Environmental Contamination, Empowerment and Stigma.

Understanding the Social Impacts of Mercurialism in Idrija, Slovenia

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Abstract

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The increase of anthropogenic activities is linked to a significant rise of large-scale environmental contaminations. As much as the environmental, the social and health impacts of these contaminations are raising serious concerns. Many studies, situated within the Environmental Racism or Environmental Justice paradigms, have demonstrated the long term negative social effects on communities' social fabric. However, fewer studies have looked at how some communities were impressively successful in reducing these negative consequences and avoid the stigmatization and exclusion that plague other sites.

By focusing on the historical analysis of a small community built on the world's second-biggest mercury mine, my M.A. underlines different social aspects of large-scale contamination and remediation. The town of Idrija, in Slovenia, has been recognized as one of the most naturally contaminated regions of the world. Combined with 500 years of large-scale mercury mining, this town initially suffered severe negative environmental and health effects. Although the mines closed relatively recently, in 1994, the town has experienced no harmful long-term social consequences from mercury mining, quite the opposite, being now designated as a UNESCO World Heritage Site. My M.A. aims to highlight some factors that influenced remediation in Idrija while ensuring this community's sustainable development.

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To my parents, who continue to show me unconditional love and support to everything I do. I wouldn't be here if it weren't for you. And to all my friends, who continue to be there for me every step of this process. Without their support, I never would have made it this far.

And finally, to the contaminated communities who have allowed me inside their struggles and who continue to persevere and fight for their justice and remediation. You show me the value of hope and endurance, as well as how our responsibility towards the planet and each other, and the possibilities that we can achieve by working together. The lessons you have taught me will never be forgotten.

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Introduction: Where It All Began

It really all boils down to this: that all life is interconnected.

-Dr. Martin Luther King Jr.

Today, the consequences of environmental disasters caused by anthropogenic activities have come at the forefront of environmental activists' and researchers concerns. From the direct negative impacts on the environment, to the deteriorating welfare of communities having to cope with dire contamination, the oftentimes terrible consequences of industrial contamination have certainly not gone unnoticed (Edelstein, 2004, p. 9-10). Researchers have described in great details the negative impacts anthropogenic disasters on the environment. Yet, in the midst of this burgeoning field, the question of the recovery of affected communities has not been as closely examined.

My interest in the social impact of environmental contaminations began in 2013 when I participated in a summer school program organized by Nishikyushu University in Japan. The program brought international students together to learn more about the effects of mercury contamination and the history of Minamata disease. Long-term consumption of fish and shellfish from the contaminated Minamata Bay, from which the disease derives its name, had poisoned the local population. The precise source of the contamination was a nearby factory, Chisso, which, when it opened in 1932, dumped methylmercury by-products into the bay without informing the

villagers. In the 1960s, facing increased scrutiny, the company could no longer deny its role in the rapid deterioration of the health and wellbeing of the environment and people.

Although Minamata is the most devastating case of mercury contamination recorded worldwide, it is not a unique phenomenon. After returning from Japan, I learned about First Nation communities, notably Grassy Narrows, living along the English Wabigoon river system (northern Kenora, in Ontario). The similarities between Japan and Canada are so great that what happened in Grassy Narrows was dubbed Ontario Minamata. I attended conferences, gatherings, and protests which were demanding reparation from the Dryden Chemical Company and the government. I was fascinated by how both countries, Canada and Japan, shared similar stories of hidden mercury contamination caused by factories and how this poisoning had destroyed their economy, health, and wellbeing, as well as to some extend their social fabric. From the contamination process, to the fight for justice and recognition, parallels could be easily drawn between both communities.

My questions followed me to Idrija, a small town in Slovenia, built on the second biggest mercury mine in the world. In 2015, Nishikyushu University was bringing Japanese students to Idrija to learn about the mercury effects in this quaint European small town. I was invited to assist in this particular school program. Arriving in Idrija, I assumed that I would encounter the same stories, the same ill effects, and the same injustices I had heard and seen in Japan and Canada. Instead, I found the almost complete opposite. I discovered a community that seemed unaffected by five hundred years of mercury mining. Here, people showed pride in the history of mercury. The promotion of the liquid silver even led to Idrija being recognized as a UNESCO World Heritage Site.

The contrast between Idrija, on the one hand, and Minamata and Grassy Narrows, on the other hand, was startling. Stigmatization and exclusion, that were common themes in Grassy Narrows and Minamata, were not present in Idrija. In Minamata, I learned about the detrimental impacts and social stigma associated with mercury. The history of Idrija, on the other hand,

showed me a more proactive and transparent approach to mercury poisoning. It made me realize how large-scale mercury contaminations may have surprisingly different outcomes, depending on the context. It demonstrated that a same contaminant does not necessarily have the same social and health impact when overflowing in different locations. It revealed that social perceptions and institutional reactions can have a decisive influence on the long-term outcome of an environmental contamination.

I endeavored to focus on the history of Idrija to identify the main factors that had influenced such contrasted outcomes. The following chapters reflect on the impacts of anthropogenic contaminations, as well as their effects and remedial processes in Idrija. By focusing on the history of this small town, my thesis underscores how mercury mining impacted its history. More specifically, my thesis explores the way stigma and exclusion influenced the ecological and social spread of toxic contamination. Through a historical analysis, this paper aims to draw out some factors that contribute to the overall wellbeing or, reciprocally, deterioration of a contaminated community.

Anthropogenic contaminations have been shown to cause severe damages to environment and people. Their impacts go well beyond health issues. From economic development to access to resources, from physical health to social cohesion, contamination impacts all aspects of human well-being. Past studies have understandably primarily focus on the negative aspects. They have outlined the importance of understanding the impact of stigma and exclusion that occur following anthropogenic contaminations. My M.A. draws on this literature. It, too, attempts to demonstrate how stigma may have an equal if not an even greater impact on the recovery process from a contamination than the contaminant itself. Yet, it adds a layer to this understanding by underscoring how stigma may sometime be replaced by expertise and pride and exclusion, by collaboration and collective empowerment, when the right conditions are met. Marginalisation is not the only possible outcome of massive anthropogenic contamination.

The first chapter outlines the Environmental Justice research field. It focuses on the historical development of the mining industry, the issue of anthropogenic contaminations, and the question of the effectiveness of different remedial approaches. The second chapter introduces the history of Idrija. It contextualizes the contamination process in this particular region. The third chapter explores the social consequences of contamination, with an emphasis on stigmatization and exclusion. It underscores its impact on the community's well-being and its remediation potential. The fourth chapter explores the notion of stigma and its effects, or lack of, on the social development of Idrija. The final chapter outlines Idrija's community values to demonstrate their influence on the decontamination process.

I am aware that the ever-growing concern surrounding the toxic impact of industrialization has fuelled an important wealth of research in the last two decades. This thesis merely offers an overview of Idrija's mining history. Yet, within its limited scope, I believe it makes a valid contribution to an understudied field of research by looking at how a community can successfully overcome the consequences of anthropogenic activities without long term negative social repercussions. By using the lens of Environmental Justice theory and basing itself on a historical analysis of Idrija, it endeavours to understand some key factors which are at play in environmental contaminations. My hope is that the identification of the social factors that influence the decontamination process within an affected community can facilitate future recognition of the social impacts of environmental contamination and help shed light on how to cope effectively with such ecological catastrophes.

Chapter 1: Literature Review

This chapter considers the current literature on the way anthropogenic contaminations impact communities. It summarizes the current state of environmental disaster research, with particular attention to mercury contamination. This metal has become of great concern over the past few decades. The increased rates of mercury emission have fuelled much alarm. According to World Health Organization (WHO), mercury is one of the "top ten chemicals or groups of chemicals of major public health concern" (WHO, 2007). In 2013, the Minamata Convention on Mercury was signed by 128 countries (Streets, Horowitz, Lu, Levin, Thackray, 2019, p. 418). The goal of the convention is to reduce the levels of mercury emissions by providing information, resources, and support to all parties involved (UN, 2013).

Many communities have been affected by mercury poisoning. But Minamata, Japan, is the most famous case. Between 1953 and 1956, villagers from Minamata started developing symptoms caused by what was at the time an unknown deadly disease (Harada, 1995). It took twenty years to confirm the source of their ailments and Minamata is still struggling with the devastating impact caused by the contamination. Other cases have come to light over the years. For example, between 1971 and 1972, wheat covered in organic mercurial fungicide that was not intended for human consumption but for farming purposes, ended being consumed in Iraqi rural homes (Budnik and Casteleyn, 2019, p. 723). It provoked one of the biggest crisis of mercury

poisoning recorded in human history. The First Nations community Grassy Narrows, in Ontario, Canada, was also victim of mercury poisoning due to a factory dumping its mercury by-products in their water. The people of this community have been affected by symptoms disconcertingly similar to Minamata (Harada et al., 2005). These are but a few examples of the many known cases found globally; each year, new cases continue to appear.

These cases have led to a consideration of the larger scope of mercury contamination. Researchers started to address not only the biological or individual, but also the social, economic, and political aspects of mercury poisoning (Pellow, Weinberg, and Schnaiberg, 2001; Tschakert and Singha, 2007). They underscored a domino effect that slowly knocks down all components necessary to overcome disasters. Some of these researchers ended up formulating the notion of environmental justice to address the various levels of analysis necessary to capture the complexity of the contamination's effects on communities.

Industrialization and Anthropogenic Activities

Metal pollution didn't emerge with the industrial revolution. Although some documents have traced it back to the control of fire by early humans (Nriagu, 1996, p. 223), high levels of copper and other toxins have been monitored since the Roman times (Tchounwou, Yedjou, Patllla, and Sutton, 2012, p. 134; Nriagu, 1996, p. 223; Hong, Candelone, Patterson, and Bourton, 1996, p. 247-249). However, it is obvious that the intensification of industrial anthropogenic activities was a game-changer. A wealth of studies underscores the strong correlation between the rapid increase of human production since the industrial revolution and increased environmental contamination. The release of metals and toxins in the environment rose massively with industrial mining, smelting, incinerating, manufacturing, as well as the use of fertilizers (Budnikand Casteleyn, 2019, p. 723; Streets, Horowitz, Jacob, Lu, Levin, Ter Schure, and Sunderland, 2017, p. 5971; Thompson, 2015, p. 242; Beliveau, Lucotte, Davidson, Paquet, Mertens, Passos, and Romana, 2017, p. 523).

The general detrimental impacts of contamination have come to the forefront of environmental activists' agenda. Scholars have looked at how unregulated and unsupervised metal emissions may have deep and long-lasting health consequences for nearby populations (Streets et al., 2017, p. 5973; Handong et al., 2016, p. 1097-1098; Streets et al., 2019, p. 415). Anthropogenic activities have been linked to an array of harmful consequences; from changing landscapes to deterioration of the ecological system, to destruction of fauna and flora, down to deteriorating human living conditions (Osenberg and Schmitt, 1996; Streets et al., 2019; Handong, Turner, & Rose, 2016). Researchers have linked environmental contaminations to adverse health impacts, loss of wages, as well as loss of social welfare (Streets et al., 2017; Handong et al., 2016; Streets et al., 2019; Tchounwou et al., 2012). Going beyond the immediate ecological consequences, they endeavor to understand an environment disaster's overarching effects on human well-being. For instance, Tchounwou, Yedjou, Patlolla, and Sutton's research (2012) looks at the increased exposure to toxic elements over the past few centuries and how health concerns emerging from this is becoming a global concern (p. 134). From acute to chronic effects, the range in symptoms and consequences has called for increased research and awareness to the dangers of anthropogenic activities on human wellbeing (Tchounwou et al., 2012, p. 152-153).

Mercury

Because heavy metals (lead, cadmium, arsenic, etc.) have unique properties, it is essential to understand how they distinctly impact the environment. Without proper recognition of their different properties, remedial measures may be ineffective. For the purpose of this research, the focus is on mercury.

Mercury represents an unusual toxin. It is classified under three forms; elemental, inorganic, and organic. Elemental mercury is the most common form. It is a metallic, silvery liquid (also referred to as quicksilver) that is processed from an ore called cinnabar. It readily

breaks into droplets and easily vaporizes at room temperature into an odorless, colorless vapor that can be inhaled. Inorganic mercury is usually white, except for cinnabar, which is red. Inorganic mercury compounds was sometimes used in school science labs. Normally found in the environment, organic mercury bioaccumulates in the fauna and flora and its presence is commonly associated to build-up in fish populations. Organic mercury, also known as methylmercury, is the most frequently addressed in the media. It is linked to health concerns due to its high level of toxicity. Although organic mercury has been labelled the most toxic of all three forms, each have their own unique toxic profiles and detrimental effects. Recognizing their different properties facilitates how they need to be addressed in decontaminations.

The industrial revolution affected the rapid increase of mercury distribution in the environment. Indeed, there is a strong correlation between industrialized regions and increased levels of mercury (Handong et al., 2016, p. 1099). Studies demonstrate that the emissions of mercury in our environment have increased threefold since the 1850s due to the rapid rise of anthropogenic activities – including coal burning, mining and ore refining, factory production, and waste incineration (Handong et al., 2016, p. 1092; Tchounwou et al., 2012, p. 134). The study of sediment records in populated and remote areas shows that the levels of mercury have risen in concordance to the increase of production, economic expansion, and growing population.

A global emission trend research confirms that the rise in mercury emissions is directly due to anthropogenic activities, although this increase is not distributed in all regions equally (Streets et al., 2019, p. 421-423). Handong, Turner, and Rose's paper demonstrates how the levels of contamination in lake sediments in the UK differ depending on proximity of anthropogenic activities, governmental regulations, as well as the geographical environment, such as an influx of sedimentary movement (2016, p. 1095). Although many forms of anthropogenic activities have been linked to the increasing presence of mercury in the environment, mining activities are primarily to blame. They have been systematically exposed to increase the metal’s presence in the water, atmosphere, and natural resources (such as fish and plants).

Health issues caused by mercury contamination

To understand the impact of mercury poisoning, one needs to know that it is odourless, colourless, and tasteless. Mercury presence is rarely detected before it reaches toxic levels and communities are usually unaware of the contamination until symptoms begin to appear, most commonly in the form of neurological and physical degeneration (Tschakert and Singha, 2007, p. 1309).

The three forms of mercury, as previously mentioned, affect health in different ways. They can vary from numbness of the extremities to impairment of hearing, speech, gait, as well as visual constriction, muscular atrophy, seizures and mental degradation, increase risk of spontaneous abortions, as well as physical and mental deformities of the fetus, sterility, increase rates of cancer; and death (Tschakert and Singha, 2007, p. 1309). There are also elevated risks of respiratory problems, kidney pain, loss of teeth, dizziness, tremors, psychopathological symptoms (Tschakert and Singha, 2007, p. 1309). Once degeneration of the nervous system begins, it usually creates permanent damage. The dangers posed by the metal go beyond first-generation exposure. Long-term generational impacts have been documented (Carvan, Kalluvila, Klingler, Larson, Pickens, Mora-Zamorano, and Skinner, 2017).

New strategies have come into play. Health policies encourage safe practices. They focus on the reduction of contact with the metal both on an individual and global scale. Advisories on fish consumption (Greiner, Smith, and Guallar, 2010), teeth amalgam concerns (Kao, Dault, Pichay, 2004), as well as bans for household items containing mercury, such as thermometers and paints (Beusterien, Etzel, Agocs, Egeland, Socie, Rouse, and Mortenden, 1991; Zelman, Camfield, Moos, Camfield, and Sweet, 1991), have been promoted by governmental authorities.

