
Chapter 7

Taming the Poisonous and the Potent

*Two idiots are sitting together, one is a European “legal king.” He is stupid because he does not know how to use mercury. The other are the Tibetans; we are stupid because we don’t know international law. These two idiots meet together, but in the end two surprises come out. First: Tibetans use mercury in their medicine, that is surprising. Second: Purified mercury is good and is helping many people (Dr. Pema Dorjee [1950–2015]).*³⁶³

The late Dr. Pema Dorjee told me this parable when we spoke about the UNEP mercury ban, a few weeks before the Second International Conference on Tibetan Medicine in Dharamsala in the autumn of 2012. At the time, no one at the Men-Tsee-Khang had heard about the impending UNEP mercury ban, and I carried information sheets in my bag to distribute to interested doctors. Dr. Pema Dorjee was one of them. He recognized the issues at stake and the shortcomings on both sides, but with his decades of clinical experience as a Tibetan physician he was certain that Sowa Rigpa would win in the end.

Mercury was a key theme during the 2012 conference, with 290 participants from twenty-one countries, not because of the UNEP ban but because the preliminary results of the second *tsotel* study would be presented (Sallon 2012). Although these were small studies and not sufficient to prove the safety of mercury in Tibetan medicines, the results were significant to the Men-Tsee-Khang and were given prominent coverage during the conference. Thus, during this conference, three lectures, two of them keynote presentations, dealt with mercury in Ayurveda, Siddha medicine, and Sowa Rigpa. Sara Sallon, a pediatrician trained in the UK with long-term research experience in Israel, announced the preliminary results of the second *tsotel* study. Dr. Jamyang Tashi, the head of the Men-Tsee-Khang Pharmacy Department, presented an overview of the *tsotel* manufacturing process in Tibetan. The final press conference emphasized the results of Sallon’s study, during which it was said:

On *tsotel* or the use of purified mercury in Tibetan medicine: we have used this for centuries, and we believe in its efficacy and will

363 Interview, Dharamsala, September 2, 2012.

continue to use it. At the same time, these days in the West there is some concern about the use of *tsotel* or mercury, and this is at times quite irritating, not only for the staff on this stage [i.e. the Men-Tsee-Khang], but also to His Holiness [the Dalai Lama].

The speaker then requested Sallon to make a statement, summarizing her main points. She said:

About mercury in Tibetan medicine, as I said in my lecture, for the West it is a problem. Mercury is a toxic metal; there is a lot of concern in the West. I can only speak from the point of view of the doctor and researcher. [...] Our question here was not “does it work?” Our question was “is it safe?” [...] From the information we got so far, that detoxified mercury in the form of *tsotel* is a very interesting and seemingly non-toxic preparation to people, because the people we looked at have been taking it for years and have really remarkably little, absent side effects, which is, quite—in a way unexpected, if you think of how much mercury they are taking and how long they have taken it for. [...] In the case of *tsotel*, I think, that this appears to be a safe preparation, but there is more work yet to be done, there are more studies to be done.

During a private audience granted to the conference participants, the Dalai Lama repeated what he has said frequently in public: that he has taken precious pills for the past forty years and that he has never experienced any side effects or mercury poisoning, despite having tested positive for elevated mercury levels. He also called for more collaboration with other Asian medical systems using mercury. The Dalai Lama, known for advocating scientific studies of Tibetan medicine, said, “We have to prove scientifically what Tibetans already know: that these medicines work.” His comments demonstrate the Tibetan confidence in the efficacy and safety of *tsotel* as well as the need for scientific analysis, thus summarizing the dilemmas Tibetan physicians face, such as having the empirical knowledge that their *tsotel*-containing compounds work but being as yet unable to establish their efficacy and safety scientifically.³⁶⁴

So far, this book has followed mercury textually and ethnographically through its sources, histories, ways of knowledge transmission, and taming processes. In Chapter 6 we have seen that toxicity and safety

364 To my knowledge, outside China there have been no scientific studies on the efficacy of *tsotel*-containing precious pills, except the documentation of a few patient case studies taking *tsotel*-containing precious pills as part of a larger Tibetan medical therapeutic regime (Bauer-Wu et al. 2014). The migraine study by Aschoff and Tashigang (1997) used reformulated precious pills without mercury. Elsewhere, I discussed the religious and political efficacy of *tsotel* (2013b) and the rejuvenating aspects attributed to precious pills from textual and ethnographic perspectives (2017a).

are not universal concepts but are culturally and historically created, continuously re-negotiated, and adjusted over time. In this chapter, I look at how the varying concepts of evidence and safety play out on the ground in the different epistemological narratives I encountered in the Dharamsala area to uncover what role science plays in them. How do these narratives link up with the pharmaceutical nexus of *tsotel* production and Tibetan social *chöyön* networks I explored in Chapter 3? How have ideas of mercury as a toxic substance shifted both globally and locally within the geopolitical debates of toxicity? How have Sowa Rigpa institutions in India responded to these debates? In exploring such questions, this chapter also looks at the Tibetan material in a wider context, assessing the potential impact of global mercury regulations on Asian medicines and pointing to related environmental issues that have been of increasing concern to physicians in their quest to make clean and safe medicines.

Regulating multi-compound elixirs

History has shown that questioning the safety of a medicine and implementing drug regulations can lead to the discontinuation of a long-established formula in a relatively short time, which the example of theriac compounds illustrate. While theriac is not a perfect case to parallel *tsotel*, it highlights the impact new safety regulations can have on a traditional medical compound without ever having determined its efficacy. The case of theriac is different from the ample examples of biomedicines that have been taken off the market due to their proven toxicity or lack of safety. In the case of theriac, the stumbling stone was that safety regulators became concerned about interactions between the various ingredients of the multi-compound elixir. The issue was not toxicity, but the unknown nature of multi-compounds. The plasticity of multi-compounds in traditional medicines is still puzzling to the modern pharmaceutical community, who define efficacy in terms of “the single chemical molecule, the ‘active substance,’ responsible for therapeutic activity” (Schwabl and van der Valk 2019, 209). I briefly recall the story of theriac here to draw attention to some key elements that have historically influenced the safety regulations of specific multi-compound elixirs.³⁶⁵

