The heartbeat is a vital signal that we do not necessarily perceive under normal circumstances. Seeing and feeling our heartbeat in this other 'thing' triggers a self-reflective action, and we are able to discover this life in us, too. The temporal structures of human body and pulsating sound seem to coincide, beat by beat. To experience a heartbeat "shifts the focus from the activities and responses of the external body […] to the internal body, where the pulse and the rhythmic filling and emptying of the lungs can enact and

[302] Capucci, "New Perspectives," 382.

express attitudes and emotions such as desire, fear, anticipation, and relief."[303] But this body is not ours, it has its own life in the sense of a "restless activeness, a destructive-creative force presence that does not coincide fully with any specific body."[304] In this installation, as in *Camera Lucida*, the observer is shrouded in darkness, fully attentive for observations, which further intensifies the experience and makes it an unusual encounter.

We might imagine the creation of life on Earth as a chaotic, accidental process that took place over millions of years ago. However, these timescales and processes are difficult to comprehend. The two artists downscale this into two actants (laser and crystal), and to a moment that becomes tangible. The observer is drawn back to a time that is far away from anthropocentric orders. In this moment, where the laser and the crystal touch, life and a whole world is created. We are able to observe an osmotic process, where entities diffuse and intermingle across boundaries, across light and matter. It reminds of *In Visible Substance*, where the energy of the restaurant staff (here: light), would lead back into the food (here: matter). Both installations give the impression of osmotic universes, which means that different realms and dimensions interact and influence each other in a fluid manner, which resembles the idea of alchemical modality of change. The alchemical translation of interaction between light and crystal becomes a moment of wisdom, full of experience.

In the installation, intuitive moments are of importance, whereby scientific aspects are bridged through and to artistic ones. Intuition makes it possible to translate these movements and metamorphoses between light and matter into something aesthetic. Intuitive moments arise here through the aestheticization of the processes, which intensify emotions and create a kind of gut feeling, which is reinforced by the immersive sound. Intuition also means that although these visible processes of life creation are somehow perceivable, they cannot really be explained, but can only be understood in a different, modified form.

Therefore, it can be argued that the two artists, by showing the creation of life, generate an experience that points beyond 'normal' knowledge, and is more akin to wisdom as it is closely related to experimenting and experience, which is a transformed experience regarding the perceptual organs. It is a wisdom that alchemists have been studying and trying to understand since their beginning: The creation of life under 'artificial' circumstances. This kind of wisdom involves new perceptions, heightened senses, the inner perception of sound, and also transforms our perception of time and history. It gives us knowledge of 'deep geology,' about matter

[303] Jennifer M. Barker, *The Tactile Eye: Touch and the Cinematic Experience* (Berkeley: University of California Press, 2009), 120.
[304] Bennett, *Vibrant Matter*, 54.

aspects that are part of the creation of life, as well as of 'deep time' or 'deep history,' leading the observers millions of years back in time and merging human history with the history of life on the planet.

Finally, the installation changes typical human perception of sight into a higher form of awareness for the little movement of the changing colors and structures, and creates an emotional, bodily connection through, for example, the sound. This awareness involves a realization that there is always more than what lies in front you, that there is an unexplainable phenomenon of life creation behind 'ordinary,' inert materialities. Therefore, it can change how we perceive matter and light around us, evolving into important actants in the creation of life.

4.5. Reconciling the 'Other'

4.5.1. Playful Translations of the 'Alien' (In Us)

In Schönfeld's installation *Alien Linguistic Lab* (2017), it seems as if we are dealing with an actual linguistic translation, performed the A.I. translation system Google Translate.[305] The art installation centers around the idea of linguini di sepia noodles, colored with octopus' cephalopod ink, as potential carriers of alien information. It posits that the cephalopod ink, traditionally seen as a defensive tool, might actually contain encoded linguistic messages: "Linguini is derived from Lingua (latin for language) which makes it a perfect linguistic unit"[306] (Fig. 14). The artistic process involves throwing a single linguini di sepia noodle, tinted with the ink of the octopus, onto a white wall and decoding the resulting shape using Google Translate's language recognition function (Fig. 15). By repeating this process, the audience generates a board full of words which form an 'oracle.' Even though Schönfeld thinks about possible futures, where we must communicate with extraterrestrial beings, her installation also gives material to think about the communication with nonhuman worlds on planet Earth. It reminds us that the 'alien,' the 'other,' is not far away on a distant planet, but with us on one planet.[307]

Ink is the original and traditional substance for writing, for creating words, meaning, and knowledge, which are also encoded properties in this material. However, this material has its

[305] Sarah Schönfeld, "Alien Linguistic Lab," accessed December 13, 2023. https://www.sarahschoenfeld.de/2019/09/19/alien-linguistic-lab/.
[306] Schönfeld, "Alien Linguistic Lab."
[307] The artwork has similarities with the movie *Arrival* (2016) by Denis Villeneuve, where octopus like aliens start to communicate through their ink and where it is the humans' goal to deciphers these messages to save Earth. Here, as well as in the installation, we have to use our imagination, actively engage with the other beings and be open for an affective relationship for a genuine interspecies connection and communication.

own agency and significance beyond its traditional role. The ink and the noodles are portrayed as vibrant agencies, carrying encoded messages that challenge our understanding of its purpose. The shift in the ink's purpose, from a defensive substance to a communication medium, reflects the alchemical idea of altering a material's nature. The octopus' defensive ink can be read as a metaphor for the protective mechanisms that certain entities employ when faced with threats. Applying this ink to artistic expression underscores the vulnerability of these entities and the need to understand their defensive responses. The use of defensive ink, on the one hand, becomes a tool to emphasize the urgency and importance of understanding entities that may be elusive or resistant to human interpretation. On the other hand, by blocking the view of the octopus' enemies, the ink can be seen as an obscuring material, like the shaped prophetic words in this installation. Translating the linguini di sepia shapes is a form of decoding messages from this obscured and absent source, akin to the alchemical practice of unveiling hidden meanings in unknown chemical structures and processes. This playful procedure of throwing pasta and translating shapes can be viewed as a transformative process, turning ordinary noodles into a medium for communication.