A Global Impact

Personal health complications are not the only concern when dealing with mercury poisoning. The overall wellbeing of communities is also affected. Mercury poisoning destroys natural resources and human populations. It isolates the affected community due to the fear generated by the unseen toxin (D'Itri and D'Itri, 1977). When workers are no longer healthy enough to generate revenue, the economy begins to decline, stigma sets in, and people may be tempted to blame the victim instead of the perpetrator, fuelling a vicious circle of disability and marginalization (Edelstein, 2004; Pellow et al., 2001; Spiegel, 2009; Tschakert and Singha, 2007; Yorifuji, Tsuda, and Harada, 2013). Contamination has been seen to "increase the stigmatization of "criminal or dirty livelihood," while promoting faulty solutions" (Spiegel, 2009, p. S551). Studies have helped us identify the social, biological, geographical, political, and economic factors that interplay in large scale contaminations and its long-term impact on a community (Normile, 2013; Harada, 1995; Funabashi, 2006; Yoneyama, 2017; Yorifuji et al., 2013). In the end, the community becomes not only impacted by the toxic exposure, but also by the long-term psychosocial and sociological effects it causes to those affected.

To recognize how contamination affects the overall wellbeing of the community, Michael R. Edelstein (2004) looked at the long-term impacts of toxic exposure in residential areas. He defines a contaminated community as "any residential area located within or proximate to the identified boundaries for a known exposure to pollution" (Edelstein, 2004, p. 9). These boundaries can change both temporally and spatially according to the social context (Edelstein, 2004, p. 9). Edelstein describes how the psychosocial factors come from a "deterioration in the relationship between humans and their ecological surround", the "stress because their way of life is disrupted and society cannot readily restore what was lost," and "threats to health and safety, social relationships" (Edelstein, 2004, p. 10). The social implications associated with the contamination "easily preoccupies a significant portion of victims' lives" through a multitude of factors, such as "loss of personal control, anger and anxiety and distrust, negative changes to the environment, loss of trust in technology, and a new way of seeing the world" (Edelstein, 2004, p.

21-22). Social perception is shown to have an equal or more significant impact on the wellbeing of the community than the contamination itself (Edelstein, 2004, p. 12).

One specific problem with mercury poisoning is that people are generally unaware of the spread of the diseases it helps propagate, and when they do, they struggle to find their source and identify the right recourse to eliminate it. This causes significant uncertainty (Edelstein, 2004, p. 12). This uncertainty, in turn, leads to misinformation, misinterpretation, and mistrust from victims and the general public. Various channels of communication are used, such as "government statements, the media, expert sources, networking to informed organizations, and word to mouth, as well as citizen research in libraries and increasingly on the internet" (Edelstein, 2004, p. 12), however, the risk of contradictory information through these various channels often amplify uncertainty instead of reducing it.

Without proper information, people may rely on half-truths or urban legend (Edelstein, 2004, p. 20); bureaucrats and authoritative figures may lack the desire to invest time and energy in the recovery process; friends and family may not be able to provide emotional and financial support. All of which leaves the contaminated community to fend for itself. It faces the necessity to solve its problem without proper knowledge, resources, aid, and recognition (Edelstein, 2004, p. 21). Because of these uncertainties, Edelstein argues that the "perception" of a human-made disaster is viewed more negatively and with greater fear compared to natural disasters (Edelstein, 2004, p. 12).

Edelstein's research is not the only one to look at how human-made environmental disasters are impacting social wellbeing. Yoneyama (2017) tackles the connectedness between individuals and essential social structures required for a smooth recovery process; family, work, food production; traditional and local ways of life; and the sense with the connectedness with nature (p.105). According to Yoneyama, disconnectedness caused by a human-made disaster may end "up destroying the very core of life itself" (2017, p. 105). For Martin Loney (1995), the

breakdown of the bonds between the individuals, the community, and the environment may cause “community trauma.”

While the physical-generational impacts are more and more well-documented, the long-term social impacts of large-scale contamination are just starting to be recognized as being as significant as the health impacts. New research demonstrates how environmental turbulence goes beyond the physical boundary of the contamination and impacts the social and psychological wellbeing of the entire community. It affects the ecohistorical context, the lifestyle, and life scape, increasing stress and fear levels. Uncertainties and unknown risks reinforce distrust (Edelstein, 2004, p. 108-109). These consequences have been demonstrated to create, in turn, long-lasting generational impacts if left unaddressed.

Stigma and Social Inequalities

The lack of attention paid to those impacted increases the inequalities and burdens placed on the victims of poisoning (Spiegel, 2009, p. S551). It creates a divide between the “sane” and the “contaminated” (Edelstein, 2004, p. 24-31). A common reaction is the development of a stigma for those affected. Edelstein uses Erving Goffman's formulation: a “stigma always involves a victim identified by an observer as marked (deviant, flawed, limited, soiled, or generally undesirable). […] Stigma readily invites a tendency to blame the victim” (2004, p. 31). Stigma, in the purest sense, is the notion of certain people marked as undesirable, which must be shunned or avoided (Gregory and Satterfield, 2002, p. 347). This act of shunning and avoidance makes it more challenging to communicate and exchange information between all parties by creating invisible barriers between the "us" and the "them." It further impedes attempts to overcome the potential long-term social and economic consequences of contamination, as well as the channelling of resources (2004, p. 32).

Of course, not all communities are subjected to the same levels of social stigma, and they do not experience the same spectrum of ill health effects. Researchers, therefore, have attempted to recognize the social factors that have more or less significant influence on the contamination's perceptions. The first major social factor identified is racism (Pellow et al., 2001, p. 424). The vast literature on Environmental Racism has demonstrated how communities of colour and racialized minorities are at a higher risk of toxic contaminations compared to predominantly white communities (Pellow et al., 2001, p. 425). Throughout these researches, the impact of racial inequalities on risk to contamination is manifest. In their paper on *The Environmental Justice Movement*, Pellow, Weinberg, and Schnaiberg (2001) rightly write that "some of the causes of environmental inequality include institutional racism in housing, discriminatory zoning and planning practices, the lack of community access to environmental policy-making, the absence of people of colour as elected officials, […], and the exclusion of low-income and people of color communities form the dominant environmental movement" (p. 427).

However, contamination is more than a race issue. Environmental Justice has taught to also include issues of class, power, poverty, and geographic locations in the sociological analysis (Pellow et al., 2001, p. 424). There is a clear link between social disparities and health inequalities, and this is especially true when talking about metal poisoning. Toxic exposure has been labelled as a "social production of an invisible epidemic" that is caused by "social inequalities" (Spiegel, 2009, p. S550). 'Blaming the victim' usually targets the most marginalized individuals in the community, viz. those with the least amount of (financial, symbolic, cultural, social) resources.

Tschakert and Singha (2007) point out in their research on the mining communities of Ghana that those blamed for the mercury contamination are the *galamsey* (illegal miners) who represent only a small segment of the population (p. 1307). They are the most vilified group in the region. Without proper education, they struggle to find other means of employment (Tschakert and Singha, 2007, p. 1307). Tschakert and Singha demonstrate that if Ghana's state officials, bureaucrats, and representatives of civil society, cannot recognize that the significant

problem facing illegal miners is a lack of access to legitimate employment, nothing will change. It does not matter whether the officials criminalize the *galamsey* work; they will continue to participate in illegal mining until new income resources are made available (Tschakert and Singha, 2007, p. 1307-1308). Moreover, while these small-time miners are condemned for causing the mercury contamination, the government negates to recognize that the actual responsibility for the contamination lays in the hands of the mining corporations themselves (Tschakert and Singha, 2007, p. 1308).

Faced with increased stigmatization, those affected find themselves even more excluded from resources and information, government officials often holding the victims responsible for their ailments (Tschakert and Singha, 2007). The stigmatized victims being excluded from the recovery process (Kelly, Maghan and Tennant, 1993, p. 29), proposed solutions are often inefficient and resources mismanaged (Tschakert and Singha, 2007). The formulation of an action plan to reduce the effects of mercury contamination without the participation of the community has poor results because only those affected can provide insights to define what resources are needed and how they should be distributed to address their specific needs.

Environmental Justice

Environmental Justice activists such as Spiegel (2009: S552) advocate for "policy-making procedures that encourage active community empowerment, institutionalize public participation, recognize community knowledge, and utilize cross-cultural formats and exchanges to enable the participation of as much diversity as exists in a community" (Spiegel, 2009, p. S552). This multifaceted approach aims to address and change the outcome of contamination from the ground up by focusing on those directly impacted. It starts by assessing the latter's needs on a case by case basis, rather than assuming a universalistic approach, and looks at the social, economic, and political inequalities which represent the "greatest threat to health and

wellbeing" (Spiegel, 2009, p. S557). It believes that without people's full participation, and without their ability to receive the proper resources, full recovery cannot be achieved.

Research looking at mercury contamination in Ghana illustrates the importance of having all parties involved in the contamination participate to the recovery. Victims and leaders need a "place at the table" to accurately assess the contamination and the different injustices involved (Tschakert and Singha, 2007, p. 1305). In their paper, Tschakert and Singha state that with "inadequate governmental policies, technological failures, and an ignorance of community dynamics […] have all contributed to a unique case of environmental injustice that has prevented miners from participating in educational activities that explore and promote more environmentally friendly techniques" (Tschakert and Singha, 2007, p. 1305). These dynamics often divert the attention to contaminated communities rather than to those who are behind the contamination (Pellow et al, 2001, p. 437). Obviously, every community is unique and does not require the same needs as another (Pellow et al., 2001, p. 428).

Usually, not all parties, especially not the victims, workers, and community members, are given space to participate in the recovery process (D'itri and D'Itri, 1977; Kazantzis, 2002; Tschakert and Singha, 2007; Spiegel, 2009). The lack of adequate exchange between all parties involved leads to further marginalization. Those most affected by the contamination receive unequal support from institutions, inadequate access to resources and information and little control over the management of their land (Tschakert and Singha, 2007, p. 1306). Some are barely involved, if involved at all, in the decision-making process (Tschakert and Singha, 2007). This not only limits the capabilities of the community to move forward, it also reinforces "social and political subjugation […] dispossession of lands, relocation of communities, inadequate compensation, exclusion from decision-making processes and fair prices from mining activities, and lack of support for alternative jobs" (Tschakert and Singha, 2007, p. 1306).

While strong governmental responsibility and policy making regarding environmental protection is useful for reducing contamination risks, it is not enough. The inclusion of all

stakeholders, especially the community, demonstrates a higher chance of success in eliminating the consequences of contamination (Pellow et al., 2001, p. 436). According to Opotow, Gerson, and Woodside (2005), achieving social justice will not happen without a shift from “moral exclusion” to “moral inclusion” (p. 306). Society needs to agree “that the overarching purpose of public policies is the achievement and maintenance of mutually beneficial circumstances that enhance the life possibilities of all" (Opotow et al., 2005, p. 306). These policies reflect an ideal type of strategy that "extent fairness to others, allocate resources to them, and make sacrifices that would foster their wellbeing" (Opotow et al., 2005, p. 306).

One way to avoid the degradation of moral exclusion is through education, which may help reduce stereotypes and misinformation (Opotow et al., 2005, p. 310). Opotow, Gerson, and Woodside conclude that the way we perceive conflicts is essential and that a change of perception can be obtained through the distribution of adequate information and resources. The "moral questions concerning right and wrong, responsibilities, and acceptable social norms" are gained a thorough understanding of oneself and others, conflict resolution skills, such a developing communication, and problem-solving skills, as well as recognizing the relationships between conflict and peace (p. 311).

Conclusion

The development of Environmental Justice frameworks has risen awareness towards the social consequences of environmental disasters. Researchers, activists, and health professionals have highlighted the dangers caused by contaminations while striving to find adequate solutions for remediation. While many studies have focused on the negative health and economic consequences caused by contaminants, less emphasis has been placed on the social dimension. Not enough focus has been placed on how the removal of the negative social perceptions of contamination affects remediation. In my opinion, without paying attention to the successful cases of decontamination, there cannot be a full understanding of the road to remediation.

The literature dedicated to an analysis of anthropogenic impacts majorly focuses on the most dreadful consequences of contamination. There is less research on communities that have successfully overcome contaminations. I believe that by highlighting the effects of stigmatization in a contaminated community, one can better comprehend the sociological impacts caused by environmental disasters and successful paths toward recovery. By focusing on Idrija's case of mercury contamination, this thesis will attempt to explore the influence of positive social factors in an environmental recovery process. Indeed, the lack of perceived stigma in this community poses an interesting case for highlighting the social impacts and influences on contamination and its remediation. Therefore, the following chapters highlight the historical context of Idrija in regard to the contamination and address the processes of contamination and remediation while highlighting how the lack of stigma has historically shaped the fate of the community.

Chapter 2: A Historical Perspective

The town is a mine, the mine is a town.

-Old town saying (Zorn et al., 2015, p. 134).

Although Idrija continues to hold the record of mercury production and exportation in Europe, little attention has been brought to the extensive historical contamination seen in the community. If the awareness of the dangers and health implications of mercury mining has increased in recent years in Idrija, there seems to be little to no mention of any negative social repercussions the toxin may have caused to the community. The contrast is striking with other cases, like Minamata and Grassy Narrows. Idrija seems almost an anomaly in mercury contamination studies.

The following chapter highlights important aspects of the history of Idrija to have a better comprehension of its recovery processes. It aims to facilitate comparison between the approaches taken by different communities during and after an anthropogenic disaster. Contrary to what Edelstein postulates, which is that "Contamination is inherently stigmatizing and arouses anticipatory fears," "stressful," and "not only affect how victims (…) perceive and comprehend their lives," none of this is present in Idrija (2004, p. 24). Idrija is proud of its history as a mining village. "The town is a mine, the mine is a town," state Zorn, Nared, Razpotnik, and Visković (2015, p. 134). Though the mines were shut down in 1995 due to a decrease in demands for the metal and increasing awareness of its toxicity, the town still celebrates its history and culture, which spans back half a century (Kavčič and Peljhan, 2010, p. 137-138). The unique history and

cultural heritage of the community is recognised by UNESCO, alongside the Almadén mines in Spain, as a World Heritage Site for the Heritage of Mercury.

Idrija demonstrates the importance of considering social factors when studying recovery processes. As we shall see in this chapter, in Idrija, the inclusion and lack of stigma towards the miners and townspeople in the treatment process allowed for a proactive approach that seems absent in other communities.

Idrija, Slovenia

Idrija has a population of just under 6,000 people. The town is located approximately 50 kilometres west of the capital city, Ljubljana, in Slovenia. It takes more than an hour by car or bus to get to this quaint place, travelling through winding roads and beautiful mountain scenery until arriving in a little valley sitting at an altitude of 325 meters. Nothing but greenery and hillsides surround the town. Located between the Dinarides, the Alps, and the Pannonian Basin, the geographical history of the region is known as an "exceptional geoheritage."

(Figure 1. Early Image of Idrija. (Zorn et al., 2015, p. 125)).