Theriac was the main elixir of the Greek world and became known varyingly as Methrodatium (later Mithridatium), Galene, or Theriac Andromachus. Over time it came to refer to a variety of multi-compounds considered antidotes to poisons (Rankin 2009, 683). Theriac was a category

365 For this brief analysis I rely primarily on John P. Griffin’s article on the history of theriac drug regulations (2004). For further details on theriac in Europe see Watson (1966); in China see Chen (2019), Nappi (2009), and Schafer (1985); in Tibet see Beckwith (1980) and Yoeli-Tlalim (2013).

of multicomponent drugs—largely with anti-poisonous properties. The term *theriac* was also frequently used to name other specific remedies that were considered a *panacea* (2009, 684). In Europe, it was the emergence of new drug regulations in the eighteenth century that for the first time questioned the efficacy and safety of multi-compounds, which ended *theriac* production after almost two millennia (Griffin 2004). While differing in their histories, ingredients, and manufacturing processes, both *tsotel* and *theriac* share a common therapeutic aim as a vitalising multi-compound elixir used to treat poisoning and other severe diseases.

Mithridates VI, the king of Pontus (Anatolia, today's Turkey), first developed an antidote against poisoning in 120 BC, which was named after him: the *panacea* *Mithridatium*. Galen later reformulated a similar *panacea* and called it *Galene*. These *panaceas* contained forty to fifty ingredients, among them viper parts, plants, and bitumen; they took forty days to prepare and twelve years to mature (2004, 318). *Theriac* was considered a *panacea* across Europe and the Mediterranean until the eighteenth century. Many types of *theriac* were traded along the Silk Routes, and the term *theriac* is mentioned in early Tibetan Dunhuang texts as *daryaken* (Yoeli-Tlalim 2013, 56). An early Nyingma tantric text also employs the term *daryaken* in the names of various complex compounds meant largely for the treatment of poisoning (Simioli 2016, 400).

Theriac entered Tang China through Islamic merchants (Nappi 2009, 746), but it did not gain the levels of popularity it did elsewhere. In Chinese pharmacopeia it was mistranslated as pig gall and was not thought of as any better than Chinese formulas (2009, 754). In contemporary China, *theriac*, called *dijiejia*, has become synonymous with opium in pharmacological reference books and occasional government documents on drug policy and is thus considered “a poison, toxic to both body and nation,” designated as an “explicitly ‘foreign’ source of pleasure, danger, and harm” (2009, 762). This example shows that the changing narratives of formulas as they travel across cultures and borders can easily be politicized and erode their popularity.

In twelfth-century Europe, *theriac* was prepared in public ceremonies to ensure its correct manufacturing (Griffin 2004, 318). Its efficacy and safety were not questioned. If its desired results were not achieved, this was attributed to incorrect preparation or storage. “The only cause for therapeutic failure therefore lay with the pharmacist” (2004, 318), not with the formula. *Theriac* disappeared only when the efficacy of multi-compound drugs began to be questioned.

Remarkably, the scrutinizing of the *theriac* elixirs in the eighteenth century formed the basis of modern medicine regulation in Europe. Apothecaries had been inspected since the fifteenth century to ensure some sort of safety of the drugs sold; additional safety regulations were also introduced through publications of obligatory recipe books and pharmacopoeias (2004, 319–320). It took another 300 years of gradual introduction of inspections of manufacturing processes as well as finished products

before the actual efficacy of theriac was questioned. In England, during the early to mid-eighteenth century, the first concerns were voiced about drug interactions within multi-compound elixirs; this eventually led to the exclusion of theriac in pharmacopoeias and its disappearance from the pharmacological realms of Europe (2004, 323). The questioning of its safety in Europe—and, in China, its perceived foreignness and poisonousness—proved instrumental in its disappearance.

The example of theriac—while certainly having a more complex history than depicted here—shows that ideas of safety perceptions are continuously negotiated; they depend as much on transcultural exchanges, the translations and (re-)interpretation of formulas, and their ingredients as they travel across larger political environments and regulatory frameworks. The key message from the case of theriac is that the long-term use of a formula is no guarantee for its continued existence into the future.

The disappearance of theriac offers an illustrative example that can be compared with the current situation of mercurial medicines in Asia. Safety debates have gone global and are fueled by the increasing concern of Western consumers, legislators, and international and state governing bodies that regulate public health. In their judgment of what is considered safe, scientific parameters are employed in various ways—such as to detect mercury atoms in compounds—and often override traditional epistemes that build more on ideas of a synergy of multi-compounds (Schwabl and van der Valk 2019).

The biomedical construction of safety has been central to policy literature of traditional, complementary, and alternative medicine (TM/CAM). Paul Kadetz has called this a process of “colonizing safety” (Kadetz 2014). He critiques the political nature of the World Health Organization (WHO) and the “biomedical hegemony [that] has influenced the construction of safety concerning TM/CAM not only at the global/multilateral level but also at the state level” (Kadetz 2014, 86; 2015). He argues that “the biomedical concerns for the safety of nonbiomedical practices and practitioners have resulted in an intensified focus on the standardized training and regulation of nonbiomedical practices and practitioners in WHO TM/CAM policies” (Kadetz 2014, 84). In India, especially since the official recognition of Sowa Rigpa under AYUSH in 2010, a process of standardizing Sowa Rigpa is currently underway, often at the cost of medical enskilment, especially with regard to *menjor* practice (Pordié and Blaikie 2014).

The concept of safety has been of great concern for the Traditional Medicine Unit of the WHO, which largely focuses on the use of herbs and their good agricultural and manufacturing practices. Kadetz notes that “in the 2002 WHO Strategy for Traditional Medicine, the term *safety* appears seventy-four times” (Kadetz 2014, 84; 2015, 124). Kadetz ethnographically shows that the way these safety concerns are expressed to traditional medical practitioners (in his case, traditional birth attendants in the Philippines) most often do not include an understanding of their emic perspectives of safety.