As mentioned, this translation is carried out by the A.I. Google Translate, which has access to many more language systems than individual humans. Thus, although words, letters, and numbers are formed by the A.I., they require a further 'human' step' in the process of meaning-making as the translations appear predominantly cryptic, which is the interpretation of the oracle. The randomness and unpredictability of the artistic translation process mirror the challenge of understanding and translating entities that resist easy comprehension. But while translating and interpreting, something exciting happens: The machine, in the act of translating, experiences a kind of tension, as it tries to "reduce the otherness of the other, thereby subsuming alien meaning into one's own scheme of things."[308] Google Translate is trying to find interdepended similarities between human language and the shapes of the noodles, where the noodles trick the technology into thinking it is something that it knows. In turn, it reveals how 'alien' our language is, as the machine actually finds familiar, human patterns in alien-language, and thus deconstructs human language in letting us 'forget' what human language entails. It shows a form of the hermetic principle of correspondence, and quite literally points to 'as above (the alien), so below (humans).' The alchemical translation reconciles human and nonhuman entities in an act of finding similarities without completely overwriting 'the other.' It still needs non-traditional ways of reading and interacting with this meaning in the form of the oracle.

[308] Kearney, "Paul Ricoeur," 150.

In *Alien Linguistic Lab*, we are dealing with an even more abstracted form of language than in the poems in *Treelemma*. In Schönfeld's translated alien oracle, the words are also not arranged in a linear way and cannot be approached through conventional reading. It needs associational and combinatorial thinking and involves a gaze where the eyes wander over the white board looking for aspect that make 'sense' (Fig. 16). It might be a language that needs rather ways of approach and thinking which resemble Haraway's concept of 'tentacular thinking.' In her essay of the same title, she takes up the metaphor of octopus-like shapes, which have multiple limbs that can move in different directions, to suggest a mode of thought that is flexible, adaptive, and able to navigate complex systems. The chthonic and the tentacular are nets and networks that connect to everything, so that "we become-with each other or not at all."[309] Tentacular thinking involves embracing complexity and uncertainty, and recognizing the ways in which different forms of life are intimately connected and interdependent, thus, revealing the alchemical selves of matter.

The installation *Alien Linguistic Lab* could become a new way for educational purposes of how we perceive languages, forming a collaborative and playful way to experience the whole process from languages' creation to translation, further to reformation and finally interpretation. Zollinger, for example, suggested that pedagogy should be viewed as a dynamic, interactive practice involving multispecies collaboration.[310] The art installation involves us deeply with 'the other,' in an exchange between humans, artificial intelligence, ink as the carrier of alien knowledge, and the linguini with its aesthetical possibilities due to its flexibility and material conditions of stickiness. Even if it is a playful act, it can become a serious one if we are actually visited by aliens, as in the movie *Arrival* (2016) by Denis Villeneuve, but also with regard to current ecological crises and the need to give 'alien' species space to act and communicate and from which we can learn and grow.

4.5.2. Haptic Alchemy: Weaving a Tapestry of Unseen 'Anti-Beings'

Oscar Santillán's *Antibeing* (2022) features illuminated boxes that show 3D-created images which are inspired by the Indigenous notion of 'huaca,' representing sacred and cognitive qualities in a variety of earthly elements. Ancient Andean weaving patterns inspired the design of the lightboxes, emphasizing a tangible presence. In addition to these cultural allusions, the pictures in this series address a contemporary ecological issue. They stress that Earth's ecosystem is more complex than western theories predict, because manmade technologies

[309] Haraway, *Staying with Trouble*, 4.
[310] Zollinger, "Lichenizing Pedagogy," 26.

interact with the surrounding biological environment, forming complex assemblages. The pictures represent the progeny of this dynamic world.[311]

The entity in the first lightbox seems to be placed in a kind of tropical forest (Fig. 17). A soft-looking but strong liana runs vertically through the picture. Flowers, plants, rock formations, and purple shining crystals inhabit the picture. This creature seems to be hairy, soft, hard, and cold at the same time. Through this haptic overload the observer is tempted to touch it (Fig. 18). However, it seems to be so strange and different from anything from the human world, captured in this 'box.' The sculpture in the second lightbox is placed in a sandy, beige, rocky cave and consists of stones, minerals, crystals mosses, and hairy plant-like structures (Fig. 19). At the right side of this stone grows out a soft looking texture, intertwined and colored like intestines. Out of this formation are growing little sea plants. Organic and inorganic entities are shown here as one being, an 'anti-being,' negating its actual existence. Both artworks are full of incredible detail and hyper realistic. Both works seem to exemplify liveliness and inert matter in "forms of spontaneous structural generation," and shows "that inorganic matter is much more variable and creative than we ever imagined."[312] This is what constitutes the Indigenous notion 'huaca,' which might be close to the ancient philosophical term of 'spirit,' 'pneuma,' or 'entelechy' – a divine and all-knowing entity.

Santillán uses artificial intelligence to translate and transforms patterns of weaving into vibrant entities. Through A.I., which carries out its prescribed protocols, a single entity has been created, but it consists of many individual parts and is somewhat reminiscent of the Frankenstein myth. Frankenstein was by all means a sentient being, and this characteristic can also be attributed to these 'patchwork beings.' The craft of weaving is brought back to mind here, which also patches fabrics and rags together and creates something new with the similar aim of 'perverting,' 'perfecting' or 're-creating nature,' which gives it similar qualities to alchemy. The artwork emphasizes the ongoing metaphoric process of weaving but also the ongoing process of technologies, where the A.I. itself becomes the weaver, or alchemist, weaving fabrics, ideas, and meaning together.

While viewers may find themselves captivated by the impact these entities have on the artworks, a prevailing sense of separation, alienation, and estrangement persists, challenging conventional notions of what is considered human, organic, or inorganic. However, this can be the base for the dissolution and separation of our selves by dissolving these boundaries. After the step of alienation follows a reconnection to the 'anti-being' that is not differentiated by

[311] Santillán, "Antimundo."
[312] Bennett, *Vibrant Matter*, 7.

consciousness. This is followed by conjunction, putrefaction, and coagulation. The close connection arises and exists through a sensory-perceptual connection with the 'anti-being.'