(Figure 2. Idrija, 2019)

Mercury is very present in the region. The deep gorges, stratigraphic cross-sections, mineral, fossil, and water deposits combined with a unique tectonic phenomenon to create an essential environment for the formation of mercury in the bedrock. The combination of these geological environments made the region the host of the second most productive mercury mine in the world after Almadén, Spain (Kavčič and Peljhan, 2010, p. 137; D'Itri and D'Itri, 1977, p. 122). Over the centuries, and even to this day, reports claim the soils are so saturated with liquid mercury that droplets often appear at the bottom of the rivers and streams. It has been observed to be "ooze[ing] out of the ground occasionally to collect on the grass and foliage" (D'Itri and D'Itri, 1977, p. 123). The liquid mercury is still so prevalent that household water wells are monitored and drained to prevent mercury accumulation within them.

The Legend of Idrija

The history of Idrija is indissociable from the history of the mercury mines. It starts with the legend of the discovery of the metal. According to the tale, in 1490, a local cooper, or barrel maker, was soaking wooden barrels in the Idrijca River. One morning, he found it difficult to lift one of the barrels out of the water. He noticed that a silver substance had formed at the bottom of the barrel. It was later identified as quicksilver by a nearby goldsmith (Giumlia-Mair, 2007, p. 68). From this moment on, the mining industry rapidly grew, creating the town of Idrija. This legend is represented in many historical documents and is proudly displayed in the local museum as well as historical sites.

(Figure 3. Images of the cooper discovering mercury found at the Municipal Museum. 2019)

Whether or not the legend is true, the story continues to be part of the town's history. Given that droplets of mercury can be seen seeping out of the rock formations during the guided tour in Anthony's mine shaft (see image below), the legend of liquid mercury accumulating in a barrel plunged into the river waters is plausible, even to the locals, and the story continues to be widely accepted by the people. One of the main historical sites that authenticate the legend is that of the Church of the Holy Trinity, which was erected in1500 in the cooper's honour — located very near where he allegedly discovered the mercury. It is the oldest church in Idrija, being built only ten years after the discovery of the quicksilver in the barrel (Kavčič and Peljhan, 2010, p. 150). The church is well-preserved and was included in the list of the most prominent monuments of Idrija and on UNESCO's Heritage of Mercury list.

(Figure 4 and 5. Church of the Holy Trinity. UNESCO World Heritage Site. 2019).

(Figure 6. Bedrock inside the mines displayed at the Anthony's Shaft Mining Museum containing droplets of liquid mercury formation shows the saturated presence of the metal still found to this day. 2019)

The History of the Mine. An Overview

The cooper's discovery was the starting point for mining extraction in the region. The earliest records of mining rights can be traced back to 1493. Over the next five centuries, Idrija developed mercury production and would eventually become the second biggest mercury mine in the world (Rečnik, 2012, p. 5). Before it ceased operation in 1995, it provided almost all of Europe's mercury and was a leader in the advancements of mining technologies (Rečnik, 2012, p. 6; Hollsten, 2012, p. 29-30).

Mining operations began slowly. The collecting of the mercury was initially limited to surface outcrops. It was based mostly on luck and guesswork as to where to dig. Over time, the prospectors gained a greater understanding of the ore-bearing rocks and geological patterns through observation and research. This proactive approach improved their ability to locate and

excavate the quicksilver (Rečnik, 2012, p. 5). Knowledge of the geological formations, as well as technology became essential to the growth and efficiency of the mining operations.

In the hope of bringing luck and good fortune to the miners and prospectors, the first shaft was named Anthony's shaft after Anthony of Padua, patron saint of caves and protector of disasters. Erected in 1500, it is today the oldest preserved mine shaft in Europe and is part of the museum tour. This tour allows visitors to go deep down into the mines, see firsthand how the miners worked, and observe the mercury still seeping from the rocks. Although it was not the most prosperous cinnabar bed found in the region, its historical and cultural importance has made it one of the most valued and most visited sites in Idrija. It displays the mine's technological advancements and reminds visitors of the history and dangers of the mines.

(Figure 7. Entrance of the Anthony's shaft. Translated from Slovenian as "good luck". 2019).

(Figure 8. Inside the mines)

After a few years of failed attempts in finding bountiful mercury deposits, the prospectors' hard work finally paid off. On June 22, 1508, the biggest cinnabar bed, located where is now the town square, was found. It turned out to be the most substantial mercury cinnabar bed ever to be mined. It brought prosperity to the town and St. Achatius day, the saint of the protector of miners, became an important yearly celebration. In paying tribute to the Roman Catholic saint, the residents honor the discovery of the cinnabar that has allowed for the blossoming of the community (Giumlia-Mair, 2007, p. 68; Rečnik, 2012, p. 5).

With the discovery in 1554 of the amalgamation processes (which uses mercury in the extraction of gold and silver), the demand for mercury sharply increased. Some mines were excavated up to a record depth of 170 meters at the end of the sixteenth century. At the end of the eighteenth century, Idrija was producing anywhere from 450 to 600 tons of mercury per year, which were transported to various countries across Europe and even to South America. Mercury had become an invaluable economic asset (Giumlia-Mair, 2007, p. 69; Rečnik,

2012, p. 9). This global need for mercury ensured that its demand remained high and constant. Idrija prospered.

At the beginning of the 16th century, there was little investment in the mine's infrastructures. The companies that owned the mine at the time were mainly interested in making a profit. However, a series of unfortunate events lead to more significant investments in the mine's safety, production, and development. For example, a devastating earthquake hit the region in 1511, which caused significant damage to the mines (Rečnik, 2013, p. 5-6). A major explosion in 1550 resulting from methane gases killed 30 miners (Hollsten, 2012, p. 28). Dangers of flooding and landslides also threatened the mine production, the miners, and the whole community (Rezun and Dizdarevič, 1997, p. 86; Rečnik, 2012, p. 21). Some travellers' accounts initially gave a "dreadful description" of the work in the mine.

The risk associated with the combination of natural disasters and human constructions fostered action to prevent further damage. New precautions were incorporated from safety procedures within the mines, such as utilising new and more durable equipment, adapting technics to reduce risks of fires and floods, as well as adapting safety measures for the miners. Also, in 1575, the mine became part of the Austrian court's assets after being owned by various companies. This acquisition, which provided essential revenue to the Austrian monarchy, allowed for even more efficient management and protection. Because great value was attributed to the mining industry, preserving and developing it became of prime importance for the monarchy. This not only attracted specialists from around the world focusing on modernisation and development, it created a focus towards maximization of mining production for increased profits (UNESCO, 2011, p. 126).

Many people praised the precautions and technological advancements taken to ensure the safety of the workers (Hollsten, 2012, p. 27). Edward Browne (1644-1708), an eminent physician and member of the British Royal Society, explored the mine shafts and expressed his admirations for the operation's technical aspects that allowed for a surprisingly safe and

dry mine. He noted the "excellent engines and devices used to pump up the water from the mines" providing safety to the infrastructure of the mines and its workers (Hollsten, 2012, p. 27). Idrija was thus known throughout Europe for its technologically advanced mining production. Even though the Almaden mercury mine in Spain was producing as much as three times the amount of mercury that Idrija was, the Idrija mines were recognized as more efficient (Rečnik, 2012, p. 5-6). Documented accounts about the impressiveness of the structure and safety aspects of the mining operation describe engineering marvels that are still preserved and displayed to the public today (Hollsten, 2012, p. 27).

Mercury Mining and Smelting

Although droplets of mercury could be found on the ground level, it was the mercury in the natural ore down in the bedrocks that attracted the most attention. Miners, therefore, had to extract ores from the cinnabar beds, bring them to the surface to have the rocks dried and crushed. From the late 17th century until the closing of the mines in 1995, there were little changes made in the methods of extraction. But continual improvements to the smelting technics were made to increase efficiency and productivity.

Extracted mercury from the natural ore required that the natural ore be heated at high temperatures in clay pots placed in fire pits. The mercury vapours were captured within these clay pots, which were then removed from the fire to allow the vapours to cool down back into a liquid form (Giumlia-Mair, 2007, p. 71). Initial roasting methods were inefficient, losing approximately 50% of the mercury, which would either seep back into the ground or evaporate into the atmosphere (Hollsten, 2012, p. 34). Two-piece clay smelting pots eventually replaced the large furnaces. The vapours that would liquefy at the bottom of the pots were collected once they were removed from the furnaces and cooled down (Giumlia-Mair, 2007, p. 71). These new clay pots were easier to transport and quicker to produce in large quantities (Hollsten, 2012, p. 34). This allowed for increased and more efficient production. Research and technology

continued to evolve in order to increase production and efficiency. For example, the introduction of electricity in the mining operations began at the start of the 20th century. It allowed for a record-breaking year in 1913, when 830 tons of mercury was extracted (Rečnik, 2012, p. 21).

(Figure 9. Two-piece clay pots displayed at the Municipal Museum. 2019)

Technological advancements continued until the closing of the mines, not only providing more effective and efficient production, but safer working conditions for the miners, and indirectly, safer levels of mercury in the environment. For example, the use of steam engines, improved furnaces, mechanical drilling, or air compressors for drilling into the rocks (Zorn et al., 2015, p. 126) was not just useful for extraction purposes, but also for the overall safety in the mines. It reduced the toxic impact of the mercury on the miners (Rečnik, 2012, p. 21). These advancements, which would eventually become part of the

standard of mining operations throughout Europe, provided safer guidelines for the protection of the Idrija workers early on.

The End of a Mining Era

1995 marked an important date for Idrija. While they still contain an estimate of 6% of the global mercury reserves, the mines officially closed after five centuries of operation. It had produced around 13% of the industrial mercury found in the world. The shortage of supply did not lead to the decision to close the mine, but rather a shortage of demand (Giumlia-Mair, 2007, p. 68; Rečnik, 2012, p. 21). The reduction of demand for mercury was itself due to health, safety, and environmental issues, and the development of new technologies that did not require mercury (Rečnik, 2012, p. 21; Dizdarevič and Rezun, 1998, p. 367, 372-374).

The closing started in 1992. It involved the gradual backfilling of the blind shafts at the lowest levels with gangue and low-grade concrete (Rezun and Dizdarevič, 1997, p. 86). This operation was done to solidify the less stable shafts that could collapse and cause large craters and landslides. The water pumps were turned off, beginning the flooding process of the lower levels of the mine shafts. Some people were concerns that the shifting of rocks and backfill during the flooding process would cause sinkholes to form around the town and provoke landslides, but that did not occur (Rezun and Dizdarevič, 1997, p. 86; Rečnik, 2012, p. 21). It seems that the closing of the mines was carefully planned.

With the closing of the mines, many of the main sites have been transformed into historical landmarks open to the public showcasing the history of the mines. Idrija's mines were named UNESCO's World Heritage site in 2012 alongside the Almadén's mercury mines. From Anthony's mine shaft that is preserved for tours into the mines, to the transformation of the Gewerkenegg Castle into the Idrija Mine Museum, the Miners' home

and the Church of Holy Trinity, there is no lack of places to explore and learn about the town's mining history. These landmarks carry on the pride of the community.

Although Idrija's history has brought pride to the presence of mercury, it has also brought awareness to its dangers. While naturally present in the environment, the anthropogenic activities contributed greatly to a rapid increase in levels of mercury in the surroundings. While Idrija has been labelled one of the most naturally contaminated communities in the world, its dangers increased significantly with the increased mining activities.

Primary and Secondary forms of Contamination

After 500 years of mining, the total production of mercury in Idrija is estimated somewhere around 147,000 tons (Zorn et al., 2015, p. 123-124). An estimated quarter of the mercury excavated was lost back into the environment (Dizdarevič and Rezun, 1998, p. 372-374). This had obvious important environmental and health consequences for the miners, their families and the community because primary forms of contamination are distinct from secondary forms of contamination. Primary contamination is linked to the natural release of mercury due to environmental phenomena such as erosions, flooding, and earthquakes (Zorn et al., 2015, p. 128). Secondary contamination, or anthropogenic contamination, is linked to human activities. The form posing the most significant risks is that of secondary contamination, which has been associated with more severe dangers of toxicological impact and linked to "uncontrolled pollution" (Zorn et al., 2015, p. 128).

Natural Contamination

Idrija's primary contamination has even been described as one of "the largest natural environmental pollution in earth's history" (Palinkaš, Pirc, Miko, Durn, Namjesnik, and Kapel, 1995, p. 322). Primary contamination in Idrija is dependent on extreme weather conditions - weathering, rainfall, snow, landslides, and earthquakes, to name a few. The weathering of cinnabars also causes mercury to seep back into the waterways through soil and water erosions (Palinkaš et al., 1995, p. 322). But such events cause only small amounts of mercury to be released, and this releasing occurs at a slow pace. Mercury escaping the ore beds through degassing, oxidation, and eventually migrating to waterways and riverbeds, although present in Idrija, is not the primary source of acute contamination (Palinkaš et al., 1995, p. 322).

While most people living in Idrija are aware of the natural presence of mercury in the environment, they pay no particular attention to its potential dangers (Palinkaš et al., 1995, p. 322-333). Moreover, as Edelstein points out in his book, the issue of physical health aside, natural contamination and disasters have a lesser effect on the psychological wellbeing of the victims. Hence, one of the most naturally polluted sites in the world had little toxic impact on the people and the environment. This stayed true until human intervention.

Anthropogenic Contaminations

Anthropogenic contaminations in Idrija were intense. They created disruption and caused high rates of emission and distribution of mercury into the environment immediately after the beginning of the mining operations (Palinkaš et al., 1995, p. 322).

The approximate amount of mercury lost back into the environment is anywhere upwards of 38,000 tonnes (Zorn et al., 2015, p. 130; Dizdarevič and Rezun, 1998, p. 372-374). These losses were particularly noticeable in the high levels of mercury recorded in the soil and air during intense production times in Idrija. Between 1968 and 1972, the mercury levels in the air rose so rapidly that it created concentration levels ranging anywhere from 300 to 4,000ng/m3. In

comparison, Ljubljana, the capital of Slovenia just over 50 kilometres away, only had levels of about 5ng/m3 (Zorn et al., 2015, p. 130). Though it is difficult to determine to identify precisely the level at which mercury in the ambient air is harmful to humans, the World Health Organization (WHO) has determined that the average is typically between 5 and 10ng/m3, and recommends that it should not exceed levels of 1000 ng/m3 (Hladíková, Petrík, Jursa, Ursínyová, and Kočan, 2001, p. 802).

The dramatic decrease that occurred after the closing of the mines demonstrates that the secondary form of contamination causes a far worse impact on the levels of mercury, even in one of the most naturally contaminated sites in the world. Levels now are as low as 10ng m3 in most areas whereas the closer you move towards the smelting sites, the higher the levels of mercury in the air are registered, which as of 2005, could still reach levels of 1000 to 3000ng m3 (Kotnik, Horvat and Dizdarevič, 2005, p. 7574, 7578).

Conclusion

Since the discovery of mercury in the region 500 years ago, the history of Idrija has provided great insight into the impact of anthropogenic activities. The industrialization of Idrija has not only contributed to the development of the second-largest mercury mine in the world. It has also demonstrated how anthropogenic activities can have a large impact even in an already naturally contaminated region. Mining contributed to an increased presence of mercury in the village. It affected, as we shall see in the coming chapters, the wellbeing of the miners and their families.