In the context of Sowa Rigpa, I argue that mercury safety debates are not a one-way initiative to which Tibetan medical practitioners just react. They are part of a larger transcultural exchange between Tibetan medicine and biomedicine that began in Tibet in the early nineteenth century (Yongdan 2016; McKay 2011) and has fueled debates on issues of translation (e.g. Prost 2006b; Gerke 2011), integrated medical practice (e.g. Adams, Dhondup, and Le 2011), and scientific studies on the efficacy of Tibetan medicine (Coelius et al. 2012; Craig 2011; Miller et al. 2009; Reuter, Weißhuhn, and Witt 2013).³⁶⁶ Moreover, as this book has shown, culturally rooted ideas of taming are at the core of how Tibetan physicians understand and articulate the safety of poisonous substances and their complex medical compounds. As we shall see next, they are also embedded in how Tibetans view and use science and how they relate to Western scientists as part of a larger *chöyön* network.

The patronage of science

"We are refugees and do not have power, but we have some values, like our tsotel practice. They should look at what we can offer" (Dr. Tsewang Tamdin, visiting physician to the Fourteenth Dalai Lama, previously director of the Men-Tsee-Khang [2010–2012], Dharamsala).³⁶⁷

Sowa Rigpa practitioners trust their experience that tells them their *tsotel*-containing medicines are safe, but have recently felt compelled to demonstrate this to a critical public; they need "scientific evidence" for the outside world. When the first study on mercury toxicity in Tibetan medicine was carried out in Dharamsala in 2002 (published in Sallon et al. 2006), Tibetan doctors at the Men-Tsee-Khang were keen to show that their medicines were safe. The media in Europe had carried a few reports from Finland and Switzerland in which Tibetan medicines, among them *tsotel*-containing precious pills, showed amounts of Hg above the levels permissible for Europe.³⁶⁸ As explained in Chapter 2, such checks typically do not take into account the various chemical bonds of Hg with other atoms and molecules and their varied toxicity since regulations are based solely on the presence of Hg. Herbert Schwabl (2013, 185) succinctly summarizes the EU regulations for medicinal products: "Since mercury is treated as a contaminant, the discussion of whether mercury sulphide might be considered non-toxic is futile. The concept of contaminants focuses on the atom mercury, irrespective of how it is chemically bonded."

366 Chinese studies are not included here and are beyond the scope of this book.

367 Interview, Men-Tsee-Khang, May 15, 2015. Dr. Tamdin is also the Chief Medical Officer and Chairman of the High Level Medical and Astrological Council and a member of the CCTM.

368 Kloos summarized these media reports (2008, 35–36; 2010, 103).

Accordingly, a Finnish newspaper reported under the headline “The Dalai Lama’s Medicine was Poisonous” that the mercury levels of the confiscated pills (which had been produced by different pharmacies), which were checked by Finnish customs, exceeded European safety norms by a factor of 100,000 (Lundberg 1998 in Kloos 2010, 103). In 2001, Swiss authorities found Tibetan pills with excessively high lead and mercury after a woman who had been taking them for six months suffered from severe anemia. Thirty percent of the pills tested showed high levels of Hg, up to 250 times above the mercury allowance for Switzerland (Kloos 2008, 36). Subsequent media reports³⁶⁹ made the importation of Tibetan medicines to Europe very difficult and contributed to the closure of the Men-Tsee-Khang’s branch clinic in Amsterdam (Kloos 2010, 103). Kloos reports that soon thereafter, all medicines of a private Tibetan medical practitioner in Switzerland were confiscated. These events all brought the issue of the safety of Tibetan medicines to the forefront. The scandals were discussed in Dharamsala and eventually forced the Men-Tsee-Khang to establish new ways to regulate Tibetan medicines in exile (2010, 104).

Despite these reports, Tibetan doctors did not doubt that their medicines were safe. They themselves had not observed unwanted reactions, even when treating patients with *tsotel*-containing precious pills for long periods of time (Chödrak and van Grasdorff 2000, 124–127; Sonam Dolma 2013). However, they also had never measured for toxicity or conducted research on the safety of their medicines that would satisfy skeptical patients and authorities abroad. By the time these reports appeared, the Men-Tsee-Khang had grown into the largest and most profitable sector of the Tibetan government in exile in India (Kloos 2008). This demand for scientific proof put Sowa Rigpa’s reputation at risk. As a result, modern biomedical science and toxicology entered the pharmaceutical nexus of Sowa Rigpa mercury practices as another key player to prove the safety of Tibetan medicines.

In 2005, a clinical researcher at the Men-Tsee-Khang, Dr. Tenzin Namdul, made a point for scientific research:

We can’t authenticate the use of heavy metals in Tibetan Medicine by referring to the ancient medical text or Medicinal [sic] Buddha—or—we can’t make those hardcore scientists understand the way we purify the heavy metals and use them in the medicine by telling them how many patients we’ve cured. We have to adopt the common platform of scientifically analysing the toxicity of such formulation and evaluate its therapeutic effect (Tenzin Namdul 2005).

While welcoming scientific analysis, Tibetan physicians have also been concerned with what would be lost by adapting scientific methodologies.

369 See Tenzin Namdul (2005). About eleven newspapers carried the story across Switzerland. Most of them are listed in Kloos (2010, 103, note 106).

During the Eighth International Congress on Traditional Asian Medicine (ICTAM) in South Korea in 2013, Dr. Jamyang Dolma, a Tibetan physician who was the head of the Research and Development Department at the Men-Tsee-Khang in Dharamsala at the time, explained the dilemma:

We feel Tibetan medicine is very safe. It is based on the *Gyushi* [*Four Treatises*]. We rely on our texts and have no doubt on the formulations. [...] We know the safety and efficacy from using the medicines. Another evidence is our text itself. But today the modern world is challenging us that scientific research is needed: quality and standardization. We do not have many research papers. Our research does not fit modern methodology. It does not fit modern science. If we do that we lose our rich and rare concepts of medicines (Jamyang Dolma 2013).³⁷⁰

Both of the above views were visible on the ground when Tibetan doctors and Western researchers began their collaboration on the *tsotel* toxicity studies, further outlined below. Initially, it was very difficult to find foreign researchers interested in a mercury toxicity study. Dr. Dawa, who was director of the Men-Tsee-Khang at the time of the second *tsotel* toxicity study in 2009, told me about these difficulties:

When these papers came out in the media, we needed some explanation on our detoxification of mercury. [...] A lot of people doubted, because there was no scientific reason. We know that our detoxification is very effective, and we have a long history of purifying mercury, as you know. So we know that after taking these medicines nobody was harmed. It is effective, especially for very serious cases. But we needed some scientific evidence. That's when we started this kind of research. We asked some of the other scientists, but nobody wanted to do this kind of research. The moment we mentioned mercury, they said, "No, no, we cannot do this kind of research. I would like to, but it is not allowed in our country." There were a lot of different reasons like this, and objections. Only Sarah Sallon had very good experience and was very interested in this kind of research.³⁷¹

Both *tsotel* studies were carried out at the Men-Tsee-Khang by Sarah Sallon and a team of Tibetan and Israeli researchers. I am not in a position to evaluate the scientific quality of her two studies.³⁷² Instead, I will focus on how the research team members communicated their different concepts

370 Recorded conference presentation, Sancheong, South Korea, September 11, 2013.

371 Interview, Dharamsala, November 10, 2009.

372 Requests for an interview about the studies during the 2016 conference in Dharamsala were unfortunately declined by Sallon because the results had not been published at the time.

of toxicity to each other, what discussions on toxicity were triggered, and what science was supposed to achieve for the different stakeholders.

I was in Dharamsala during the time Sallon's collaborators, two Israeli biomedical researchers, were living at the Men-Tsee-Khang to conduct the second *tsotel* study in 2009. At the time, I interviewed the Tibetan and Israeli research team with Dr. Dawa's permission. My questions focused on how toxicity concepts were translated between the various medical epistemologies. In the following, I will present two examples referring to both *tsotel* studies that illustrate the different epistemologies of toxicity at play.

Translating epistemologies of toxicity

In 2002, the first pilot study was conducted. It was quite small, with eleven participants: six patients in Group I taking Tibetan precious pills over long periods of time, three in Group II taking Tibetan medicine without mercury compounds as explicit ingredients, and two healthy people in the Control Group III, not taking anything. During the study, blood and urine tests were analyzed for their Hg content. Patients were physically examined for twenty-three non-specific symptoms of mercury toxicity (e.g. metallic taste in the mouth, depression, insomnia, weight loss, etc.) as well as for cardiovascular, neurological, dermatological, and oral symptoms related to mercury poisoning (loose teeth, bleeding gums, etc.; Sallon et al. 2006, 407). Laboratory tests revealed that "mean serum levels for liver and renal function tests were within the normal clinical range and did not differ significantly between groups. [...] Blood mercury levels were not detectable in all groups" (2006, 409). Mean urinary mercury levels for Group I were 67 µg/L; mean urinary mercury levels for Group II were 1.7 µg/L (one sample positive); they were not detectable in Group III (2006, 409). Notably, the mean urinary mercury level of the first group, who took Tibetan precious pills for more than three months, were three times higher than Environmental Protection Agency (EPA) permissible levels.³⁷³ Sallon et al. (2006, 405) concluded: "Prolonged ingestion of mercury containing TTM [traditional Tibetan medicine] is associated with absent blood levels, but relatively high urinary levels. Further studies are needed to evaluate toxicity and therapeutic potential."

This higher urinary mercury level was interpreted differently by the Men-Tsee-Khang Tibetan doctors and the scientists; it provides my first example to illustrate the different interpretations of toxicity at play during the two studies. The reasoning among Tibetan doctors for the higher urinary levels was that mercury was expelled in the urine, therefore not harming the patient. Dr. Dawa Dolma was head of the Research and Development Department at the Men-Tsee-Khang during the first *tsotel* study.

373 The EPA Biological Exposure Index for urinary mercury levels in chronic oral exposure is below twenty micrograms per liter (Sallon et al. 2006, 409).

She wrote a report in Tibetan about the study and was aware of the results showing higher urinary mercury levels.³⁷⁴ When I met her in Dharamsala and mentioned Sallon's study, she explained that "they found all toxins were going out with the urine," but that "this was not poisonous mercury, because it had been purified." She was well aware that from a biomedical perspective, it would be perceived as the "toxic mercury" being expelled, whereas from a Sowa Rigpa perspective there was only "purified, non-toxic mercury" present in the first case. Nevertheless, she interpreted the scientific result positively since it showed that no mercury remained in the body. Note that the chemical bond of the mercury expelled in the urine was not tested during the study.

For Dr. Yahav Dory, one of the leading scientists of the second *tsotel* study in 2009 and a trained medical doctor from Israel, the higher urinary mercury level detected in the first study raised the question of whether there were any therapeutic properties in the purified mercury, since it was largely expelled and any potential therapeutic effects would be due to the other ingredients of the pills.³⁷⁵ This shows a different rationale that was difficult to translate cross-culturally; while for the Tibetan physician mercury in the urine was a sign of safety and an elimination of possible (though purified) toxins, it made the Western scientist question the efficacy of *tsotel*.

I discussed the issue of mercury absorption with the Tibetan physician Dr. Dawa Ridrak, who had published a description of a *tsotel* event (2003, 412–451). While the Sallon study did not measure the percentage of mercury absorbed versus the amount expelled, my question was how, in principle, the mercury contained in *tsotel* could be efficacious when it was hardly absorbed and, if absorbed, expelled in the urine (at least in one case during the first study). He drew two simple and practical parallels linking it to Tibetan ideas of potency or *nüpa*:

When we eat a plate of food, maybe only one spoon is absorbed by the body; the rest comes out as stool. If all that we eat would come into the blood stream, it would be too much. Only the essence can be absorbed. It is like burning an incense stick. If the smoke that comes from the incense fills the entire room, it is very uncomfortable; you only need a little bit. The actual medicine is a very tiny amount, a small dose, but with great *nüpa*.³⁷⁶

Dr. Tenzin Namdul—who was trained at the Men-Tsee-Khang, took part in the first *tsotel* study, and later moved to pursue a doctoral degree in anthropology at Emory University in the US—explained the potency of *tsotel* in terms of it escorting the other ingredients of the medicine that it is added to (*tsotel* is not given singly) to its destination in the body:

374 Personal communication, Dharamsala August 25, 2010.

375 Personal communication, Dharamsala, October 2009.

376 Interview, New York, July 21, 2011.

From a scientific point of view, they say that mercury sulfide is kind of washed out and not absorbed. But we have to look at the primary function of *tsotel*. It is really there to speed up the *nüpa [nus pa myur du btang nas]*. [...] The inherent nature of liquid mercury is blunt and heavy. These main characteristics are completely changed through the purification and it becomes light and smooth, and a binding agent, especially after it is bound with sulfur. With this binding effect we use *tsotel* as a medicine horse or *menta [sman rta]*, a kind of escort, like a vector to reach the part of the body that we want it to reach. We want to target the root cause of cancer and chronic disease, which in our view is the undigested nutritional essence, or *dangma ma zhuwa [dwangs ma ma zhu ba]*.³⁷⁷ *Tsotel* does this very efficiently. It combines with the *dangma ma zhuwa* and then the main ingredients of the medicine get to their destination. The *tsotel* binds the *dangma ma zhuwa*; then the *tsotel* is washed out and does not stick in there. Since it has been purified and its quality has been changed, it is safe. This is how I understand it.³⁷⁸

In 2012, during the Q&A session of the Second International Conference on Tibetan Medicine in Dharamsala, I had the opportunity to ask Sarah Sallon directly why the urine levels in Group I of the first study were so much higher than in the second study, of which she had just presented the preliminary results at the conference. She said:

I can't [answer this question]. Except that the mean urinary level in the first study was based on one or two patients, in the second study it was based on fifty patients. So in the second study our mean level was much more reliable. In the first, the one or two we tested were higher, but in the second [study] the mean level all together was much lower [below EPA permissible levels], and you can only give a really significant level when you have more than two to three patients, otherwise it is kind of meaningless. It was OK to get into the journal, but it did not mean very much because it was such a small sample size. With fifty patients [in the second study] it seems that this is really a whole genuine answer.³⁷⁹

In the second study with 120 participants across three groups, "Hg in blood and urine [...] were well below international safety levels" (Sallon et al. 2017, 330). Scientific consensus requires a body of evidence, and these two studies are not enough to provide scientific proof. Since the Sallon studies

377 *Dangma ma zhuwa* relates to a vast group of diseases in Tibetan medicine where the nutritional essence is not properly produced due to metabolic disruptions in the gut and low digestive heat.

378 Interview, Dharamsala, May 25, 2016.

379 Question and answer session after Sallon's presentation, Dharamsala October 27, 2012.

simply measured the presence of Hg, we do not know exactly which chemical forms of mercury were found in the urine.

We have seen in Chapter 6 why Tibetan physicians consider certain forms of processed mercury safer than others, what exactly determines safety from a Sowa Rigpa point of view, and how this relates to taming. Dr. Yahav Dory explained his perspective on the various processed mercury compounds, which were produced at the Men-Tsee-Khang at the time:

For us in the West, medical perception is different than their perception. For us it is all mercury sulfide. I am interested in what type of mercury it is and what the quantity is. I want to know how much mercury sulfide is in the substance that the patient is exposed to. What is the amount that is ingested? For them it is totally different. *Tsotel* for them is very, very safe. The others [*chokla* and *kardül*] are also safe, but *tsotel* is the safest. For them *tsotel* is the flag of Tibetan medicine. The detoxification of *chokla* is very fast, it has not many stages, but *tsotel* is unique, it is precious. With *tsotel* there is a prolonged process of purification, of detoxification, and therefore it is much, much safer. There is no doubt about it, for them. For me, I just want to know how much mercury sulfide is inside each pill.³⁸⁰

Future studies might want to focus on distinguishing between the chemical compounds of mercury in the blood and urine analyses and pay attention to the different Sowa Rigpa processing methods that were used. In the first *tsotel* study, one out of the four precious pills taken by Group I, Jumar 25, did not contain *tsotel* but *chokla* and perhaps *tsekar*, others contained *kardül*. All were considered to be largely mercury sulfide, of which less than 0.2% is absorbed through the intestinal tract in the cinnabar form. However, tested *tsotel* samples show a particular micromorphology (see Li et al. 2016; Tidwell and Nettles 2019), and their bioavailability might differ from other forms of cinnabar. This requires further detailed studies.

MERCURY'S HALF-LIFE

My second example to illustrate challenges of translating epistemological ideas related to mercury toxicity within the *tsotel* research team refers to the biomedical understanding of mercury's half-life as an exponential loss, referring the amount of time it takes to reduce the existing amount of mercury in the body by 50%.

Mercury is not thought of as having a half-life in Sowa Rigpa. This had to be explained to the Tibetan team members during the second study

380 Interview, Dharamsala, October 14, 2009. Unfortunately, neither the exact amount of mercury sulfide nor the form of mercury sulfide could be tested for each pill in this study.

since it affected the research methodology. Dr. Yahav Dory remembered their team dialogue on half-life as follows:

It was difficult to explain to them what half-life is. What is the meaning of having something in your blood and then having it secreted into the tissues and back into the blood and from the blood to the urine and from there outside of the body? We repeated this idea many times, until they understood. For them if it is toxic, it is toxic and if it's not, then not. If someone was exposed to mercury compounds many months ago it was difficult for them to understand that they might still have some remains of mercury in their urine now.³⁸¹

Mercury's half-life depends on its chemical compound and the body parts it accumulates in. For example, mercury's half-life in tissues is approximately ninety days, and in the blood it is only three days, depending on the type of mercury (Furr 2000, 300–305). Some forms of inorganic mercury can remain in the brain for “several years to several decades” (Rooney 2014, 425). Since the half-life of mercury in the urine is about three months, the research methodology had to be amended. All medications that participants had been taking for the past three months had to be noted down and checked for processed mercury as an ingredient. Dr. Yahav Dory explained:

If a patient was exposed four months ago to a high quantity of *tsotel* or other mercury-containing compounds it will take time until they will excrete it in the urine. So we wanted a period of at least six months for the patient to be free of mercury compounds before they could join Group II. This disqualified a lot of patients, and it was very difficult to explain this to the Tibetans. It was easier to explain this to the younger doctors. In one week they understood why a patient from the control group who was exposed to mercury a few months ago had to be excluded. They understood exactly in my terms what it means to be exposed.³⁸²