It is an intimacy that emerges from a closeness to our senses, especially the senses we normally pay less attention to, like touch or our 'guts.' In Santillán *Antibeings* we are confronted with a form of haptic visuality, as theorized by media theorist Laura Marks. It amplifies the immersive and affective qualities of viewing experiences. Haptic looking involves using vision as though it is a sense of touch, emphasizing the interplay between touch and visuality.[313] Especially the textuality of the two entities is highlighted, which leads back to its origin of weaving. Furthermore, seeing these fabric-like intestines growing out of the stone effects the visceral parts of the human body (Fig. 20). The viscera represent a part of our bodies that we do not typically employ for direct perception or interaction with the external world. The term 'viscera' refers to the innermost regions – the depths, the guts – of the human body, where emotions and intuition reside.[314] It is within this realm that visceral reactions originate deep within and make their way to the surface. The experience becomes one of 'seeing otherwise,' as it includes 'internal images' that result from vision mediated by technology "that is neither purely optical nor haptic."[315] These images seem "to transcend the border between the very real and the imaginary."[316] The emphasis on the internal bodily experience highlights the profound connection between the viewer and the 'anti-being,' underscoring the ways in which the most intimate rhythms of our bodies resonate within the experience.[317]

Viewing these works of art develop into a synesthetic experience, where complex perceptional operations are at play and where sensory engagement extends beyond the glass box. The artworks transmute perception in shifting it from common, traditional ways of experiencing the world, revealing its alchemistic transmutational forces. It uncovers how inorganic and organic entities are transmuted into a being that comes into deep contact with the observer. The 'anti-beings' reveal the 'fabric' of life that weaves everything together, in which we might find ourselves.

[313] Laura U. Marks, *The Skin of the Film: Intercultural Cinema, Embodiment, and the Senses* (Minneapolis: Duke University Press, 2000), 129.
[314] Barker, *The Tactile Eye*, 122.
[315] Fedorova, *Tactics of Interfacing*, 118.
[316] Fedorova, *Tactics of Interfacing*, 118.
[317] Barker, *The Tactile Eye*, 141.

5. Conclusion

The exploration of alchemy as a scientific and philosophical concept for translating nonhuman worlds has proven its efficacy in the analyzed artworks. This concept renders nonhuman 'language' tangible, drawing attention to processes that escape conventional perception. In conclusion, alchemical translation opens procedural and intuitive strategies to uncover and experience meaning, knowledge, and wisdom in the signs and clues of the 'other,' as well as to experience oneself as the 'other.' As I stated in the beginning of the thesis, alchemy deciphers these signs, symbols, and traces in connecting them to physical as well as metaphysical aspects. Alchemy's modality of passing and becoming brings a focus on the processuality and a shifting consciousness. My assertion that alchemical concepts, especially in connection to translation studies, are powerful tools for discovering perceptual changes and thus to create a new awareness for these processes within oneself as well as on the outside, has been proven correct. Alchemical translation is indeed able to generate knowledge of this perception, of matter's inner lively mechanisms, and about 'deep time.' However, this concept and approach does not let us linger in the past or point to any easy-going answers about the future but connects the experiences of the artworks to a troubled present.

The theoretical and conceptual frameworks, consisting of, among others, Bennett's vibrant matter, Haraway's interspecies connections, Doane's indexical signs, van Tuinen's notion of modality, Cronin's eco-translation, or Vaage's concept of wisdom, provide a robust and interdisciplinary foundation for approaching and understanding the vitality, agency, and expressivity inherent in all entities.

Alchemy's historical roots, examined alongside contemporary notions and related topics, reveal a shared concern for the dynamic and interconnected nature of the material world. Discussions in alchemy of the liveliness of matter is visible throughout the centuries, revealing that new materialisms are not really 'new.' In medieval times, Renaissance and Modernity alchemy stayed an experimentational field of matter and thought, where notions of creating artificial life, transmuting materials and the human, and metaphorical worlds intertwine. Alchemy's imagery offers a rich associative collection of micro- and macrocosmic interconnection, where the practical work on matter is mirrored by the inner work of the human. This minor-science and philosophy of passing and becoming has remained a subject that continues to occupy the imagination of artists, scientists, and theorists and seem to provide ever new aspects from subjects such as psychology, biology, physics, chemistry, or ecology.

It is almost surprising that alchemy has not been utilized as a source for translation studies, although concepts such as 'eco-translation' report on the symbolic nature of the expressiveness

of ecologies. However, Chapter three was able to show the similarities between the two disciplines. Alchemy is a hermetic discipline of deciphering, interpreting, and creating an intuitive way of translating 'alien' language. Alchemical concepts bring sciences, art, crafting, and philosophy closer together, as alchemy encompasses qualities from all these fields. Alchemical translation emerges as a powerful conceptual tool, creating value, awareness, nonhuman sensing, and wisdom. Artists acting as translators of the more-than-human 'language' contribute to a renewed consciousness of our relationship with the natural world. The synthesis of alchemy, translation studies, and the above-mentioned subjects and concepts fosters a holistic understanding that transcends anthropocentric viewpoints.

The examination of the selected artworks through the iconographic, formalistic analyses unfolds that alchemical translation can shed new light on the intuitive experimentations in context of hybrid art, uncovering narratives of liveliness, expressivity, and interconnectedness and emphasizing the transformative potential of alchemical processes. Alchemical translation becomes a catalyst for dismantling preconceived notions, opening new channels of communication, and fostering a coexistence with the diverse entities that share the planet.

Interspecies communication needs 'new' procedures, technologies, and regimes of perception for consulting nonhuman worlds more closely to understand the "full knowledge of radical difference"[318] and "to listen and respond more carefully to their outbreaks, objections, testimonies, and propositions."[319] Incorporating alchemical translation can reinforce and support this goal of awareness of other species and matter. The concept can change human perception, through which we can experience, see, and communicate differently with the assemblages around us. It shows how multiple meanings lie behind the mere things we see, bringing us closer to the mysteries of life. The concept of alchemical translation can be used to discover these aspects in diverse artworks, collaborating with scientific research and nonhuman worlds. If we look at alchemical translation in a larger context, it can give new ways of thinking to entrenched ecological-political issues, providing a voice for the invisible entities, and thus perhaps it can have a real impact on the precarious ecological situation.

[318] Cronin, *Eco-Translation*, 71.
[319] Bennett. *Vibrant Matter*, 108.