The cost of pollution, however, never caused such negative consequences as can be seen in other communities. To have a better grasp of the negative social repercussion that communities usually face in the light of anthropogenic contamination, the following chapters

will highlight the different factors influencing the remedial process of a contaminated community through the historical analysis of Idrija's mining history.

Chapter 3: Stigma and Victimization

Walking around the town of Idrija today, few would suspect that it was once the site of a heavy mining industry. The beautiful environment surrounding this little town only brings a sense of peace and tranquillity. This differs greatly from the sense of disruption and despair that has been observed in other contaminated areas. However, this was not always the case. Idrija was transformed from its initial description of “despair,” “crippled," and “paralyzed" town, to a World Heritage site. Key events have contributed to this recovery process. In order to understand how Idrija has become a successful case of recovery and shed light on the necessary processes for a constructive recovery, the following chapter will first focus on the consequences of contaminations.

The Costs of Contamination

The costs of contamination on a community are multifold: environmental, social, financial. Initially, costs are assessed from a financial standpoint. This includes medical resources, remunerations, and remedial expenses.

To understand the financial impact, economists have calculated the cost and benefits of environmental disasters, and even more specifically of mercury production versus human health costs (Swain, Jakus, Rice, Lupi, Maxson, Pacyna, Penn, Spiegel, and Veiga, 2007, p. 59). An American based study looking at the cost of methylmercury exposure on the developing brain "suggests that the true cost of methylmercury exposure from American emissions ranges from $0.4 to $15.8 billion annually" (Trasande, Landrigan, and Schechter, 2005, p. 593). The study also focused on the cost of fetal exposure, which ranged from $0.1 to $6.5 billion a year

(Trasande et al., 2005, p. 593). These calculations provide an estimation of the financial burden due to health and impairment costs related to mercury emissions. While these cost values are approximations, they show the enormous economic risks associated with mercury poisoning.

Calling for a reduction of mercury emissions based on cost-benefit calculation is a first step. However, much more must be taken into account (Swain et al., 2007, p. 54). The indirect costs associated with mercury contaminations are often not included or considered in "cost-of-illness methods". Other, more global methods evaluate the costs that are indirectly "associated with illness and injuries" (Swain, Jakus, Rice, Lupi, Maxson, Pacyna, Penn, Spiegel, and Veiga, 2007, p. 54). These indirect costs can be associated with pain and suffering, which focuses on the physical and psychosocial aspects of illness due to mercury toxicity (Swain et al., 2007, p. 54; Edelstein, 2004, p. 10).

Scholars have suggested that the contamination should not be exclusively measured in terms of economic costs. Rather, they argue, the "cost" of the impact on social wellbeing needs special consideration (Spiegel, 2009, p. S550-S551). While monetary costs' impact can rely on numbers and graphs (treatment costs, loss of income and resources, cleanup and time costs, to name a few), it is not easy to quantify the cost of the impact on social wellbeing. Moreover, we know that the indifference toward local needs increases costs of decontamination and provides "faulty solutions" (Spiegel, 2009, p. S551) which ultimately leads to a worsening of the situation for contaminated communities (Spiegel, 2009, p. S550-S551). The failure to recognize the communities' needs during an anthropogenic disaster has therefore severe and long-lasting consequences.

Victimization, Stigmatization, and Social Exclusion

The monetary impacts of mercury contamination should not be the only cost considered. Victimization and stigmatization should also be taken into account. As noted by one research,

"ambiguous probabilities of (physical) harm may lead to a more severe form of negative psychosocial consequences" (Freudenberg, 1997, p. 27). These ambiguities amplify the perception of the dangers of contamination and contribute to a breakdown in "effective communication of real or perceived risks with high uncertainties" (Tyshenko, Phillips, Mehta, Poirier, and Leiss, 2008, p. 346). Proper communication between stakeholders "(experts, regulators, political leaders, news media, and civil society groups)" is said to be necessary for successful recovery, but the difficulties lie in the lack of shared knowledge (Tyshenko et al., 2008, p. 348). The consequence of this leads to increased "injuries" which can be both physical and psychosocial (Williams, 1998, p. 20).

Victimization

The definition of "environmental victims" from anthropogenic contaminations embodies the notion of "suffering caused by a *deliberate or reckless human act* (including an act of omission)" (Williams, 1996, p. 19). This differs from the concept of "environmental casualties" which designates those affected by natural disasters. The deliberate, or reckless, acts which cause injuries to individuals and communities shift the power relations between the contaminators and contaminated. Those affected ultimately become victimized due to their injuries and "the avoidance of liability and responsibility by perpetrators" (Williams, 1996, p. 26). Many tactics have been employed to reduce contaminators' liability. Denial, blame, divide, avoidance, and when possible, "papering out" and settling out of court to avoid costly trials and taking responsibility for one's actions (Williams, 1996, p. 26).

Victimization leads to isolation of the contaminated body from the rest of society. It singles out the victims and creates boundaries between healthy and non-healthy individuals. It becomes an instrument in the "othering" of those who are different (Lord and Hutchinson, 2017, p. 28-29). The community suffers from social perceptions. Imagined boundaries separate the

contaminated and the non-contaminated. These socially constructed differences create isolation for those who are defined as victims of the disaster. Real and symbolic boundaries keep the outsiders safe from toxic contamination, while the people within must stay segregated to avoid further contamination and exposure to others. These boundaries not only further this notion of "othering" by creating clear geographical distinction of contaminated land, it isolates victims by retaining them within imaginary borders.

Impairment is not caused by vulnerability; rather, it is caused by how society reacts to "differences." When these reactions lead to increased separation, alienation, and segregation, this reinforces the marginalization and othering of the individuals or communities who are further excluded from the decision-making processes. A prevailing theme in Environmental Justice is how stigmatization and a 'blame the victim' attitude disallow victims from participating in the recovery process. This ultimately leads to social exclusion of those affected by the contamination. In turn, social exclusion from the environmental problem is linked with increased vulnerability to the health and environmental problems the contaminant causes (de Freitas, Schütz, and de Oliveira, 2007, p. S514). This vicious circle increases the risks of injuries - which further affects victimization.

We need to acknowledge that the impacts of stigma go beyond the material and physical effects of the contamination. Uncertainties create fears and these anticipatory fears reinforce the impression of danger. Affected groups become "victims of contaminating social and political processes" (Ellis, Greenberg, Murphy and Reusser, 1992, p. 49). This leads to discretization towards those impacted, reducing their ability to receive validation as well as the proper resources for recovery (Ellis et al., 1992, p. 49). Ambiguity and fears, coupled with lack of access to information, or the proper resources, transparency, and clear understanding of the cause and effect of contamination impact individuals' ability to make informed decisions (Tyshenko, et al., 2008, p. 346).

Stigmatization

Relocation is rare. Communities continue to live in contaminated sites, a situation that increases toxic exposure, the risk of victimization, and the risk of being stigmatized. As Michael Edelstein reminds us: “contamination is inherently stigmatizing” (2004, p. 24). Michael Edelstein uses Irvin Goffman's formulation of stigma, stating that this term "always involves a victim identified by an observer as marked (deviant, flawed, limited, spoiled, or generally undesirable)" (Edelstein, 2004, p. 32). Once the boundaries of contamination are defined, the community within these delimitations become "spoiled" and "marked." (Anderson, 2006). This marked attribution leads to a discretization of individuals’ judgement. The contaminated populations become “something” that has to be dealt with rather than people who need help. Stigma excludes them from receiving the proper aid and resources specific to their needs. It becomes easier to "discount and ignore" them rather than include them in a recovery process (Goodwin, 2010, p. 51).

Responsible for their own problems, contaminated populations cannot be trusted to find the proper recovery processes. Goodwin (2010) further states that "Exclusion can be seen as a significant failure of government […] to recognize the rights of all its citizens, and instead to count some as less valuable than others" (p. 57). This, in, turn disrupts the collective identity of the community. Mobilization within the community and with all stakeholders involved with the environmental disaster cannot arrive at a consensus. The lack of collective response shuns the victims from remedial efforts.

A first general rule is that the higher the uncertainty and risk, the greater the stigma (Chen, Chuo, and Ma, 2019, p. 372). A second general rule is that stigmatization causes a greater "dread" towards risks posed by others than by the toxin itself (Gregory and Satterfield, 2002, p. 351). Time after time, communities that become stigmatized due to anthropogenic activities have to shoulder the negative impacts it causes not only to its economy but to its psychological and emotional wellbeing as well (Gregory and Satterfield, 2002, p. 357). Stigmatization leads to an

array of increased complications in regard to the ill-effects of contamination. This goes beyond the health impacts caused by the contaminate. It causes a breakdown of the collective identity of the community resulting in individual and segregated responses (McGee, 1999, p. 78). The breakdown caused by stigma begins at the individual level by reducing their ability to reach out to others in a collective manner.

The boundaries created by contamination reinforce the impression of a danger zone. Social perception of the dangers associated with the contamination fuels shunning and avoidance (Gregory and Satterfield, 2002, p. 347-348). Such isolation "reduce[s] the ability of the community to cope with the environmental […] contamination in an effective manner" (McGee, 1999, p. 78). The shunning of victims not only excludes them from the world beyond the boundaries of contamination, it also excludes them from the processes of recovery. Their opinion is not valued. Stigmatization, therefore, becomes a leading cause to the exclusion of the community, impacting their ability to be involved in the process of decontamination.

Social Exclusion

Social exclusion reduced the urgency of recovery. According to Bandura, "stripping human qualities" encourages dehumanization (Bandura, 1990, p. 38). By removing the "human" aspect, the victims become people without "feelings, hopes, and concerns," and are "portrayed as mindless "savages," "gook"" (Bandura, 1990, p. 38). Dehumanization leads to further discrimination and violation of human rights (Opotow et al., 2005, p. 305). Exclusion can occur through subtle or blatant actions, whether intimidation or oppression and structural violence (Opotow and Weiss, 2000, p. 476; Opotow et al., 2005, p. 306). It is not only realised with intent to harm; it is often due to ignorance and indifference (Opotow et al., 2005, p. 305).

Social exclusion corresponds to a "process of social disintegration, a progressive rupture of the relationships between the individual and society." This phenomenon is commonly

experienced in marginalized, socially disadvantaged, and racialized communities (Gutberlet and Hunter, 2008, p. 4). Exclusion is defined as “a state of detachment, where individuals are retrained from or not enabled to access public services, goods, activities, or resources, which are essential for a life with dignity” (Gutberlet and Hunter, 2008, p. 4-5). It represents a means of "controlling and subduing people,” i.e., as a “strategy to maintain hegemonic structures and power distribution” (Gutberlet and Hunter, 2008, p. 4).

In Gutberlet and Hunter’s paper (2008), exclusion is justified based on existing social inequalities. Stigmatization and "strong prejudices" associated with "race, education, and income" are attributed to specific communities, placing them in a "lower social status within society". It “provides excuses […] to not do enough” for these marginalized communities (p. 5). The exclusion of the communities from the decision-making processes leads to a “lack of access to economic resources, education, and information” (Gutberlet and Hunter, 2008, p. 6). The mismanagement of resources allows for a continuation of the injustice (Gutberlet and Hunter, 2008; Opotow and Weiss, 2000; Opotow et al., 2005; Bandura, 1990).

The complexity of the exclusionary process on a community reflects not only the uniqueness of each case but also of the multileveled impacts contamination causes to a community. But in every case, exclusion goes beyond the simple act of avoidance and shunning of the victims. It affects every aspect of community well-being.

Breaking down the Consequence of Stigmatization

The "exclusionary posture" that takes place towards those who are stigmatized removes them from the process of remediation and shared information (Kelly et al., 1993, p. 29). Communities and individuals become "devalued and excluded from a broad array of social relationships and social domains" (Major and Eccleston, 2005, p. 63-64). As Goffman reminds

us, stigma causes a person to become "tainted" and "discounted." The consequence for the person is more or less total discredit (Goffman, 1963, p. 3-5).

The Invisible Boundaries

As we have already seen, the notions of stigmatization and exclusion are intimately linked (Major and Eccleston, 2005, p. 66). Because stigma creates an invisible boundary between the contaminated and non-contaminated communities, it reinforces this exclusionary process and reduces the victims' ability to have a proactive say in any factor regarding their wellbeing and how to overcome the effects of contamination. The absence of community inclusion within the boundaries of the contaminated space creates a loss of identity, isolation, and social disruptions (Edelstein, 2004, p. 24-33).

Impacts of Exclusion

Because exclusion affects so many facets of the welfare of a contaminated and stigmatized community, it is difficult to pinpoint the specific factors that have the most substantial effects on recovery. As was identified in previous chapters, research demonstrates that although the economy is a driving force in the recovery of a community, the "physical, social, economic, cultural, and environmental benefits" are all factors that should be included in the remedial process (Hribar and Lozej, 2013, p. 377). Therefore, it is vital to understand the multifaceted reality of contaminated communities.

According to Malcolm Shookner, eight dimensions define exclusion: culture, economy, politics, structures, environment, relationships, function, and participation (Neimanis, 2015, p. 58). These dimensions vary in value and importance from community to community. They can only be used as guidelines to understand the complexity of social and economic wellbeing and

demonstrate the "diverse spectrum of issues" that have to be addressed and incorporated into the "problem solving and decision-making processes" (Neimanis, 2015, p. 63). Each dimension is an integral part of an environmental justice framework that searches "for systems wide concepts and tools that are at the same time holistic, bottom-up, community-based, multi-issue, cross-cutting, interdependent, and unifying" (Neimanis, 2015, p. 60).

Exclusion takes various forms. Withholding or excluding access to pertinent information affects the ability to make informed decisions (Neimanis, 2015, p. 5). This, in turn, affects access to specific resources, such as medical aid, food, water, financial support, and social support. Victims are faced with unequal access to health care (Neimanis, 2015, p. 1). This leads to increased insensitivity towards the victims' injuries and input affecting the overall wellbeing and recovery process (Neimanis, 2015, p. 1). Victims facing exclusion cannot fully understand the contamination itself and are excluded from the decontaminated processes both on a regional and national level (Oesterling, 2015, p. 31). This marginalization increased the stigmatization and "othering" of the contaminated community.

Participatory Modelling for Resilient Futures

In the book *Participatory Modelling for Resilient Futures* (2017), the authors outline a Participatory Action Research to understand the impacts of different processes and procedures in environmental models to overcome contaminations (Hewitt, Hernández-Jiménez, Zazo-Moratalla, Ocón-Martin, Román-Bermejo and Encinas-Escribano, p. 182-184). Through the comparison of different environmental models, their research aims to demonstrate that top-down approaches, such as governmental and policymakers, are misleading when addressing environmental issues. Instead, they argue, we must redesign our environmental approaches to incorporate a bottom-up process incorporating all stakeholders to have more effective means of recovery (Hewitt et al., 2017, p. 185).

The authors outline three goals in the social transformation identified in aiding environmental contamination's impact on communities. Described broadly, these goals must be strategically approached based on the targeted needs. They are nonetheless useful in creating a "coherent process design" bridging "diverse initiatives" (Hewitt et al., 2017, p. 182). The goals foster an inclusionary approach and focus on three different tiers of identified requirements to address environmental issues (Hewitt et al., 2017, p. 182): 1) shared knowledge; 2) participatory processes; 3) innovative and consensual approaches tailored to the community's needs. These goals, in concordance to the dimensions addressed previously for social and economic wellbeing, reemphasize the complex dynamics of community dynamics in remedial procedures.