Sonam Yangdon was the Research Department secretary at the Men-Tsee-Khang in 2009. One of her main tasks in the second *tsotel* study was to translate for the patients and biomedical doctors during the physical examinations from Tibetan to English and vice versa, which placed her in the midst of transcultural medical communication. She expressed to me that it would be useful if the biomedical researchers would make an effort to understand the Sowa Rigpa way of thinking about mercury toxicity to achieve some form of integration. Sonam Yangdon accommodated Dr. Yahav's biomedical thinking, because she kept a higher goal in mind:

381 Interview, Dharamsala, October 14, 2009.

382 Interview, Dharamsala, October 14, 2009.

I accept that mercury is poisonous, that is very much true. I understood all these questions on half-life. But we don't need to worry about this, because Tibetan medicine has been detoxified. And also, we are doing this to prove that our medicines are not poisonous; we are doing this research to save Tibetan medicine.³⁸³

For the Tibetans at the Men-Tsee-Khang, the two research projects they conducted with Sarah Sallon were meant to save Tibetan medicine from Western toxic scrutiny and global critique, and to improve its standing in public opinion; it was at no point anticipated that it could potentially change the Tibetan ways of processing mercury. The director at the time, Dr. Dawa, made this very clear:

Of course, we have to do some of such kind of research. But the scientific evidence is not going to change our system. We are going to keep our own identity. This is very important.³⁸⁴

THE ROLE OF SCIENCE

These last comments are crucial for our understanding of what science might mean to a traditional medical system that operates within its own parameters and is deeply linked to political and national identities. It is well known that science serves many purposes, for example, colonialism (Prakash 1999), and is strategically used and varyingly translated to further political goals (Cordner 2016). In India, Tibetans have employed science in the discourse on the loss of tradition and the strengthening of Tibetan culture and identity (Kloos 2011, 2015, 2017b).³⁸⁵ The Men-Tsee-Khang's *tsotel* studies exemplify how science has entered the pharmaceutical nexus of Sowa Rigpa mercury practices as another key player, in this case, to prove the safety of precious pills and other processed mercury sulfide-containing medicines.

In the ethnographic examples of the *tsotel* studies from Dharamsala, the role science was expected to play was similar to the role that the patron played in the Tibetan *chöyön* system in supporting *tsotel* events in Tibet's past, as explained in Chapter 3. Accordingly, the patrons (in this case science or the scientists) are expected to support what is worth supporting—Sowa Rigpa—the worthiness of which is perceived to have been established beforehand through long-standing traditions and practice. It

383 Interview, Dharamsala, November 27, 2009.

384 Interview, Dharamsala, November 10, 2009.

385 The use of science for Sowa Rigpa in the PRC is different. Here, science has been central during the introduction of GMP to Tibetan pharmacies (e.g. Craig 2011; Cuomu 2016; Saxer 2013) and the standardization of Sowa Rigpa medical practices. The use of science has not been a one-way transfer. Adams, Dhondup, and Le (2011) analyze ways in which Western science is tibetanized at the Arura Medical Group in Xining; they argue that this is a sign of medical systems being porous and mutually permeating (2011, 109).

is assumed, that having questioned their practice (through science), the conviction in their tradition is even greater. Patrons gain merit by the very fact of giving (Kauffmann 2015). They can also be quite invested in the outcome of what their gifts might affect, but they are not meant to change the long-established tradition. This does not mean that Tibetan physicians at the Men-Tsee-Khang thought the Sallon study was biased. They just had a different assumption of the role that science would play for Sowa Rigpa based on a conviction that science would find out what they already knew.

Many Tibetan physicians I met in India often tended to view Western scientists as patrons whose research is meant to prove what they know from personal experience, that Sowa Rigpa practices are safe and efficacious. The way scientists offer research to Sowa Rigpa is often perceived as an act of charity, which is not meant to change Sowa Rigpa practices as Dr. Dawa and also Dr. Pema Dorjee expressed. Sowa Rigpa practice is so closely linked to Tibetan identity that a change in practice does not come easily. It was largely among the younger generations of Tibetan physicians that I found a more open approach to science and some willingness to question their own traditions.

Overall, based on how I understood Dr. Dawa and others I spoke with, science was meant to serve Tibetan medicine and help strengthen Tibetan identity. This is understandable since Sowa Rigpa suffered a severe blow in the 1950s during the Chinese invasion, which endangered and fundamentally altered its existence in the PRC (Janes 1995, 2001; Hofer 2018). Kloos has shown how Sowa Rigpa in exile consequently had to serve a dual role, “ensuring not only the physical survival of sick Tibetan refugees, but also the cultural survival of the Tibetan nation” (Kloos 2015, 125).

Complementing his analysis, I suggest that Tibetan social customs of giving and taking, such as the *chöyön* support system, are so pervasive (Kauffmann 2015) that they cannot be ignored when analyzing the ways science has entered the field of Sowa Rigpa in India³⁸⁶ (in the PRC, the situation might be quite different). I have shown that this is specifically the case in the context of mercury *tsotel* practices, since these were transmitted through *chöyön* patronage for centuries. I conclude from the data presented here that from a Tibetan perspective it would not be appropriate for science—in the role of a patron (*yön*)—to bring about fundamental changes to Sowa Rigpa practices, which takes the role of the beneficiary (*chö*). That would mean misunderstanding the *chöyön* roles and their responsibilities. After all, the beneficiary is “the donor’s spiritual superior” (Kauffmann 2015, 86). In the case of *tsodru chenmo*, the patron (science) is expected to endorse the beneficiary (Sowa Rigpa) with a labeled stamp of modern science and safety, thus making a beneficial contribution to the preservation of Sowa Rigpa and Tibetan culture. Let us not forget that the

386 See the doctoral thesis by Dylan Lott (2016) on other examples of how representations of Buddhism as scientific have successfully employed *chöyön* dynamics.

value of gift-giving in Tibetan culture is deeply forged by a motivation for beneficial forms of giving (DeVoe 1983). Thus the gift of science would only be valuable if it is given for the benefit of Sowa Rigpa.

Dylan Lott (2016, 144) writes about a similar observation he made at the Men-Tsee-Khang, where any research arrangement with Western scientists raised concerns such as “what will happen if this research ends up discrediting Tibetan medicine. What if this is, in fact, the aim of Western researchers? Then, in partnering, they will have failed their people and the Dalai Lama.”