Images

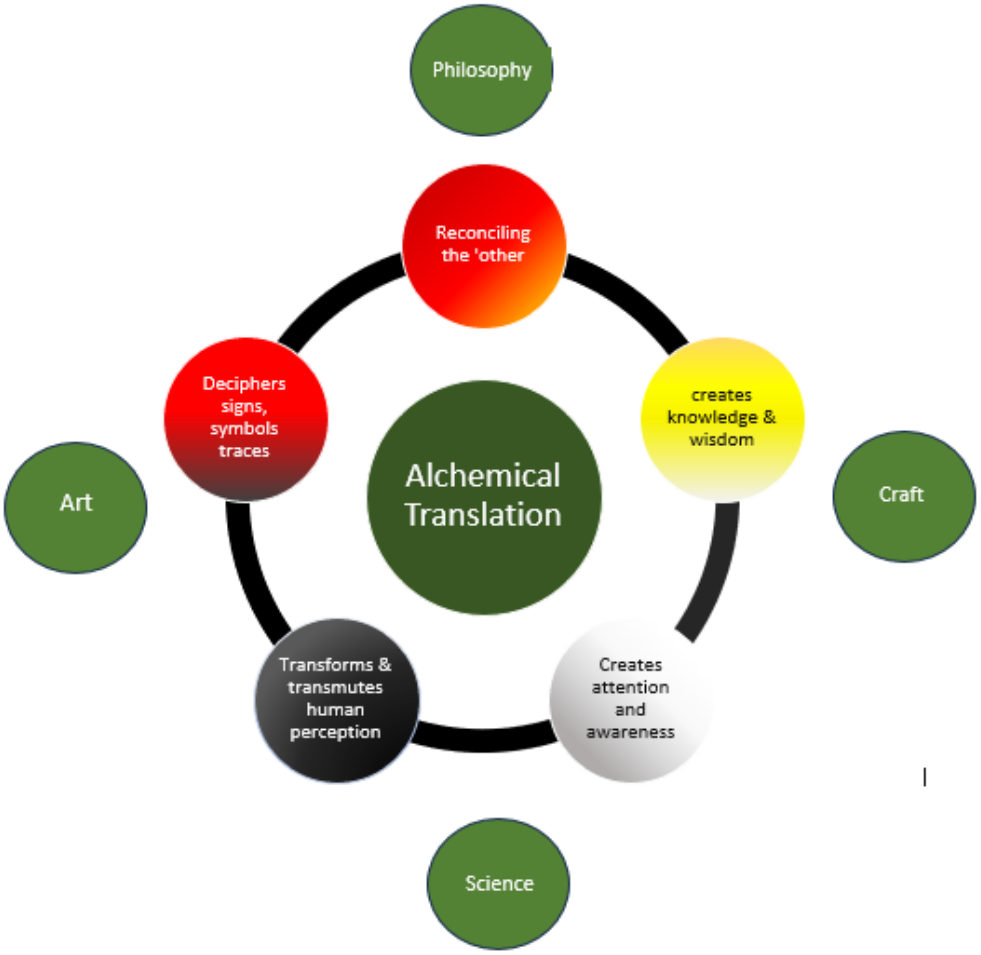

Figure 1. Mind Map of the five alchemical translation steps in the colors of transmutation, with its proximity to arts, crafts, philosophy, and science. Mind Map by Irini Demi. *Alchemical Translation*, 2023.

Figure 2. The appearance and disappearance of the poems by trees on the screens in collaboration with A.I. Art installation by Oscar Santillán. *Treelemma*, A.I. technology, plants, soil, 2023. Accessed December 12, 2023. https://antimundo.org/cryptical.

Figure 3. Digital panels and connectors in their embedment in the plant-world. Art installation by Oscar Santillán. *Treelemma*, A.I. technology, plants, soil, 2023. Accessed December 12, 2023. https://antimundo.org/works.

Figure 4. Exhibition space of *All You Can Feel*. Art installation by Sarah Schönfeld, *All You Can Feel*, exhibition view, Heidelberger Kunstverein, 2014. Accessed December 12, 2012. https://www.sarahschoenfeld.de/2022/03/05/all-you-can-feel/.

Figure 5. Opium under the microscope evolving into an icy planet in deep space. Art installation by Schönfeld *All You Can Feel*/*Planets*, liquid Opium on photo negative, enlarged as C-Print, 70 x 70 cm, 2014. Accessed December 14, 2023. https://www.sarahschoenfeld.de/2022/03/05/all-you-can-feel/.

Figure 6. Mephedron forming a landscape of different natural structures. Art installation by Sarah Schönfeld, *All You Can Feel/ Maps*, Speed and Mephedron on photo negative, enlarged as C-Prin, 125 x 150 cm, 2014. Accessed December 14, 2023. https://www.sarahschoenfeld.de/2022/03/05/all-you-can-feel/.