1- Transfer of Knowledge

In time of crisis, each stakeholder, whether it be community leaders, medical experts, or financial advisors, has its own perspective in regard to the contamination (Hewiit et al., 2017, p. 3). The goal, here, is not the "rejection or replacement of scientific evidence, but the transfer of scientific information and approaches to the reality of civil society and vice versa" (Hewitt et al., 2017, p. 3). On the opposite, it is to create a platform that allows for more "realistic alternatives" tailored-fit to the community's uniqueness. Without an open transfer of knowledge, the decision-making processes will lack valuable knowledge and will end up negating the unique features of the contamination and the community itself.

Many of the commonalities of complaints from the victims of anthropogenic contaminations revolve around access to valid information. They lack valid information regarding the response to the contamination, as well as to the response to the recovery process. Without information on the cause of the contamination, as well as the toxin involved, it is difficult for them to identify and allocate the resources needed to begin the recovery process.

2-) Design and Delivery of Participatory Processes

Hewitt et al.'s book focuses on how this transference of knowledge facilitates designing new participatory processes between the neighbouring regions of the contaminated community. The sharing of knowledge between stakeholders provokes a paradigm shift between an affected community and external stakeholders. This shift not only allows for open and transparent dialogue between stakeholders, it creates an even playing field in the decision-making process. It puts greater emphasis on community needs rather than on profits and individual gains of alien stakeholders. By putting the community's wellbeing before external stakeholders' profit, there is an increased efficiency in integrating effective cost and production relationship between the contaminated community and external resources and aid (Hewitt et al., 2017, p. 181).

This shift has been seen to "favor proximity, regional identity, food sovereignty, food security, and sustainability," among other vital forms of resources that allows a community to survive (Hewitt et al., 2017, p. 181). The inclusionary process of interdependence between regions and resources is provided through a more significant transfer of knowledge to target the necessary resources required by those affected by the contamination. This not only reduces exclusion; it increases cooperation between stakeholders.

3-) Participatory Models. Innovative and Consensual Approaches

Participatory model allows for planning "innovative and consensual approaches" with the (ideally) full consent of the community (Hewiit et al., 2017, p. 181-182). The goal is to ensure an equal distribution of power in the decision-making processes. This allows for more proactive policymaking that are created through the interactions between the community and policymakers, as well as official, shared, and consented strategies between all stakeholders. External agencies and institutions no longer have sole control over the decision-making processes (Hewitt et al., 2-17, p. 181).

For these participatory models to be successful, three key strengths have been identified: 1) “breaking down barriers between facilitators and participants;” 2) “non-hierarchical and egalitarian approaches to decision-making;” 3) “and explicit political dimension that seeks to address power imbalances within the stakeholder community” (Hewitt et al., 2017, p. 9). Emphasis is placed on a “loose operating strategy for structuring information” by acknowledging the context and objectives of each case and the specific needs of the community and stakeholders.

Conclusion

Recent research shows how victimization and stigmatization hinder the remedial and recovery process. They contribute to the marginalization of individual and community needs, which ultimately further victimizes those affected, causing a vicious cycle. As one paper points out, "fears of stigma effects are viewed as irrational obstacles to progress" highlighting the impact of stigma on the ability of the community and external stakeholders to find the right resolutions to recovery (Slovic, Flyyn, and Gregory, 1994, p. 776). New participatory processes need to be developed to target the necessary means of recovery for each specific community. We need to shift the focus from profit making to moral inclusion.

As we have seen, the impact of anthropogenic contamination is not limited to health issues. The social and economic dynamics interplay in the recovery process. Victimization and stigmatization, for instance, can lead to long-lasting detrimental consequences. According to Michael Edelstein, all contaminations are inherently stigmatizing. He identifies stigma as a major factor in the exclusion of an effecting community and the lack of effective decision-making processes. But the history of Idrija questions such conclusion. It seems that it is not always the case that contaminated communities are stigmatized. However, very few studies look at communities overcoming contaminations without experiencing stigmatization. By examining

cases of contamination that show little to no impact from stigma one may explore further the hypothesis that (positive or negative) social perceptions have a deep and lasting impact on contaminated communities, equal at least to that of the contamination itself.

Concepts forged to understand the effects of large-scale contamination need to be refined. The history of mercury toxicity in Idrija offers a great example to do so. Here, the lack of victimization and stigmatization created an inclusionary process that seems to fit the theoretical model put forth by Hewitt et al. (2017). Idrija offers a different window to uncover the complexity of recovery processes. The next chapter will look at how, in Idrija, a paradigm shift within the community created new participatory models targeted to a higher degree towards the specific needs of the community.

Chapter 4: Stigma in Idrija

How greatly Idrija's treasure turned into a poison for the people of Idrija.

-Paracelsus

Previous cases of largescale mercury contaminations unassailably demonstrate that long-term impacts go beyond the question of environmental and health. Today, in Japan, it is still common to hear about families doing background checks on prospective partners to ensure they are not from Minamata (Johnston, 2006, p. 4). Marriages have broken up after the discovery that a spouse was from Minamata. People passing by the city by train close their window (Kusago, 2011, p. 104). In 2000, a group of school kids from Minamata were jeered at when they went to a swimming pool because the other kids were too afraid to swim with them (Hirano, 2006). The changes and measures implemented since 1990 in order to rebuild the community after extensive contamination have not sufficed to bring Minamata's reputation back. Similar marginalization has been documented in other countries, including Canada, the United States, South America, Africa, and China (Kusago, 2011, p. 110). These cases serve as reminders of the impact stigma and exclusion in environmental crises. At some point, the social effect of contamination becomes more problematic than the contaminant itself.

Idrija, interestingly, has not faced victimization. Considering that Idrija has been recognized as one of the most naturally polluted regions in the world, such observation is surprising. Risk perception should increase in concordance with high levels of contamination. But Idrija's mining and mercury contamination did not lead to stigma. The history of Idrija

shows that, even when a town has been described as a place "without hope of ever being completely healthy," there is potential for recovery when the right decisions are made.

Understanding Idrija's Contamination

When the symptoms of the mercury contamination started seriously impacting the villagers of Minamata in the 1950s, government officials warned the public of an unknown, contagious, and deadly disease. Not certain of the source of the problem, the government cautioned outsiders to stay away from the region. This created an invisible boundary contributing to the stigmatization and exclusion of the community (Goodwin, 2010, p. 14). The entire community seemed to be "fenced." This situation persisted years after the discovery of the cause of contamination by nearby factories. The stigma plaguing the community endures to this day.

In contrast, in Idrija, the mines have been transformed into a tourist attraction. The local heritage revolves around the history of the mercury. People are invited to go down the tunnels and see how the miners worked underground. Displays in the walls show the droplets of mercury as they seep out of the ore. The history of mercury is proudly exhibited in the local museum and the surrounding historical buildings. During my first visit to Idrija, we were brought around old smelting sites up in the mountains. During our tour, someone asked our guide if there was stigma associated with the community and the mercury, such as is the case in Japan. To which the tour guide responded: "Why would there be stigma? We know its mercury."

In Idrija, no research associates any forms of stigma to mercury, nor does anyone see the town as an ecological disaster, although people are well aware of the presence of mercury and its health impacts on the villagers. This awareness came early and allowed for the implementation of regulations and procedures to reduce the long-term effects of mercury exposure. Innovations were adopted to reduce its impacts. In his famous work, "The Glory of the Duchy of Carniola", published in 1689, Janez Vajkard Valvasor presented the first depiction of Idrija and described

with amazement the technologically advanced equipment of the mine. But from research and technological advancements, to medical developments, as well as social welfare and workers' safety measures, these innovations touched upon every aspect of community welfare, not only the exploitation of mercury. Idrija's history demonstrates their important impact on the overall well-being of the community. Paving the way to this community well-being took centuries of research and development. The initial mining life was difficult and detrimental to the community's health and wellbeing.

The vast history of Slovenia gives further insight In order to have greater perceptions into how these groundworks were made possible, a better understanding of the historical development of the political, cultural, and technological within Slovenia. The vast history of this country gives further comprehension of the development of this community.

The History of Slovenia

Although a small community isolated in the mountain area, Idrija's political and cultural history is deeply influenced by the transformations Slovenia has seen as a country over the centuries. Declaring independency in 1991, Slovenia has a colorful history leading up to this. Its political history has been described as "the struggle of a small nation resisting foreign domination and assimilation over many centuries as a constituent part of various monarchies, kingdoms, a fascist state and, finally, a socialist federation" (Haček, 2009, p. 98). Throughout these exchanges, Slovenia has surprisingly stayed quite homogenous in its national identity, yet reflects different cultural, political, and economic acquisitions from its various exchanges.

Once part of the Republic of Venice, it was passed to the Austrian Empire in 1797 where it remained part of the Austria-Hungary Empire for centuries until it began to seek for greater cultural and political autonomy. A shift in ideologies became more apparent during World War I where many Slovenes were drafted to fight with the Austro-Hungarian Army causing many

casualties and displacements. The dissolution of the Austro-Hungarian Empire after the war lead to a declaration of independence for Slovenes, Croats, and Serbs, uniting them in creating a new kingdom, that of Yugoslavia in 1929.

During World War II, Slovenia was divided between Nazi Germany and Fascist Italy where they began to face ethnic cleansing and resettlement. Men were sent to the army while their language was banned from education. A shift from the gained independence from WWI was being transformed into a communist ideology lead by Communist leader Josip Broz Tito. An upsurge of anti-communism united the Slovenes in their anti-Nazi resistance. After Yugoslavia was liberated in 1945, the region became a socialist federation under the title of People's Federal Republic of Yugoslavia. Germans who represented approximately 2.5% of the population before the war were either expelled or killed during this time as an aftermath to the death and resettlement of the Slovenes.

The Shift Towards Independence

After the end of WWII, Slovenia became a socialist state where they began to experience economic liberalisation, or self-management. This ultimately influences a cultural liberalisation after failed attempts of forced collectivisation and assimilation. From there began a decentralisation of the Yugoslavian economy where Slovenia's economic development surpassed the average of Yugoslavia's population ultimately creating a sense of exploitation.

Slovenia's independence and move away from communistic society to a more socialist one lead to the start of negotiations to independency in 1987. An undeniable shift in political differences within Yugoslavia influenced Slovenia's shift to independence. After an electoral vote, Slovenia became independent on June 25th, 1991, making it one of the six republics of the new social state (Pleskovic & Sachs, 1994, p. 192). The social development experienced in Yugoslavia influenced the path of Slovenia in its transformation away from a communist state to

a socialized one increasing its autonomy both on a cultural and economic level. Ownership became viewed as "market socialism" rather than state, and enterprises were run by workers as "workers management system," not centralized branch ministries (Pleskovic & Sachs, 1994, p. 193).

The shift towards independence has been noted long before WWII where Slovenia has been recognized as working towards autonomism even before gaining independent status through Yugoslavia's socialism (Toplak, Haček, Lukšič, & Bačlija, 2012, p. 11). A sense of "unitarism" has been used to describe the Slovenian history where Slovenia was not viewed as a nation-state, but rather an "autonomous entity that would unite Slovenian (native) speakers" (Toplak et al., 2012, p. 13). This sense of autonomism and unitarism was not only influenced by conventional ethnogenesis (common language, tradition, and territory), but also by class identity and language which initially was heavily influenced by the Catholic Church (Toplak et al., 2012, p. 22). The clergy had represented the elite in which Slovenians followed them, not only in terms of religion, but political matters as well. Historians have highlighted this relationship as early as the 18th century, when many of Slovenian inhabitants were peasants needing to follow a dominant political and cultural force. A sift moving away from the Church as a dominant political figure began in 1848, also known as the year "of birth of the Slovenian nation into political life" (Toplak et al., 2012, p. 23). This continued the strengthening and reinforcement of Slovenia as seeing itself as independent and moving towards a socialistic ideology through increased education and literacy programs.

Religion

As has been seen in Slovenia's history, religion played an important role for the people of Idrija. From the church of the Holy Trinity erected in 1500 to the completion of the St. Barbara church in the mid-16th century after Protestant Priest temporarily took charge of the church (UNESCO, 2011, p. 144). Even the church bells were used to signal the start of the working day for the

miners. The symbolic representation of the Roman Catholic Church can be found throughout the development of the mines and town, and are still preserved to this day. Each shaft was dedicated to different Saints. Most notably that of St Anthony of Padua who represents an important figure to the miners who believed he would protect them from underground mining accidents (Hughes, 2005, p. 153). In the mid-18th century, a chapel was built within the mines dedicated to the Holy Trinity for which the miners could say a last prayer to before their full descent into the mines. This chapel is still present and can be visited during the underground mine tours.

(Figure 10. Holy Trinity Chapel found within the mines)

As it has been seen in Slovenia's history, religion played an important role in the political and cultural identity of the community. The Roman Catholic Church was viewed as the elite in which the town's people should listen to and follow in nation-state affairs, therefore, giving them power in authority initially. The majority of workers had little to no education and tended to be highly superstitious. The Church provided not only religious support, but political, cultural, and, social as well and therefore represented a stable source to follow in all matters of life. Though religion continues to play an important role in Idrija's citizens, there has been a shift moving

away from religious authority to a more secular standpoint both in matters of education and politics. This reflects that though an initial religious stance played a large role in the shaping of the community, the incorporation of higher education and shared knowhow has aided the shift from a dominant religious standpoint to the more socialist one.

Slovenia Today and Its Influence on Idrija

Through its rich history, Slovenia has transitioned through many hands slowly gaining its own ideologies and independence. By utilising its experiences and knowhow, this country has carved its way into its own cultural and economic independence. The Slovenian history is also reflected in Idrija's community development. The history of Idrija has lead it to be described today as a creative milieu with "openness to new ideas and knowledge, strong personal relations, a high level of communication, solidarity, a strong identity and tacit knowledge, a sense of belonging, active participation in civil society, and intense face-to-face contacts" (Zorn et al., 2015, p. 132).

Though the life of the community was not always described as such with the harsh mining lifestyle and limited resources, the development of the town through perseverance, exchange in knowledge and knowhow, and focus on shared community values have contributed to the ability of the town to overcome the negative impacts from the mining. The "soft" role in development factors, such as social and human capital and quality of life and livelihood in Idrija, has demonstrated their vital importance to the survival of a community during a crisis. What was once considered most important, that of traditional economic geography, as the influencing factor for community survival has now been demonstrated as more complex in its structure. This contributes further to the understanding of the importance of social wellbeing in community survival. By taking Slovenia's history into context, these transformations will be further explored within Idrija's context to give further insight into understanding the roles in which the community provided towards decontamination.

Researching the Toxin

Although often used in medical practices, mercury toxicity is a known fact since Antiquity (Hollsten, 2012, p. 35). But because the symptoms of mercurialism vary greatly, it is not always easy to initially diagnose. From neurological deterioration, such as tremors and loss of motor function, to increased damages to internal organs, such as the kidney and liver, the toxin's symptoms were not fully understood. Yet, obviously, when a community is aware of the presence and dangers this metal pose when present in their environment, the ability to take proactive measures is facilitated.