My observations were that the idea that science could potentially challenge Sowa Rigpa practices did not occur to most physicians at the Men-Tsee-Khang. In the process of establishing the safety of *tsotel*-containing medicines, science was viewed as a potent benefactor for Sowa Rigpa. On public occasions, Sarah Sallon—in the role of the chief patron of the *tsotel* study—was given a prominent position during conferences and press releases. I understand this role in that the underlying assumption was that science can become a patron and protector to validate the safety of *tsotel* and the making of precious pills as an established tradition, but it cannot alter it. That would also not fit Tibetan understandings of taming. Rudra (the demon who was transformed into a protector of Buddhism, see Chapter 2) has no power on his own; once tamed and bound to be a protector, his purpose and role are clearly defined and tightly controlled. Once subdued, he cannot be argumentative. Understanding the nature of this culturally engrained complex relationship might help explain why responses to scientific findings that one would expect to result in a change in established practices were slow to be implemented—if not ignored. Institutional implementations of research projects at the Men-Tsee-Khang are of course a complex issue and each case needs to be contextualized with how authority works within existing decision-making structures, which cannot be analyzed here. My discussion here is limited to the two *tsotel* studies and how they were presented during public events.

During the 2016 conference in Dharamsala, the final results of the second *tsotel* study were presented (Sallon 2016). I noted that most Tibetan physicians I spoke with after the conference could not follow the scientific language of the presentations. No translation into Tibetan was provided for the non-English-speaking doctors. One essential narrative, however, was understood and spread quickly: when I went to a Men-Tsee-Khang clinic a few weeks later, the amchi proudly mentioned that it finally had been proven by Western science that precious pills were safe, which they had known all along. Science had thus fulfilled its role as a patron. I was reminded once again that in the process of dealing with toxicity in a modern context it is not only a question of applying science; it is also a question how it is applied, by whom, and with what intention (Cordner 2016).

The second *tsotel* study has since been published. The “results suggest mercury containing Tibetan Medicine does not have appreciable adverse

effects and may exert a possible beneficial effect on neurocognitive function" (Sallon et al. 2017, 316). The improved neurocognitive function in Group I (patients taking *tsotel*-containing medicines) was received with curiosity by those few Tibetan physicians who had understood Sallon's talk in 2016. One of them told me after the conference that this was a surprising result since *tsotel* is not added to specific pills to improve neurocognitive function but that its main aim is to act as a catalyst to strengthen the potency of the other ingredients in a formula, which is encapsulated in the concept of *menta* (see the quote by Dr. Tenzin Namdul above). As Tidwell and Nettles (2019, 135) succinctly phrase it: "*Tsotel* is used to reduce toxicity and/or heighten potency of various formulas including precious pills, by acting similar to a *menta* or carrier." *Tsotel* is never given as a single substance, only added in very small amounts to specific formulas. Its *nüpa* or potency thus lies in its ability to enhance the *nüpa* of other ingredients.

In the case of the second *tsotel* study, science had not shown what was already established knowledge in Sowa Rigpa, but came up with a new set of ideas. Some Tibetan physicians in private conversation with me questioned whether the reason for the improved neurocognitive function in Group I should rather be understood as caused by the multiple compounded ingredients found in precious pills, and not *tsotel* itself.

The second *tsotel* study at the Men-Tsee-Khang also measured the mean mercury level per precious pill and other processed mercury-containing and herbal Tibetan medicines, revealing considerable variations, thus raising questions of standardization and also possible contamination (Sallon et al. 2017, 323, 331). Unfortunately, the actual chemical compositions of mercury, specifically its bonds with sulfur, which would have provided a clearer picture of the bioavailability of mercury, were not tested in the sample pills (due to lack of funds). How much of the mercury found in the pills was actually bound to sulfur? What was its micromorphology and bioavailability? These remain open questions. Sallon and colleagues broadly concluded:

In the current study, Hg in TM [Tibetan medicine] was taken at doses far below those associated with HgS toxicity, while Hg in blood and urine (the latter detected in only 20% of patients) were well below international safety levels. These results tend to confirm the relatively poor gut absorption of Hg in TM and indicate a pattern of low-grade chronic Hg exposure (Sallon et al. 2017, 330).

The above examples demonstrate the complexity of transculturality in Sowa Rigpa, specifically in the interpretations of scientific concepts relating to the safety and toxicity of mercury and its forms. Scientific results were interpreted across different epistemologies, serving particular purposes. While the *tsotel* research team at the Men-Tsee-Khang followed standard procedure to translate questionnaires into Tibetan during the study, at the conference the scientific results were not translated into Tibetan. While the

Sallon *tsotel* studies so far have based their findings on detecting mercury atoms (Hg) in *tsotel* and precious pills, irrespective of mercury's chemical compounds, one of the ways Tibetans have resisted such hegemonies of scientific knowledge and also potential scientific criticism has been by regarding science in the known role of a patron. This illustrates how the pharmaceutical nexus of Sowa Rigpa mercury practices appears differently to different stakeholders and how varied the concerns are of each group involved in the research of *tsotel*.

Now that *tsodru chenmo* is facing the global debate of environmental mercury toxicity, can global players, such as UNEP, become part of a Tibetan *chöyön* narrative? Can Tibetans utilize global institutional efforts to save Tibetan medicine, the way the Sallon studies were meant to show that *tsotel*-containing medicines are safe? How do Sowa Rigpa practitioners respond with the mercury toxicity debate taking an ecological turn towards global environmentalism and global health?

Contamination and the ecological turn

David Arnold (2016) has shown the complex relationships between India's social life of poisons and environmental governance in the eighteenth and nineteenth centuries. He argues that the "'contaminated city' of the colonial era serves as a precursor and proxy for toxicity in the post-colony" (2016, 176). In terms of air, water, and urban pollution, British colonial politics of toxicity tended to blame low-status communities, especially those already marked by "ritual pollution" (2016, 184). Arnold presents examples of pollution from insecticides, pesticides, DDT, the Bhopal gas leak disaster of 1984, and the more recent arsenic ground water pollution in Bengal to demonstrate how cultural ideas of pollution and poison often blame subaltern communities and—further—how the lack of regulation supports industrial inertia, often silencing the few critical activist voices.