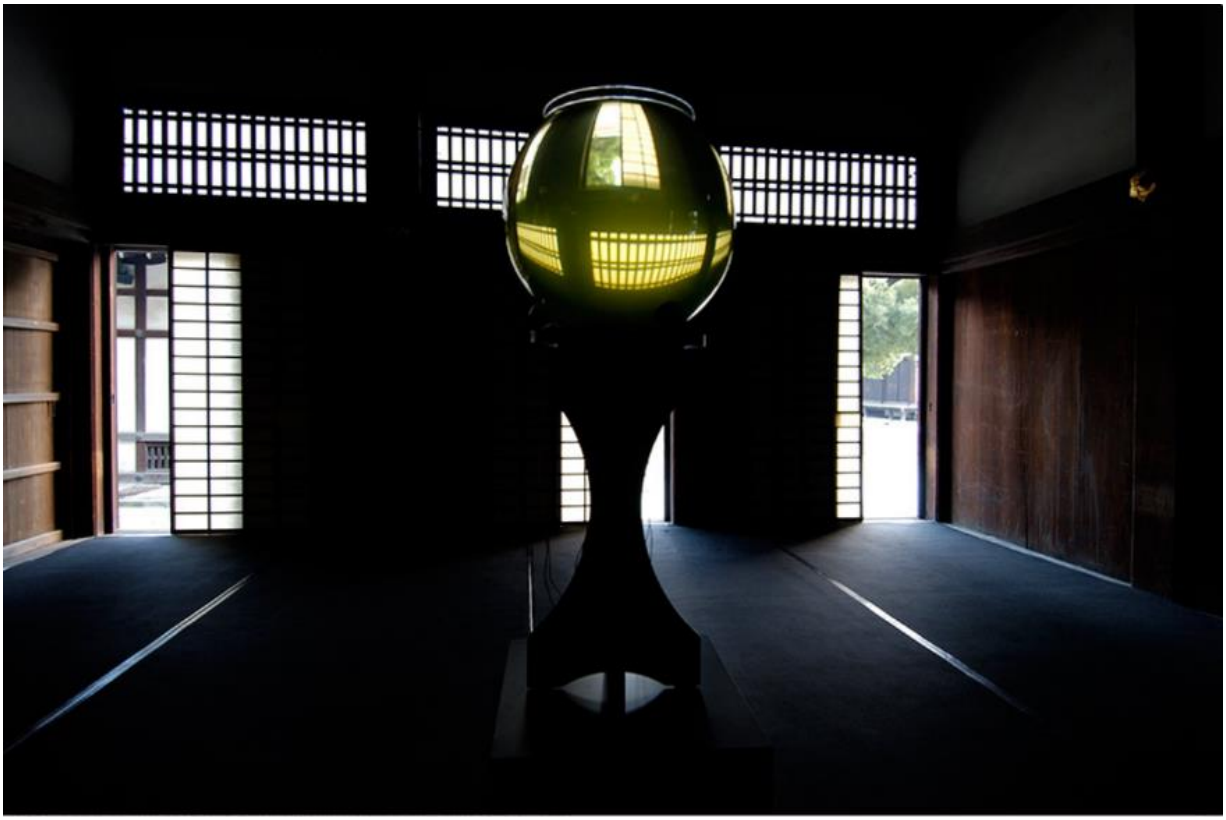

Figure 7. Glass chamber filled with water, view of the installation place. Art installation by Evelina Domnitch and Dmitry Gelfand, *Camera Lucida*, glass chamber, water, sound equipment, 2003. Accessed December 15, 2023. http://www.portablepalace.com/camera_lucida.html

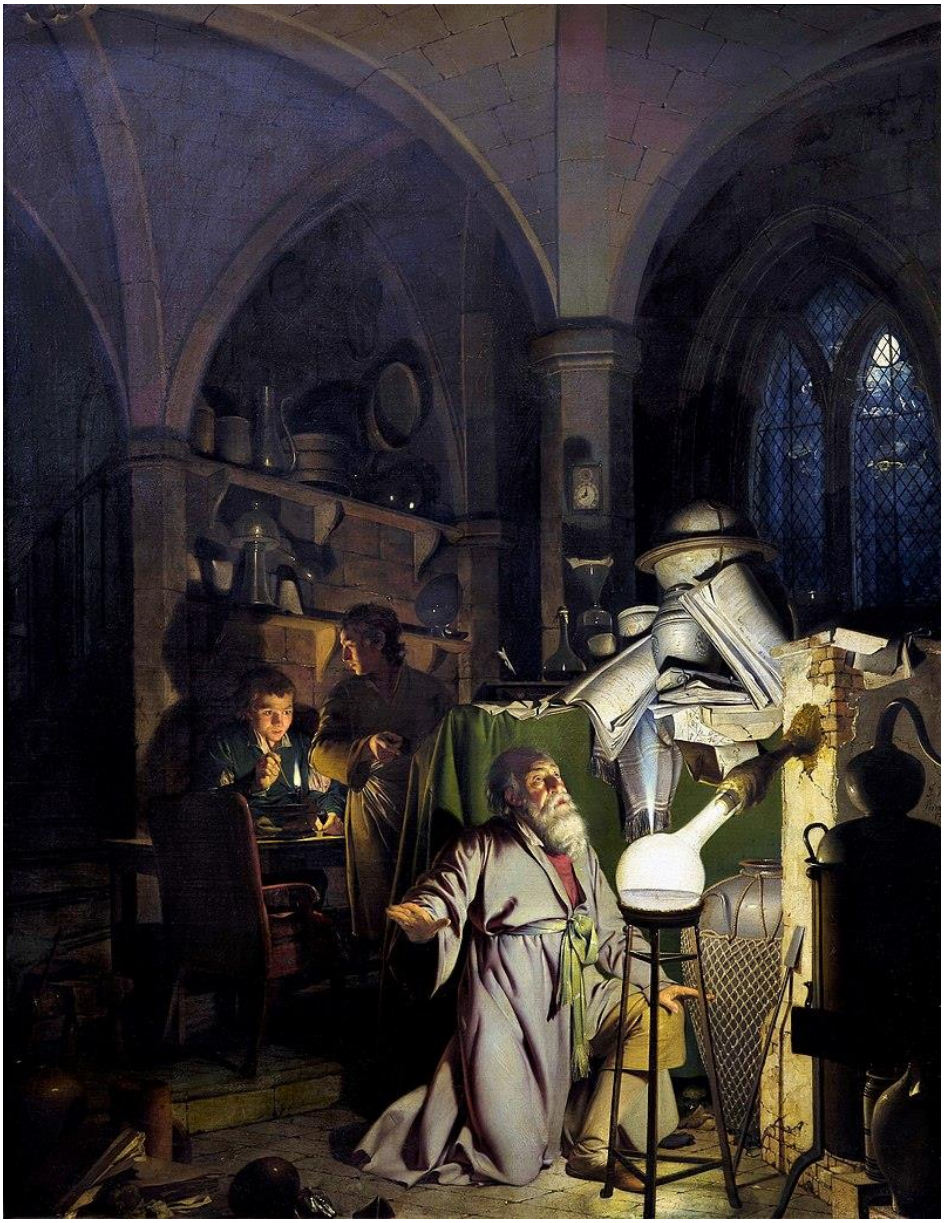

Figure 8. A praying Alchemists after his ‘accidental’ discovery of Phosphorus. Joseph Wright, *The Alchymist, in Search of the Philosopher’s Stone, discovers Phosphorus*, oil on canvas, 127 cm x 101.6 cm. 1771/ 1795. Accessed December 15, 2023. https://en.wikipedia.org/wiki/The_Alchemist_Discovering_Phosphorus.