The dire danger of mercurialism was not fully understood when the mines first opened in Idrija. Some documents described that miners initially blamed their ailments on mountain spirits (Hollsten, 2012, p. 35). But because the town of Idrija was constructed with full purpose of mining the liquid silver, a correlation between miners' ailments and mercury exposure was eventually made. The first experts who investigated the matter soon made a connexion and started finding a way to treat or avoid mercury poisoning. Their groundwork and recommendations allowed for more effective remediation.

Research and Technological Developments

Idrija attracted experts from around Europe. The unique geological structure, combined with the rapid development of technology and production, provided experts from across Europe an "important scientific center" for research and observation (Rečnik, 2012, p. 11). Doctors, engineers, as well as geologists, cartographers, botanists, and mineralogists, conducted extensive research to better understand environmental and health issues (Rečnik, 2012, p. 10-11). They were fascinated by the town's unique geological environment (Rečnik, 2012, p. 11). This "research hub" (Idrija is sometimes known as "Slovene Athens") provided Idrija's inhabitants with access to important information that included mining production

data, geographical surveys, as well as important health data. The garnering of information paved the way for new technologies and cures, many of which are still used today.

While Idrija transformed into an important research hub, its beginnings did not reflect the prosperous image it was evolving into. Initially, there was barely any social security or health care provided to the miners and their families (UNESCO, 2011, p. 163). It was not until the mid-18th century before the first physician was hired by the courts to begin treating the negative health and social impacts (UNESCO, 2011, p. 163). Although awareness of the impacts from the mercury toxicity have been noted since the 16th and 17th century, the technical approaches that were being applied were not enough to subdue to detrimental impacts from the toxin nor the dangers from the mines (UNESCO, 2011, p. 163).

In the 17th-century, the Idrija Mine was administered directly by the Austrian Court and contributed one third to the total income of all mines operating in the monarchy. Its vital importance helped opened a dialogue between authorities and victims of mercurialism. These two groups shared a common religion (Roman Catholicism), a common language (Slovene), a common culture, and a common purpose. Although the population of Idrija was large by medieval standards, it didn't surpass 3,600 at the end of the 18th-century, and was ruled according to the feudal regime in a very cohesive way. The town was rich: it had the oldest theatre in Slovenia, a castle (named Gewerkenegg, which means "miner's castle", it was occupied by the mine administration), and magnificent stone water barriers that have been named the "Slovene pyramids."

Conscious of their interdependency, local workers and authorities had a shared interest in understanding the impacts caused by the mercury mining. The transparency between Idrija's inhabitants and experts created a baseline for remediation. This opened the possibilities of new participatory processes and effective model developments targeting the well-being of the community.

Harsh Beginnings

Although the impacts of the mercury mining on the health and wellbeing of the community are no longer of concern, this was not always the case. From geographical remote distance, to land infertility, unliveable living wages, not to mention the toxic impacts from the mercury, it is hard to imagine how it has transformed into the community it is today.

While the living wages in Idrija were similar to those in Austrian mines, the geographical disposition of the community provided for harsher economic wellbeing (UNESCO, 2011, p. 167). The remoteness of the community made it more difficult for importation, as well as the lack of land fertility in providing naturally grown resources. Combined with the increase in environmental contamination, the initial financial gains for the miners were very limited (UNESCO, 2011, p. 167). Mining wages did not suffice to make ends meet in the beginnings making the families branch out in other manual jobs for the men and lace making for the women for additional income. These side jobs became increasingly common in Idrija gaining its own name "sojšna," or "working on your own" (UNESCO, 2011, p. 167). This not only allowed for individuals and families to improve their financial wellbeing, but also improved the community's standard of living through the increase of shared services (UNESCO, 2011, p. 167-168). While community members struggled with access to liveable wages and food resources, they were also facing the health consequences caused by the extensive mining. The early descriptions of the mining town depicted the harshness and despair these people faced. The health impacts the community faced brought a desperate need for medical resources.

Health and Medical Developments

The rapid growth of mining production led to a rapid rise in occupational health hazards. The first doctor to visit Idrija arrived in 1527. Physician Paracelsus signed, in 1533, the first known publication about the risks of mercury poisoning in Idrija (Ĉar and

Dizdarevič, 2004, p. 36). He described how “Everyone that lives [in Idrija] is bent and paralyzed, partly asthmatic and partly chilled through, without hope of ever being completely healthy again” (Zorn et al., 2015, p. 128). He described "How greatly Idrija's treasure turned into a poison for the people of Idrija" (Zorn et al., 2015, p. 131). His initial reaction to the "crippled" and "despair" aspect of the town fueled his desire to understand the cause of the miners' diseases (Slavec, 1998, p. 53). He became one of the first people to suggest new methods to protect miners from mercury vapours. He implemented the use of primitive prophylactic respirators, which paved the way to occupational medicine, industrial hygiene, medical toxicology (Slavec, 1998, p. 53) and future research on ways to reduce the harmful effects of mercury mining.

Ten years later, in 1544, Pierandreia Mattioli, a physician and botanist of a neighbouring town, described in his book *Pedacii Dioscuridis de materia medica Libri VI,* the effects of intoxication in the smelters (Kobal and Grum, 2010, p. 536). In the book, *Die Ehre des Hertzogthums Crain* (1689), J. W. Valvasor, member of the Royal Society of London, wrote about the social and health issues that appeared to link the mercury mines and its poisonous effects on the miners (Kobal and Grum, 2010, p. 536). While many experts conducted research independently, others were sent from higher authorities. A trained surgeon named Joseph Gutt was sent to Idrija in 1740 to determine how to provide help and resources to those afflicted by mercurialism (Savec, 1998, p. 54). Giovanni Scopoli (1761 to 1784), a naturalist and mining physician, Balthasar Hacquet, in 1781, a well-known surgeon, and even a German writer by the name of Keyssler in 1740 also contributed to the advancements in understanding the impacts of mercury on human health.

The influx of researchers persisted over the years. Multiple reputable researchers of various fields of study published a growing mass of documentation (Ĉar and Dizdarevič, 2004, p. 36; Zorn et al., 2015, p. 126). The multidisciplinary approach and collaborative work from specialists contributed to the rapid development of studies in mercury toxicity and occupational hazards (Ĉar and Dizdarevič, 2004, p. 36). No one was blaming the victims.

Rather, they all pointed to the negative impacts that the mining industry and mercury had on workers and villagers. In other words, the onus was placed on the toxin rather than the community. A set of remedial procedures began to emerge to reduce the impact of mercury on the environment and the people.

Idrija's Case: Creating a Standard

The experts coming to Idrija built awareness around the toxic effects the mines. From Paracelsus describing the people to be without hope in 1527, to detailed description of mercury poisoning in 1544 by physician Pierandreia Mattioli, as well as recognition of the continuing deterioration of the health and social wellbeing of the miners by J. W. Valvasor in 1689 (Kotnik et al., 2005, p. 7577; Kobal and Grum, 2010, p. 536), there is an abundance of sources into the impact of mercury poisoning on the community.

Joannes Antonius (Giovanni Antonio) Scopoli (1723-1788)

Doctors were explicitly sent to work with the miners to alleviate their symptoms (Kobal and Grum, 2010, p. 536). Following the work by surgeon Joseph Gutt, physician Joannes Antonius (Giovanni Antonio) Scopoli began his work as the first appointed physician in 1754. Through his careful observations, he described the symptoms of mercury poisoning and sought to understand pathways of exposure, such as inhalation or skin contact, and the different effects mercurialism had on humans. Inspired by the work of Paracelsus, he treated the miners and worked alongside them in the mines in order to address every aspect of the working conditions and ultimately acquired the title of "the first company physician of modern times" (Kobal and Grum, 2010, p. 536-537). In 1769, when he left Idrija, he was appointed a professor of chemistry and metallurgy at Mining Academy at Schemnitz (now Banská Štiavnica, Slovakia),

(Figure 11. Joannes Antonius (Giovanni Antonio) Scopoli (1723-1788). (Kobal and Kobal Grum, 2010, p. 536)).

Demanding Workers' and Villagers' Rights

Scopoli had interests in botany, entomology, chemistry, and mineralogy (Kobal and Grum, 2010, p. 536). His passion for insects and flora initially got him in trouble with the workers. When he first started, the miners stated he was not paying enough attention to their health and well-being. They criticized how he was spending too much time drawing flowers rather than tending to their needs (his biographer Otto Guglia named him the "Linnaeus of the Austrian Empire"). But they also lacked confidence in a doctor who came from a different community (Scopoli was born at Cavalese, obtained a degree in medicine at University of

Innsbruck, and practiced as a doctor in Venice) and spoke a different language (Italian) (Speta, 2004, p. 592). The villagers believed Scopoli did not understand their culture, lifestyle, and needs.

Complaints from the village about Scopoli's 'ineptitudes' were sent to the Empress of Vienna who owned the mines since they had been 'nationalized" in 1580. High authorities from Idrija asked for him to be removed in 1757 (Speta, 2004, p. 592-593). Scopoli wrote in response to the Empress of Vienna and fought hard to keep his position. On December 28th, 1757, the Empress responded that he would receive a warning and allowed him to continue working as a doctor in Idrija on the condition that he would improve his work ethics (Speta, 2004, p. 593).

Fearful for his position, Scopoli became more involved. He knew he needed to prove his dedication to the miners. He adopted a more on-the-ground approach and gained awareness of how the mines were sickening the workers (Slavec, 1998, p. 55). His work created new standards of approach in medical research, paving the way for occupational medicine as we know it today (Slavec, 1998, p. 53) and ended up influencing mining production across Europe (Kobal and Grum, 2010, p. 537).

Scopoli aimed at treating and preventing the symptoms of mercury poisoning. He began working in the mines in order to get a full picture of the life of a miner. By experiencing first-hand what the working conditions were, he adopted a more inclusionary and cooperative approach to determine mining standards and safety measures. Being the first appointed professor and physician in Idrija allowed Scopoli to publish and share his findings and research with others. He started to teach the science behind mercury mining (Čársky and Herčko, 2015, p. 339). The redistribution of his findings allowed for transparent shared knowledge providing resources for future informed decision-making procedures. This cooperative work created a more open dialogue between external resources and stakeholders. The development of different tools and approaches to foster a new standard of living was more consensual and adapted to concrete needs.

Preventative Measures: Scheduling Workers and Smelting Times

Scopoli's research was partly focused on preventative measures. He emphasised the correlation between highly toxic tasks, such as the smelting work and excavation, and the intensity of the symptoms the miners were experiencing. His contribution to the well-being of the community can be traced through many of his recommendations, which include the implementation of scheduled work hours with task rotations between work sites, wearing masks to reduce contact with the vapour, proper hygienic regulations, and proper compensation for sick leave (Kobal and Grum, 2010, p. 538-539).

Scopoli was not the first to lay out solutions. From the beginning, many technics were implemented to protect workers. Between 1557 and 1635, reports described how miners would burn the clay pots to extract the mercury out of the ores with their back to the wind in order to avoid the toxic fumes emanating from the burning process (Guimlia-Mair, 2007, p. 73). Smelting times were limited to winter to reduce the effects of mercury vapour on agriculture and farming productions (Zorn et al., 2015, p. 129). But contrary to these initiatives, Scopoli's proposals were well-documented and varied. By understanding how the working conditions were impacting the miners, he was able to implement changes that systematically and scientifically reduced the exposure to mercury.

One of Scopoli's concerns was the dangers associated with mercury vapours and dust. He condemned the "lack of ventilation, increased temperature, stifling atmosphere, and native mercury in some parts of the pit" (Kobal and Grum, 2010, p. 537). He began recommending "glass" masks used in other mines to prevent arsenic and sulphur inhalation. These masks became an efficient preventative measure in the furnaces and smelting sites (Kobal and Grum, 2010, p. 538). Initially, masks tended to be simple cloth wrapped around the nose and mouth,

then expanded to using animal bladders before developing into more effective materials (Unesco, 2011, p. 163).

Some of Scopoli's suggestions for treatment and prevention ranged from fresh air to hot baths and sweating to expel mercury from the body (Kobal and Grum, 2010, p. 539). To reduce the loss of teeth and swelling of the gums, he suggested gargling barley decoction mixed with honey (Kobal and Grum, 2010, p. 539). But, essentially, Scopoli believed in a more "natural" approach to treatment. He did not use medicines to treat the sick, even though the Empress of Vienna had allowed for free medication (Slavec, 1998, p. 56). Instead, in accordance with the state of medicine in his time, he focused on reducing contact with high levels of mercury. He recognized the importance of rest for all workers. He wanted workers to be able to take some time off when they felt they needed it. It was therefore important that they receive proper compensation during sick leave. It became a priority for Scopoli to ensure a proper welfare system (Hollsten, 2012, p. 36). Miners were given temporarily monetary compensation when they were ill to allow them the time to recover, even though many continued to work out of fear of not receiving their wages (Kobal and Grum, 2010, p. 539). Some of the other recommendations focused on limiting the number of hours the workers would spend underground and around the smelting sites, as well as limiting shifts to six hours a day (Kobal and Grum, 2010, p. 538). Rotations between the different sites were implemented so that workers would have limited contact with heavily mercury-contaminated tasks (Kobal and Grum, 2010, p. 539). This was primarily implemented where the vapours had been associated with the more severe symptoms.

Although Scopoli met opposition, and not all of his ideas were accepted, what he provided was a notion of the importance of preventative measures (Slavec, 1998, p. 58). His work allowed for a better understanding of the impact of mercury and the value of social welfare and occupational medicine. He created a basic standard from which social welfare and health and safety measures were developed from. For instance, the insurance system that was developed in Idrija was seen as an "extremely pioneering development in this region" (p. 342). Indeed, these

new regulations have been "reportedly the first legislative measure passed for industrial hygiene in history" (D'Itri and D'Itri, 1977, p. 122).

Health and Social Security

Initially, when the mines were taken over by the Habsburgs in 1575, there was little health care or social security (UNESCO, 2011, p. 206). While there was some remittance provided for the disabled and widowed, there were little to no recourses during the 16th century. It was only at the turn of the 18th century where authorities began hiring medical professionals to treat and provide assessments for financial compensations (UNESCO, 2011, p. 206). Alimony for widows and orphans began in 1718, sick pay in 1736, and pensions in 1783 (UNESCO, 2011, p. 206).

As financial and medical resources became increasingly available and necessary for the community's wellbeing, the first form of social welfare and unionisation began. The majority of its financing was done through the Brotherhood Treasury, also referred to as the Fraternity Fund. Records indicate that a Fraternity fund was present as early as 1600 providing financial assistants for injured miners and by the mid-18th century, covered the majority of the Medicare costs. The Brotherhood started the beginning of organized healthcare in Idrija (Bilban, 2016, p. 80). The fund provided financial and medical resources to the miners and smelters, such as new hospitals, physicians, preventative medical examinations (Bilban, 2016, p. 80).

The Brotherhood treasury took on full legal responsibility of health and pension insurance in 1891 and continued to work closely will the community. The miners' contribution to the brotherhood treasury was of 3% wages, a fee that remained unchanged for many years (UNESCO, 2011, p. 207). This paved the way for the development of occupational hygiene which ultimately created occupational medicine as we know it today. The establishment of the brotherhood treasury not only represented the beginning of healthcare, but also social insurance and pension plans. This unionization not only provided a safety net for the miners and their families; it allowed for the development of occupational medicine. The resources provided

contributed to the decline of severe health issues caused by the mining operations while providing the necessary resources for community development.