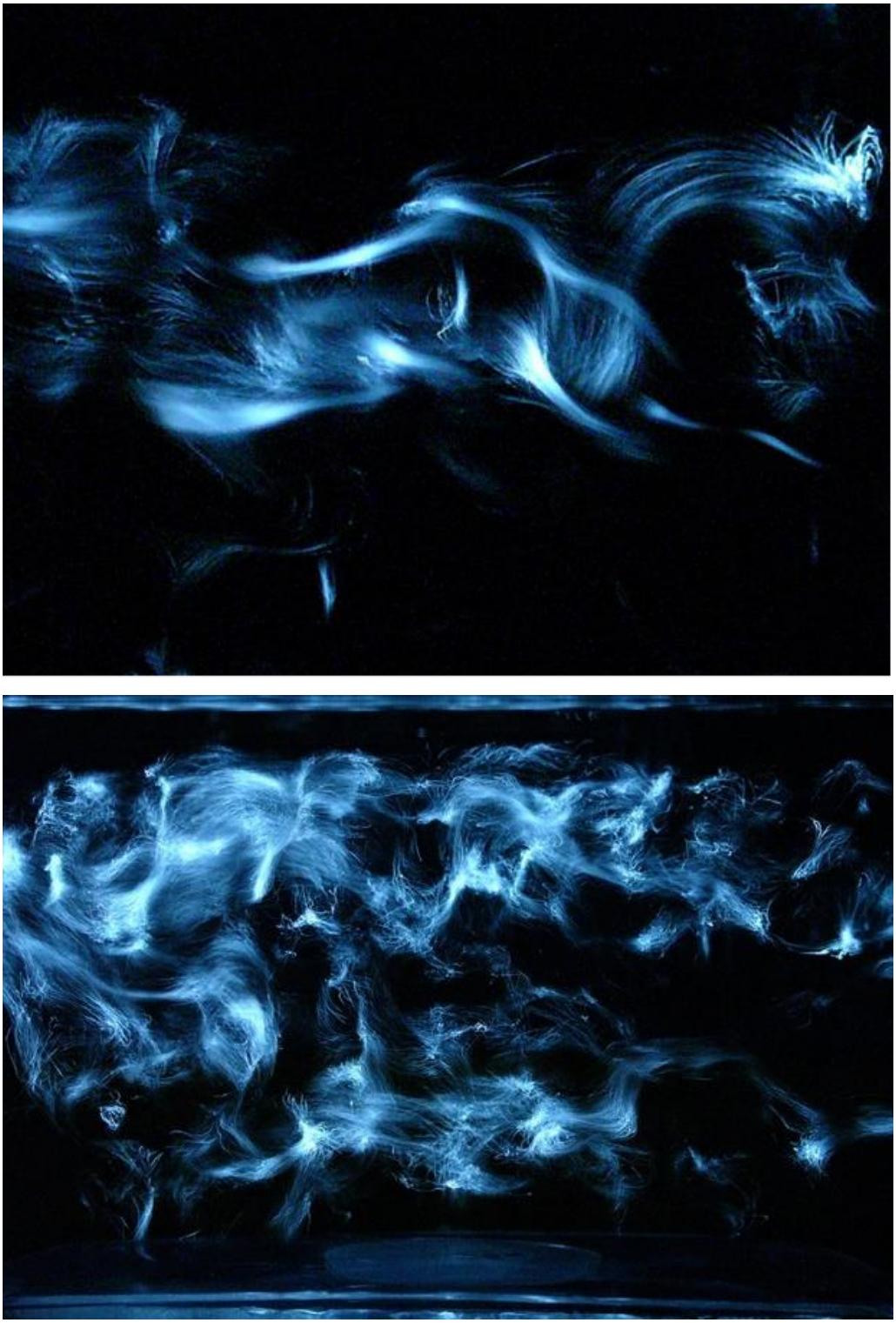

Figure 9. Photographs of sonoluminescence forming dynamic sculptures and structures. Art installation by Evelina Domnitch and Dmitry Gelfand, *Camera Lucida*, 2003. Accessed December 15, 2023. http://www.portablepalace.com/camera_lucida.html.

Figure 10. Microscopic view of squid ink transforming into landscapes. Art installation by Heather Barnett, *In Visible Substances*, printed photograph, squid ink, 2014. Accessed December 15, 2023. https://heatherbarnett.co.uk/work/in-visible-substance/.

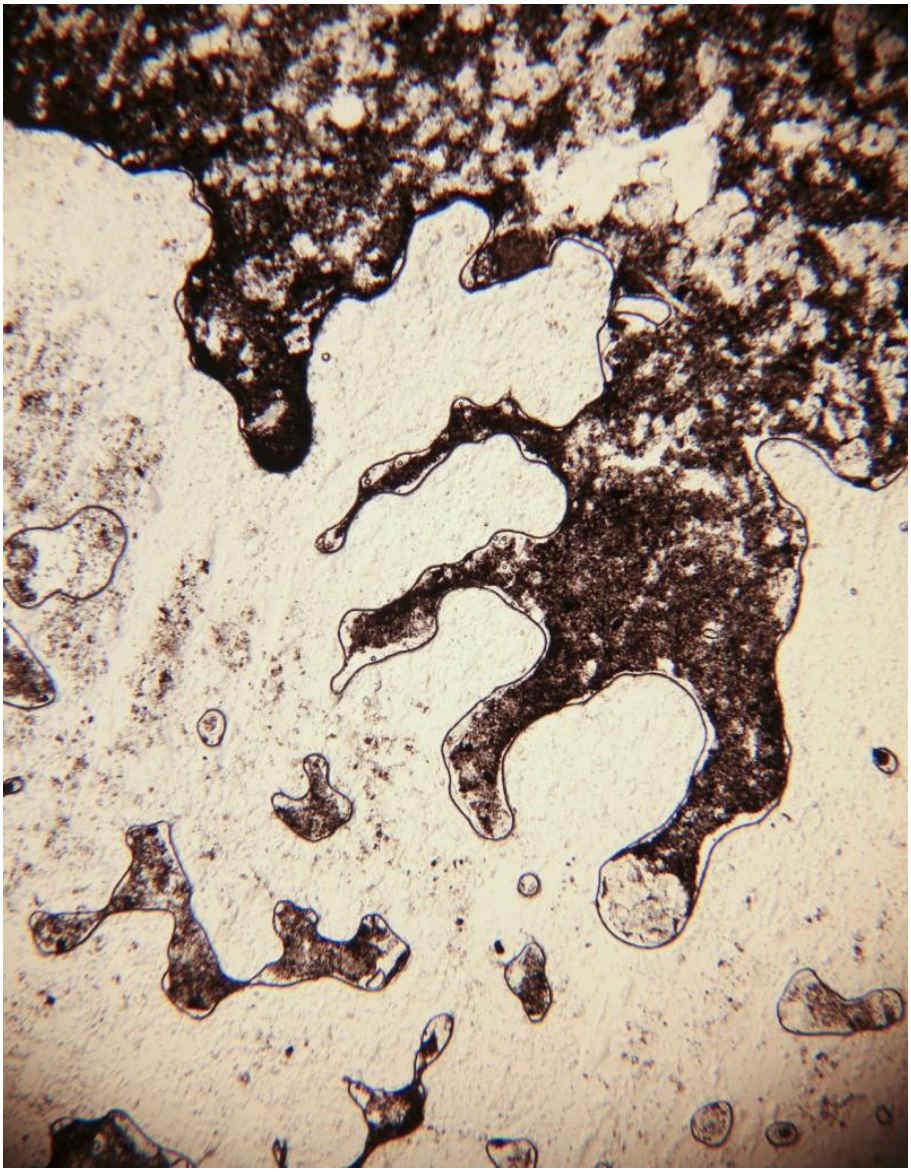

Figure 11. Beetroot pure under the microscope forming decipherable maps. Art installation by Heather Barnett. *In Visible Substances*, printed photograph, beetroot pure, 2014. Accessed December 15, 2023. https://heatherbarnett.co.uk/work/in-visible-substance/.

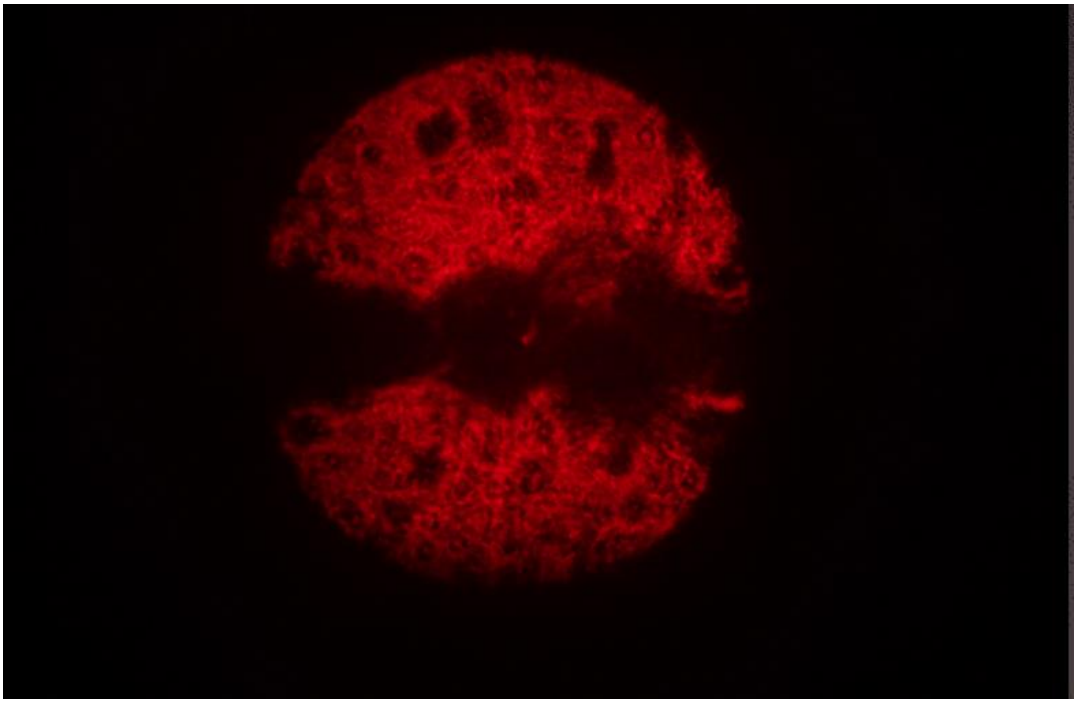

Figure 12. While the light of a laser wanders through a liquid crystal, structures appear that resemble organic life. Art installation by Evelina Domnitch and Dmitry Gelfand, *Lemniscate Cascade*, liquid crystal, light of a laser, 2022. Accessed December 15, 2023. http://www.portablepalace.com/lemniscate_cascade.html.

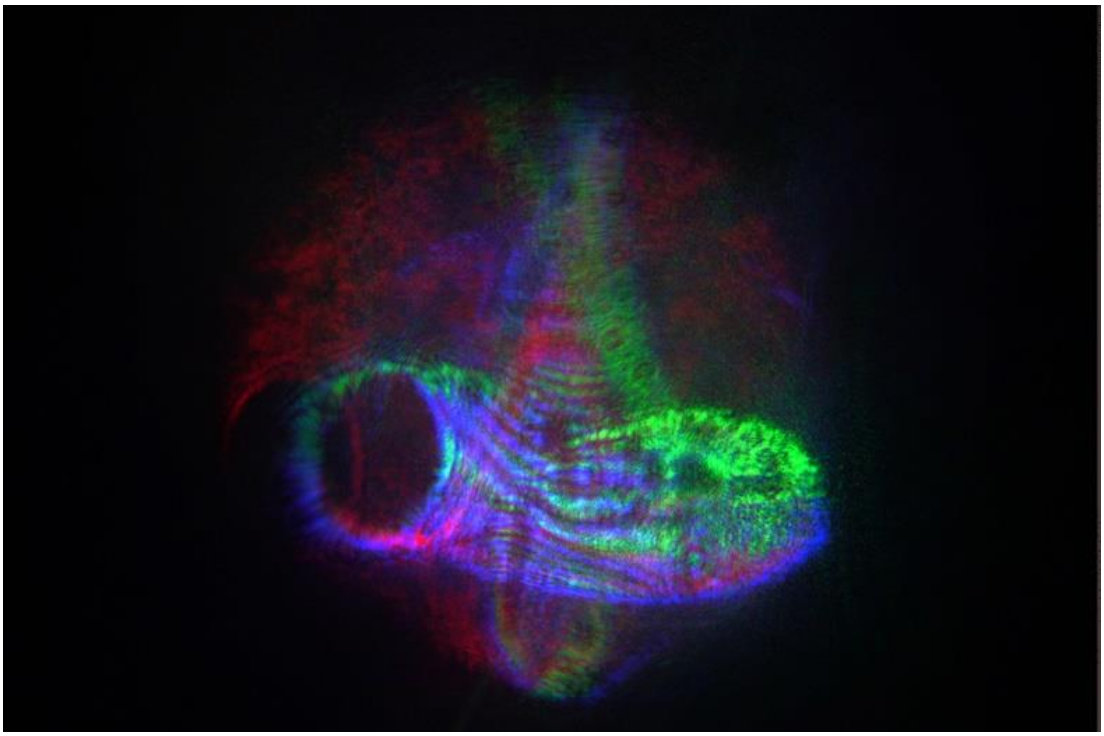

Figure 13. Colorful dynamic and growing structures evolve in the touch of laser and crystal. Art installation by Evelina Domnitch and Dmitry Gelfand, *Lemniscate Cascade*, liquid crystal, light of a laser, 2022. Accessed December 15, 2023, http://www.portablepalace.com/lemniscate_cascade.html.