Safety Measures and Health and Safety Program

Scopoli's recommendations became a stepping stone on the road to improving workers' conditions. With the collaboration of the Brotherhood Treasury providing financial resources towards medical developments, new safety measures continued to be developed. They contributed to reducing exposure to mercury without compromising the community's well-being. They created a standard to reduce occupational injuries while maintaining a strong economy.

After Scopoli's departure, other experts who came to Idrija for research, observation, medical and technological developments proposed various reforms and safety measures. With them came a renewed understanding of how to reduce the impact of long-term mercury exposure. Officials began implementing different measures to alleviate the risk associated with mining. Not all treatments and attempts were successful in reducing the health impacts but with the continual cooperative work between the victims and the experts, the recovery process was well connected to research development. Monitoring the mercury levels within the mines, developing new technologies to reduce the mercury vapour emissions, wearing protective gear, imposing stricter work hours with shift rotations, and offering regular medical exams did not eliminate all the effects of mercurialism, but these measures and others provided the social support needed to reduce the intensity of the long-term effects of the toxin (Unesco, 2011, p. 164). What stand out is a committed effort to adopt a holistic approach that included mining technics, technological innovations, safety programs, and health monitoring.

Personal Hygiene

Technological and medical advancements were not the only strategies implemented. Scopoli's work stressed the importance of taking proper personal hygienic measures after work. He concluded that the miners' clothing was bringing mercury dust back to their homes. This affected their wives and children. Necessary precautions were implemented (Kobal and Grum, 2010, p. 539; D'Itri and d'Itri, 1977, p. 123). Practices encouraged by Scopoli included baths after work and keeping the work clothes away from their homes.

Also, Scopoli focused on changing specific behaviours in family dynamics to reduce contact with the toxin and enhance preventative measures (Kobal and Grum, 2010, p. 537). He recommended not to allow children to sleep in the same bed as the workers the first few nights after working in highly contaminated sites at a time when it was common practice for families to share two or three beds, and even for seven or eight family members to share the same bedroom. Progressively, the showers and changing rooms became standard practice in the late 1800 and early 1900s (D'Itri and d'Itri, 1977, p. 123).

As previously mentioned, not all of Scopoli's recommendations were implemented straight away. But they became a baseline for the necessary improvements needed to increase the quality of life of the miners. These recommendations led to significant improvements to the overall health of the miners and their families. They helped create a collaborative network between the miners, the community, and mining managers, everyone working together to reduce the ill effects of the mining while maintaining production. For some, it seemed that, thanks to these improvements, people in Idrija "suffer no ills effects" from the mercury present in their environment (D'Itri and d'Itri, 1977, p. 123).

Alcoholism and Mercury

Inclusion de-victimizes and de-stigmatizes those affected by a disease. A great example is the of-cited link between alcoholism and mercury exposure. Studies have demonstrated that

alcohol has a stronger health and wellbeing impact (including increased risk of depression and other psychosocial factors) on those exposed to mercury compared to individuals who have not been drinking nor have been exposed to mercury (Grum, Kobal, Arnerič, Horvat, Ženko, Džeroski, & Osredkar, 2006, p. 295; Kobal and Grum, 2010, p. 539). In many mining communities, mercury exposure increases adverse psychosocial reactions when high levels of alcohol are consumed.

Usually, communities' flaws are linked to alcohol consumption, not mercury poisoning. They are ultimately denied aid and resources because they are seen as the cause for their ailments. And because symptoms of alcoholism and mercury poisoning share similarities, it is easy to dismiss communities' claims. Today, there is a greater understanding of how the combination of both mercury and alcohol exponentially increases the deterioration of health and wellbeing in people.

Scopoli was concerned by alcohol consumption. He noted its effects on the miners' psychological wellbeing. He estimated that in six years, more than one million litres of wine had been consumed in Idrija (Kobal and Grum, 2010, p. 537). But by including Idrija's miners' daily lives into his research, Scopoli was able to recognize that miners' drinking problems were dependant on specific factors that increased or decreased according to the exposure to mercury poisoning.

If at First You Don't Succeed

After Scopoli's departure, doctors and workers continued to find ways to reduce mercury's toxic impact. While not all treatments and technology proved successful, persistence in finding solutions allowed for incremental improvement. One solution lay in reducing direct contact with the metal. Precautionary measures started being taken more seriously in the late 1800s and early 1900s when doctors understood how vaporized mercury can transfer onto the

skin of the workers and be absorbed through the pores and breathed in (D'Itri and D'Itri, 1977, p. 123). In 1897, a new scheduling was implemented that built on past initiatives. Workers would spend one month tending to the more hazardous tasks, then rotating to less dangerous tasks (D'Itri and D'Itri, 1977, p. 123). By further reducing the workers' contact with the mercury, the number of confirmed cases of mercurialism plummeted from 122 to 5 in a span of approximately ten years (D'Itri and D'Itri, 1977, p. 123). The implementation and development of efficiently filtered masks also made a big difference for the workers' health (Brown, 2002, p. 489).

The continual development throughout the mine's history demonstrates the importance of research. After centuries of trials and errors, the dangers and impact of mercury poisoning had diminished tremendously, although, in the 1970s, an estimate 10 to 14% of miners was still experiencing severe symptoms from the toxin (Brown, 2001, p. 489) and reports still indicated high levels of mercury in the soils, vegetation, and waterways, not only in Idrija but downstream the Idrijca River. A 2007 study looking at the effects of living in polluted sites versus non-polluted sites of Idrija and its nearby regions, and cancer rates from 1961 to 2000 demonstrated that there are still higher rates of cancer incidents in the areas with higher rates of mercury compared to the non-polluted areas. Yet, interestingly, this research also shows that living or not in polluted or non-polluted areas had no impact on the miner's rates of cancer (Zadnik and Pompe-Kirn, 2007, p. 902). This is attributed to better healthcare plans for the workers and the 'healthy workers' effect' (Zadnik and Pompe-Kirn, 2007, p. 902).

Revisiting Stigmatization and Exclusion in Idrija

In Idrija, the miners were not victimized and neither were they excluded. When the miners felt that they were not receiving the resources they wanted, they protested until their most pressing needs were met. This mobilization contributed to changes in mining procedures and

policymaking and the sharing of the community's knowledge and experiences with external agencies, such as the Crown.

This chapter shows that inclusionary and collaborative work between all stakeholders are necessary to develop the right solutions. Without inclusion, the people who are impacted by the anthropogenic contaminants don't have the ability to participate in the remedial procedures. Access to information and resources become more challenging to obtain (Schlosberg and Carruthers, 2010, p. 15).

While researches in Environmental Justice and remedial focus on the resources provided by certain key stakeholders (viz State agencies), there seems to be less focus on the resources and values specific to the community itself. By looking more specifically at the history of Idrija, one can better understand the community's importance in the pursuit of remediation. Working from a ground-up approach gives the community members greater roles in defining remedies and pathways to recovery. Empowerment is the first step toward recovery from large-scale contamination.

However, the question remains: what does a community value bring to the table? By looking further into the history of Idrija, the next chapter will attempt to demonstrate the importance of the community as a stakeholder. Through this, special attention will be directed to the town's underling importance within the remedial process.

Chapter 5. Community Survival

Life After the Mines

Many researchers are interested in knowing how rural communities cope with major ecological disasters. They highlight the importance of social and cultural, rather than simply economic values. "Physical, social, economic, cultural, and environmental benefits for the local community should be taken into account rather than seeking short-term gains" (Hribar and Lozej, 2013, p. 377). Hribar and Lozej conclude that although the essential factor in the growth of a (rural) community is economic potential, it is closely followed by social and cultural potential (Hribar and Lozej, 2013, p. 377). In other words, while the economy is a driving factor for the development of a rural community, the social and cultural heritage has a significant impact on the sustainable development of a (rural) area.

An array of values can be identified throughout Idrija's history. These values reflect more than just the financial and economic dimensions of the region. They express a cultural and social life, which is vital to uphold a community (Hribar and Lozej, 2013, p. 377). Many examples, such as the development of technological advancements, artworks, culinary dishes, and music schools, can be linked to Idrija’s traditional cultural heritage (Hribar and Lozej, 2013, p. 377; Gorjup-Kavĉiĉ, Režun, Eržen, Pelijhan, and Mulec, 2010, p. 138). These heritages give insight as to how Idrija was able to continue thriving after the mines closed.

Idrija's Knowhow

Researches looking at the region have recognized how aspects such as cultural and environmental development, or technological and economic progress, have been central in the advancement of the mining industry and community development (Zorn et al., 2015, p. 132). Idrija's history demonstrates the importance of flexibility, adaptability, and the positive impact of quick responses to a crisis (Zorn et al., 2015, p. 132).

But, conversely, Idrija's resilience is itself linked to the inclusion in the public discussion of virtually all facets that impact its wellbeing. From the cultural to the social, and from the economical to the industrial dimensions of social life, Idrija has been recognized to foster "strong interpersonal relations, a high level of communication, solidarity, a strong identity and tacit knowledge, a sense of belonging, active participation in civil society, and intense face-to-face contacts" (Zorn et al., 2015, p. 132). This has made the inhabitants more "open to the influx of ideas and innovations" brought by people from home and outside (Zorn, et al., 2015, p. 132). This has made the community more resilient and placed it in a better position to overcome contamination without the stigmatization and exclusion that plagued other communities facing dire anthropogenic disasters. This exchange in knowhow not only influenced the community development, but also how education was viewed and played an important role, not just in Idrija, but Europe as well.

Education

Education has played a significant role in the development of Idrija's culture and heritage. The educational system established has been recognized as being part of a crucial role in shaping Idrija through the transference of knowledge and exchange in information (UNESCO, 2011, p. 165). Training and education was not limited to mining; it also focused on science, arts, and vocational training. The support from the locals in the development of the educational

system seen in Idrija has been highlighted in its importance for a successful school system (UNESCO, 2011, p. 165).

Education had been developed early on where the first primary school opened in 1581 with progression to technical metallurgical, chemistry, and mining schools in the late 18th century (Zorn et al., 2015, p. 127). Even to this day, Idrija still holds the oldest lace school in the world. The focus on education and vocational training contributed to Idrija's unity and independence as a community by highlighting the importance of exchange of knowledge and knowhow. Demonstrated through early establishments of schooling systems, they cannot be successful on financial and regulatory grounds alone; local support is detrimental to their success (Zorn et al., 2015, p. 127). Much of the funding for the educational system was provided through the Brotherhood Treasury highlighting the community's perception towards the importance of it. The increase of literacy and recognition of the Slovenian language has been attributed to the shift of political independence from the Church and moving away from communistic ideologies to a more nationalistic one. The influence of the educational system not only reflected the nature of the research hub Idrija created, but also the contribution from the shift of a harsh peasant life to a self-sustaining community.

The historical influences combined with the development of education, exchange in knowhow, and cultural values have lead to a unique heritage in this community. Through a combination of important heritages that have been highlighted, there is a better appreciation to the complexity of not only a community, but a community overcoming an environmental contamination. These heritages reflect important factors associated with community survival which have been observed by many researchers.

Idrija's Heritage

Idrija's heritage can be categorized into three distinctive spheres: technological, social and cultural, and ecological. Although distinct, these spheres constantly overlap and interplay. Idrija's history demonstrates the importance of each of these spheres in its development. But

they also remind us of the necessity to reach a holistic balance between them. By understanding how values and heritages impact a community's survival, we can highlight the power of the community as a stakeholder.

1) Technological Heritage

Technological advancements include machinery, power generators, smelting plants, safety gear, as well as the famous Kley pump (or Kamšt), a water pump constructed in 1790, which is today preserved as the biggest water wheel in Europe (Gorjup-Kavčič et al. , 2010, p. 143). They are beneficial for the mining industry as well as for miners. One the one hand, they were designed to make ore collection and the smelting process more efficient, allowing Idrija to become one of the most productive mines in Europe and a leader in mining production. On the other hand, they also ensured greater safety for the workers and the town's inhabitants.

Moreover, technological advancements were, in many cases, the products of the miners themselves. As the mines grew, so did the "relationship between the miner, his skill and his knowledge and the available implements," leading to an adaptation and development of labour skills and technological advancements to keep up with the changes (Safley, 2018). The autonomy the workers enjoyed meant that they could improve to some extent the mining operations. For example, it was two miners, Josip Čermak and Vincenc Špirek, who designed the new smelting furnaces in 1886, described as being the "peak of smelting technology in Idrija" and a technological marvel. The smelting furnaces were used until 1974 (Gorjup-Kavčič et al., 2010, p. 142). One of those furnaces is still preserved today and embodies "the local knowhow" that had allowed Idrija to become one of the leaders in mercury production at the end of the 19th century (Gorjup-Kavčič et al., 2010, p. 142).

The advancements in technologies accomplished in collaboration with the miners empowered the community. By including miners' knowledge, mining prospered, and so did the

community. The freedom they had to improve the technology they were using in Idrija led to more collective self-awareness.

2) Social and Cultural Heritage

Cultural heritage has been said to "contribute to the quality of life in individual communities" and bring opportunities "to the region's development" (Nared, Erhartič, and Razpotnik Visković, 2013, p. 395). The cultural heritage that developed in Idrija can be seen everywhere. Members of the community continue to celebrate their culture through lace-making festivals, musical schools, mining schools, theatres, and performances, as well as culinary specialties, and museums and tours (Nared et al., 2013, p. 401; Hribar and Lozej, 2013, p. 377). This sense of belonging brings the community closer together and strengthen community ties.

The cultural heritage is reflected in the community's activities and social events. It is embodied in the protection of natural and cultural monuments (Hribar and Lozej, 2013, p. 374). The community is well aware that some of these natural and cultural hallmarks may have tourism potential (Hribar and Lozej, 2013, p. 374).

(Figure 12.Žlikrofi, traditional miner meal.)

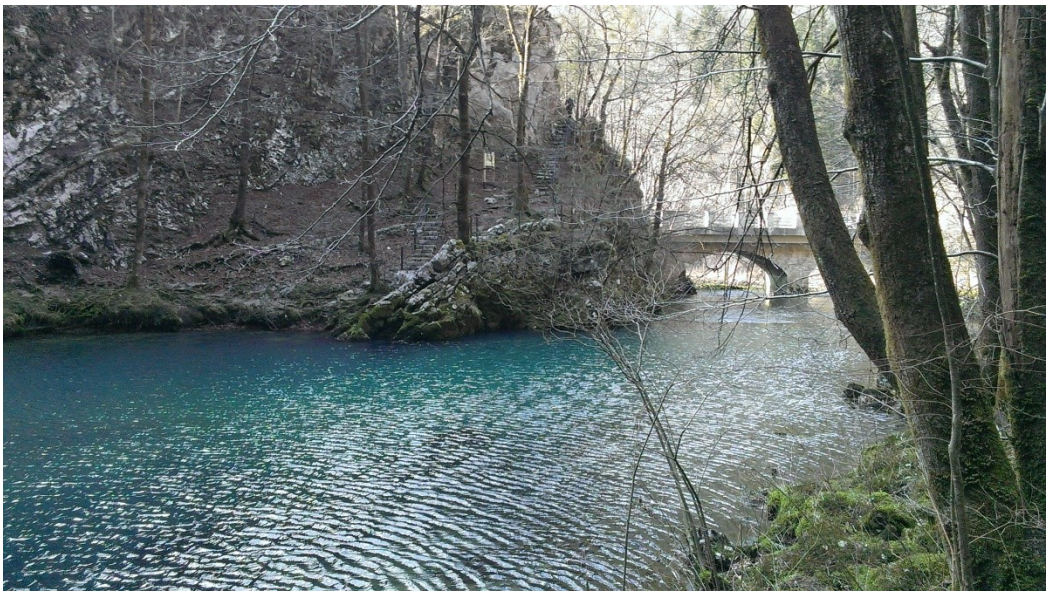
(Figure 13.Traditional lacework, specialty of Idrija.)