Figure 14. Linguini noodles tinted with ink sticking on a wall, forming decipherable structures. Installation by Sarah Schönfeld, Alien Linguistic Lab, linguini di sepia noodles, squid ink, Google Translate, 2017. Accessed December 16, 2023. https://www.sarahschoenfeld.de/2019/09/19/alien-linguistic-lab/.

Figure 15. The playful act of throwing linguini di sepia noodles on a while wall. Art installation by Sarah Schönfeld, *Alien Linguistic Lab*, linguini di sepia noodles, squid ink, Google Translate, 2017. Accessed December 16, 2023. https://www.sarahschoenfeld.de/2019/09/19/alien-linguistic-lab/.

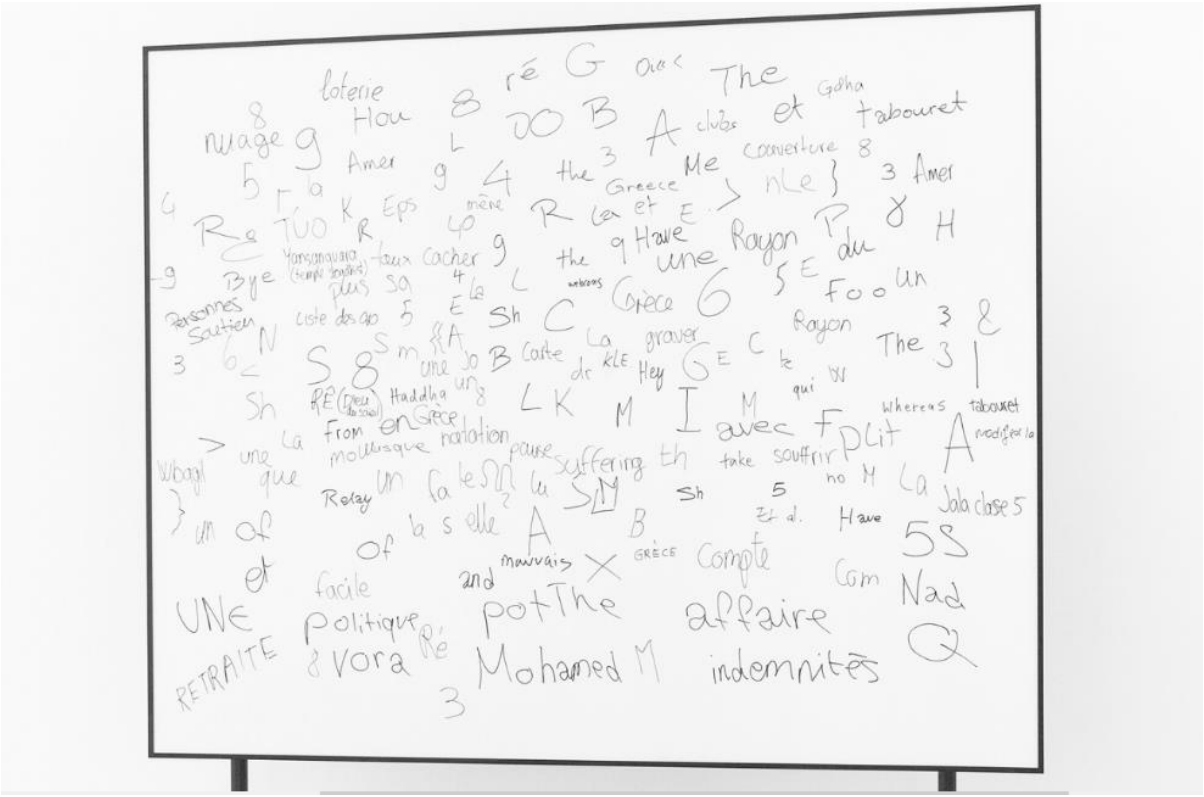

Figure 16. White board with the collected, translated words forming clusters which constitute the oracle. Art installation by Sarah Schönfeld, *Alien Linguistic Lab*, linguini di sepia noodles, squid ink, Google Translate, 2017. Accessed December 16, 2023. https://www.sarahschoenfeld.de/2019/09/19/alien-linguistic-lab/.

Figure 17. A woven entity from patterns of Indigenous weaving patterns, inorganic and organic aspects interwoven. Art installation by Oscar Santillán, *Antibeing 1*, illuminated boxes, metal mounting, 100cm x 140cm x 4cm, 2012. Accessed December 16, 2023. https://antimundo.org/works.

Figure 18. Detail of hairy, soft, and cold looking materials. Art installation by Oscar Santillán, *Antibeing 1*, illuminated boxes, metal mounting, 100cm x 140cm x 4cm, 2012. Accessed December 16, 2023. https://antimundo.org/works.

Figure 19. Installation view of ‘anti-being 2’ (left) and view of inorganic and organic fusions. Art installation by Oscar Santillán, *Antibeing 2*, illuminated boxes, metal mounting, 100cm x 210cm x 15cm, 2012. Accessed December 16, 2023. https://antimundo.org/works.

Figure 20. Detailed view of the ‘intestines’ of Anti-Being 2. Art installation by Oscar Santillán, *Antibeing 2*, detail, illuminated boxes, metal mounting, 100cm x 210cm x 15cm, 2021. Accessed December 16, 2023. https://antimundo.org/works.

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Appendix I: Declaration of Originality

Universiteit Leiden

Declaration of originality

By submitting this test, I certify that:

- ✓ this work has been drafted by me without any assistance from others (not applicable to group work);
- ✓ I have not discussed, shared, or copied submitted work from/with other students
- ✓ I have not used sources that are not explicitly allowed by the course instructors and I have clearly referenced all sources (either from a printed source, internet or any other source) used in the work in accordance with the course requirements and the indications of the course instructors;
- ✓ this work has not been previously used for other courses in the programme or for course of another programme or university unless explicitly allowed by the course instructors.

I understand that any false claim in respect to this work will result in disciplinary action in accordance with university regulations and the programme regulations, and that any false claim will be reported to the Board of Examiners. Disciplinary measures can result in exclusion from the course and/or the programme.

I understand that my work may be checked for plagiarism, by the use of plagiarism detection software as well as through other measures taken by the university to prevent and check on fraud and plagiarism.

I understand and endorse the significance of the prevention of fraud and I acknowledge that in case of (gross) fraud the Board of Examiners could declare the examination invalid, which may have consequences for all students.

21.12.2023