3) Ecological Heritage

While, in regard to the survival of a community, technological and cultural heritage have been identified as the second most valuable factors after economic heritage, ecological heritage remains important. Idrija's unique natural heritage has undoubtedly contributed to the development of the town (Šabec, 2014, p. 404). Though the mines are no longer excavated, they have become a natural resource to preserve and maintain. This heritage is protected by the people rather than by any rules or laws. People's attachment illustrates the value the ecological environment represents for the community (Nared et al., 2013, p. 401). This heritage has become a "common project with a clearly defined concept shared by all residents" (Šabec, 2014, p. 406).

(Figure 14. Old *klavže,* or water barriers used for transporting lumber to the mines.)

(Figure 15. One of many Natural Monuments of Idrija's Geopark: Wild Lake. 2015)



(Figure 16. Part of Idrija's Geopark waterways.)

Recognized by UNESCO, the mines are now a public heritage. They have been turned into a museum, open to the public. Visitors can climb down into the tunnels to learn about the mines' history. Beginning from the legend of the discovery of the liquid silver, mining is presented as a catalyst for everything that happened to the town. Without it, it is said, no other heritage would have been possible.

Impacts of Heritage on Community Survival

If a community can demonstrate its power of perseverance and survival through its different heritages and communal values, it is better placed to engage with external stakeholders during an eventual environmental crisis. Idrija's history demonstrates a recovery process through the inclusion of the community's "basic heritage values" (Ifko, 2018, p. 67). It shows how stigma and exclusion may not be inescapable by-products of an area's contamination.

Today, in Idrija, the question is no longer about the dangers caused by the mine. It is about the rich cultural history it has created. This sense of community and cultural heritage has allowed for the town's continued prosperity after the closing of the mines, but we have a sense that it also helped the community progress when the mines were operational. This, unfortunately, is not the case for other communities affected by mercury contamination. We know that without empowerment and inclusion, social recovery from contamination is compromised. People are not in a position to adequately define the resources they need; they are also unable to obtain them.

Risk Communication and Transfer of Knowledge is not Enough

When attempting to tackle contamination, risk communication and transfer of knowledge is not enough. As Hewitt et al.'s book *Participatory Modelling for Resilient Futures* (2017) shows, there needs to be a combination of different goals to target the diverse needs required by

each specific community. In other words, from transference of knowledge, to design and delivery of participatory processes, and the development of participatory modelling tools, one has to recognize the inclusionary multilevel process needed to address mass contamination. The uniqueness of each community means that approaches must be designed for the community by the community.

As the case of Idrija demonstrates, it is not enough to be aware of the dangers of a contaminated resource to reduce its negative health impacts. Reducing populations' contact with toxins must go beyond just risk communication and knowledge transfer (Swain et al., 2007, p. 58). Social constraints, such as financial and educational aid, affect the ability of the community members to change current damaging practices. What is needed, therefore, is a strategic involvement that fosters a change in behaviours without negatively impacting the workers' livelihood and community life.

Revisiting Environmental Justice

Environmental racism began in the 1980s to address the unequal distribution of pollution among racial minorities (Pulido, 2016, p. 1). Environmental justice confronts environmental racism and incorporates all facets of inequality, such as geographical, economic, social, and cultural. Many studies demonstrate that inequality increases the risk of environmental contamination. Inequality and injustice in environmental contaminations based on discrimination towards race, economy, culture, geographical location, to name a few, are still present and continue to affect communities. For example, one research shows that UK contamination rates affect communities of low income at a much higher rate than more affluent communities (Agyeman, 2002, p. 32-33). These discriminations lead to stigmatization of the victims, which excludes them from the recovery and remedial process, which further victimizes them by negating their specific needs, which affects their ability to find resources within their community

out of fear of being labelled as "contaminated" and further stigmatized, thus creating a vicious cycle.

Expanding Social Justice Framework

Because large scale contaminations affect a community as a whole, insisting on individual rights won't suffice to enact change. The broadening of the environmental and racial justice to a more encompassing definition of social justice allows for the incorporation of all of a community's needs (Lord and Hutchison, 2017, p. 50). This new understanding is necessary to begin the healing process.

This, of course, is easier said than done. From accessing medical treatment to accessing valid information, each community has its own needs. Moreover, no community will ever reach a perfect consensus on its values and aspirations (Lord and Hutchison, 2017, p. 56). Yet, by working inclusively and directly with the most members of a contaminated community, one can gain some insight into the specific needs of a community. The alternative would be an othering of contaminated communities (by outsiders) which would only further stigmatization and segregation.

It is important to go beyond access to information and awareness of the contamination. Although access to information initiates the ability to make informed decisions, it is not enough if those impacted are barred from the participatory and model making processes. Ensuring inclusionary approaches within the affected community and all stakeholders involved reduces the risk of stigma and exclusion. It also increases recognition of the importance of collective participation of all stakeholders.

Revisiting Stigma through Idrija's Lens

Because a community's response to an ecological crisis is affected by many factors, it is essential to understand how these factors (perception of risk of the pollutant, access to information, community culture) interplay (Messer, Shriver, and Adams, 2015, p. 316). A community's collective identity is linked to the response to the environmental contaminant: it may elicit activism towards decontamination or draw attention away from the environmental hazard (Messer et al., 2015, p. 317).

If there is no existing stigma associated with the community's collective identity, mobilization is facilitated (Messer et al., 2015, p. 317-318). But if stigma is already strong within a community, it will inevitably impact the recovery process. In their paper *Collective Identity and Memory* (2015), the authors highlight how a community's collective identity can influence their responses to contamination. Either the community can feel excluded from the remedial processes or it will reject outside aid to avoid the risks of being associated with the contaminant and further stigmatized (Messer et al., 2015, p. 317). Stigma also reduces their ability to cope with the contamination by finding mutual support within the community (McGee, 1999, p. 78). In brief, stigma begets exclusion. It affects the community from active participation out of fear of being negatively labelled and targeted, and it also separates it from the other stakeholders involved in the contamination.

Inequalities can be found in all communities (geographical, racial, cultural, social, or economical, to name a few). But it is the stigmatization of the community that appears to present a significant impact on the remedial process after a largescale contamination. Without an acknowledgement of the long-lasting impacts of stigma and its exclusionary consequences on communities, approaches to contaminations will continue to be largely ineffective, costly, and oftentimes counterproductive.

Idrija's Legacy

Though Idrija appears to not have suffered from the mining industry, the reality is that there are still underlying lingering effects from the contamination. In an interview conducted in 2006, Amy Staden talked with Dr. Milena Horvat, a senior researcher at Ljubljana University who has been studying the effects of mercury contamination on the environment. She points out the high levels of mercury still found in the Idrijca river system and how they pose risks to the environment, as well as to human health and wellbeing. Even with the precaution and safety measures in place, people from Idrija continue to experience high rates of cancer, neurological and psychological problems, and other health-related problems (Boffetta, Garcia-Gomez, Pompe-Kirn et al., 1998; Ženko, Džeroski, Kobal, Grum, Arneric, Osredkar & Horvat, 2004). Although studies have not correlated these increased risks in health issues to the residual effects of mining, researchers, including Dr. Horvat, believe there is a very plausible correlation.

Dr. Horvat states that the community puts much glory into its history, which leads to belittle potential risks involved with the lingering contaminant. The glory associated with the mines and their history is reflected in the way people speak of their family's historical connection to the mining industry. Most community members have had a least one family member who worked in the mines. The city's inhabitants like to emphasize what the mining corporation has brought them and contributed to the cultural and social development of the community. The mine, they cheer, "sponsored schools, gymnastics contests, and Slovenia's first theatre. It houses the town's award-winning mining museum and launched the Idrija miners' band, founded in 1665 and is still going strong today" (Standen, 2006).

The community addresses various issues (such as high levels found in the water sediments and local food resources, or the higher rates of certain cancers and diseases) as they arise. The lack of stigma associated with the consequences of contamination creates a safe space in which community members can seek and receive the proper resources. And with the community values highlighted through the different heritages, the legacy of Idrija brings the people together to collaborate for the continual wellbeing of their town.

Idrija's Heritage

Each community has different needs. This diversity should be highlighted when addressing the resources required during a crisis. Understanding a community's needs without fear of exclusion and stigma is crucial. It may involve some simple gestures, such as listening to the villagers of Idrija to know which food meets their dietary and financial needs. But this dialogue is an essential step towards successful remediation. As we have seen in the case of Idrija, the lack of stigma associated with the victims of the contamination allowed for quicker and more effective responses. Including the community in the decontamination process ensures that its unique needs will be met.

Conclusion

The impacts of contaminations are complex. Certainly, they go beyond individual health implications. Although increased awareness of the dangers of the exposure to the toxin initiates the process of decontamination, if no targeted remediation is implemented, the dangers persist. Throughout the history of Idrija, the awareness of the presence of mercury did not bring stigma to the community. The community members were included in the discussion to address contamination. This collaborative approach contributed to the successful continuation of the community after the closing of the mines.

Idrija demonstrates the importance of understanding the multifaceted dimensions of a community during an environmental disaster. The right approach demands to look at every aspect of a community's wellbeing. Special attention must be given to the values of the community. In Idrija, members were continuously included in the development of concrete solutions. And when they weren't, they took action to pressure the authorities. In 1905, for

example, the first Socialist mayor in the Austro-Hungarian Empire was elected in the Slovene mining town. It explains much of Idrija's current pride in its history, despite intense mercury pollution.

Conclusion: Community Resilience

There has been an increase in risks from anthropogenic activities since the industrial revolution. Many regions have been, and continue to be confronted with unexpected rise in the level of contamination. Communities that fare better have fewer inequalities. In particular, those that are not, or less, affected by stigma and exclusion are not as crippled by the long-term impact of mass contamination. They fell more empowered and tend to stand up to the challenges caused by environmental disasters.

As we are reminded by Michael Edelstein' postulate, there is still a belief that contamination is inherently stigmatizing because the community is viewed as spoiled by the toxin. But Idrija demonstrates that this is not always the case. Idrija's history highlights the dangers of mercury contaminations, but also the importance of a community's involvement to overcome these hazards. In Idrija, a proactive process including all stakeholders helped face contamination and distribute resources more effectively. The community was included at every stage, although with varying degrees of openness (one has to remember that Slovenia only became a democracy in 1991, after being ruled by imperial, monarchist, fascist, and communist regimes). This more positive and inclusionary approach contributed to the reduced negative social and health impacts from extensive mining in one of the most naturally contaminated communities in the world.

As we have seen, the impacts of contamination are situational and contextual. Not all cases of large-scale contaminations are faced with the burden of stigma. It is vital to understand each contamination on a case per case basis and recognize the specific factors that influence the long-term outcome of contamination. And to remember that large scale anthropogenic

contaminations will continue to affect the wellbeing of the individuals and communities impacted if not properly addressed.

Idrija illustrates the potential of inclusion to cope with contamination. Its history shows that not all contaminated communities become inherently stigmatized, nor that there cannot be successful remediation. By understanding the potential and successful approaches taken in Idrija through their inclusionary approaches of all stakeholders, there is hope that can be brought to current and future cases of communities affected by anthropogenic contaminations in which there can be remediation and survival of the community. These participatory models not only highlight new means of approaching contamination, but also the heritages of a community. This allows for a paradigm shift of exchanges between stakeholders and moved them away from profit-based exchanges to moral-based exchanges.

In my thesis, I hope to have demonstrated the value of social inclusion to reduce the harmful consequences of contamination by eliminating the effects of stigma through greater transference of knowledge. By utilizing a community that has overcome anthropogenic contamination without long-lasting forms of stigma or exclusion, I have emphasized how stigma deeply affects an impacted community's wellbeing. It is now clear that removing stigma is an essential step to help a community recover from an anthropogenic contamination. By recognising a community’s heritage and knowhow, we can be better positioned to include its members in the remedial process. Without such recognition, the pouring of economic and governmental resources will too often prove completely ineffective.

Research Limitations

My thesis provides a general overview of the history of Idrija in regard to contamination, stigma, empowerment, and remediation. Yet there needs to be further research for a comprehensive understanding of the remedial process after mass contamination. I see two major

limitations to this research. The first is a lack of interviews. The second is a lack of in-depth comparative analysis between Idrija and other similar cases.

Interviews would have brought invaluable insight into the inhabitant's perception of the impacts of mercury in Idrija. Interviews with health officials and locals would have also facilitated a greater understanding of their awareness of the dangers of mercury. These interviews would have contributed to a better understanding of their concerns and fears and their experiences throughout the closing of the mines. Although this paper mainly relies on historical documents, incorporating interviews from both community members and specialists would certainly have helped me understand the community's relation to mercury and mercurialism better.

The lack of in-depth comparative analysis regarding other communities affected by mercury contamination is the other major limitation. Although I insisted on a few cases, including Minamata, Japan, to foster a refined understanding of the history of Idrija, more substantiated comparisons could have drawn a clearer picture of the impacts of stigma and exclusion on the recovery process in the Slovene town. This would have helped me draw more refined conclusions regarding the most effective approaches to remediation. Without having a complete understanding of the differences and similarities between communities, it is difficult to ascertain that some approaches are more effective than others.

Future Research

Further research is necessary to understand the positive value of remediation, prevention, and collaboration in contamination recovery. With the combination of historical analysis of different contaminated sites through a comparative analysis, we can draw a clearer picture of the effective means that are necessary to create an effective remedial response. Only then could we envisage a reduction of the long term social and health consequences of regional contamination.

But by utilizing Idrija as one of the best-case scenarios of large-scale contamination, valuable learning points can help create standards to respond to the challenges created by an ever-growing industrialized world. Although more insight into the long-term effects of contamination and remediation is necessary to draw a clearer picture of the overall impacts of anthropogenic activities on a community's wellbeing, we can already posit that an inclusionary approach with the victims of contamination is necessary to begin an effective remedial process. The necessary steps needed towards recovery go beyond economic inequalities and include fighting against stigma and marginalization and, inversely, foster collective empowerment.

Modern-day Idrija highlights the potentials of recovery which have rarely been addressed in other cases. Its study brings a standard of remediation that has not necessarily been seen in other communities. Idrija was once recognized as one of the most naturally contaminated community in the world. It was so heavily mined it was said to bring despair to anyone living in it. Now, it is recognized as a UNESCO World Heritage site which celebrates its pride in its long history with the liquid silver. Its history eloquently highlights the potentials of a community faced with consequences from heavy mercury contamination and its recovery process. It may bring hope to other communities that are at the present also described as places of despair.

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