Arnold's "toxic histories" are morphing into current themes of the Anthropocene: environmental pollution and contamination of medicinal raw materials. How will Arnold's ideas of toxic histories play out between those using mercury sulfide in medicines (in Ayurveda, Unani, Siddha, and Sowa Rigpa), those trading elemental mercury with India (e.g. traders at the Khari Baoli market in Old Delhi), and those wanting to protect the environment (e.g. Toxics Link)?

As traditional medical systems across Asia move to take part in global health efforts, so do the movements to control and safeguard such efforts. Mercury practices in Asian medicines have recently been overshadowed by the UNEP mercury ban. In India, among Sowa Rigpa practitioners, there is palpable uncertainty regarding the future of precious pills and other processed mercury sulfide-containing medicines because of the currently undecided policies at the ministry of AYUSH on how to regulate

cinnabar-containing pharmaceutical products once India implements the UNEP mercury ban.

During the years of this study, I observed how the toxic discourse on mercury gradually seeped in and shifted through Sowa Rigpa *menjor* thought and practice. During the Tibetan medical conference in Dharamsala in 2012, when the first *tsotel* study was presented (Sallon 2012), no one at the Men-Tsee-Khang had heard of the approaching UNEP ban on mercury. It has been a gradual process. In 2014, the Men-Tsee-Khang director Tashi Tsering Phuri (2014, 3) publicly expressed concern during a conference in Kathmandu that with the approaching UNEP ban, “there might be a time when we cannot use detoxified mercury in Tibetan medicine.” When we spoke about this in May 2015, he was aware that precious pills might have to be phased out of production. He expressed reluctance to invest in pharmaceutical expansion involving the production of precious pills because of these legal uncertainties. Such legalities, he felt, were beyond the Men-Tsee-Khang’s influence. He was turning instead to safer ways of promoting Sowa Rigpa, avoiding controversial substances by promoting Sowa Rigpa practices linked to wellness, such as *kunyé* massage and medicinal baths,³⁸⁷ as well as herbal supplements and cosmetics.³⁸⁸

When I spoke again with Tashi Tsering Phuri in June 2016, he said that the Men-Tsee-Khang had been approached by Ayurvedic and Siddha medical practitioners to join in protest against the UNEP mercury ban, but he declined, preferring to follow whatever rules would come down from the AYUSH ministry. His attitude was that if it meant not producing the six *tsotel*-containing precious pills and phasing out cinnabar completely, so be it. Not trained in Sowa Rigpa but as an administrator directing a large institution, he had different concerns than the Tibetan physicians, who felt that the absence of *tsotel*-containing precious pills would be a palpable loss of their therapeutic practice not only for themselves but also for humanity. Dr. Tenzin Thaye represented the view many physicians held, when he said:

If they can prove that *tsotel* is poisonous and causes harm in patients we will certainly stop using it. We do not want to poison our patients! But our clinical experience shows that so many patients improve taking these medicines. It would be a real loss for humanity not to have these *tsotel*-containing formulas.³⁸⁹

387 To that end, the new profession of a Sowa Rigpa therapist (involving six months of training) was established in 2015 through the Men-Tsee-Khang to cater to the needs of high-end wellness at the exclusive Vana retreat centers in Dehradun and Delhi (Craig and Gerke 2016).

388 These are sold over the counter and are listed on the Men-Tsee-Khang website (MTK 2017e).

389 Personal communication, McLeod Ganj, December 7, 2014.

Dr. Namgyal Qusar pointed to the example of using *tsotel*-containing medicines to treat strokes: “Actually, the precious pill Rinchen Ratna Sempel is very effective in treating patients with strokes and paralysis. Of course, we have also other herbal formulas, but it would be a shame to lose this medicine.”³⁹⁰ During the Kathmandu workshop in 2011, the senior professor and physician Gen Gojo Wangdu from Lhasa highlighted the benefits of precious pills for cancer patients; he also considered them a contribution to humanity:

Nowadays we have unrecognized and very serious *dréné* [*bras nad*, types of cancer] and *nyenné* [*gnyan nad*, severe infections] on this earth. For these diseases we use medicines that include *tsotel*, such as Rinchen Drangjor, Rinchen Ratna Sempel, or Rinchen Mangjor. If we know the practice of *tsodru chenmo* in the right way, it is like the king of all the medicines; [...] all kinds of disease and disorders can be subdued by it. This is the main power and strength of our Tibetan medicine.

It is difficult to cure *dréné* completely, but for patients who have the serious *dréné*, if they take Tibetan medicine regularly, the pain reduces considerably and they tend to live longer. [...] So in the future, if we can use *tsotel*-containing medicines to treat *dréné* and other serious diseases on this earth, our Tibetan medicine can make a great contribution to humanity.³⁹¹

As of this writing, it is still uncertain whether Tibetan medical practitioners in India will receive any kind of exemption for their precious pills and other cinnabar-containing medicines under the UNEP treaty exemption clause for “products used in traditional or religious practices” (UNEP 2013, 61). As refugees in India with limited rights,³⁹² they do not feel empowered to protest or lobby actively for an exemption like their Ayurvedic colleagues. In this case, being refugees—which in other contexts has been a fruitful tool to attract support (Kauffmann 2015)—limits the perceived potential of political activism. Tibetan physicians I spoke with feel that if Ayurvedic mercury practices are exempted, Sowa Rigpa will automatically also be exempt, since these systems are all registered under AYUSH. Unlike Ayurvedic practitioners, who are lobbying for Ayurveda to be specifically mentioned in the exemption clause of the UNEP treaty (see Chapter 2), for Tibetans it is not so important to have Sowa Rigpa specifically mentioned in the exemption clause of the treaty. They would gladly accept an exemption under the current clause for “traditional or religious practices.”³⁹³

390 Interview, Sidhpur, May 1, 2016.

391 Translated from a video recording of the Sowa Rigpa workshop in Kathmandu dated December 6, 2011, by Tenzin Demey, Dharamsala.

392 Tibetans in India do not hold official refugee status since India did not sign the 1951 Refugee Convention and its 1967 Protocol. Thus, refugee here refers more to an identity than an official status. See Bentz (2012).

393 Dr. Tenzin Thaye, personal communication, McLeod Ganj, May 10, 2015.

With the UNEP treaty, the mercury toxicity debate is also taking a strong ecological turn beyond the human public health and safety debates by pointing to the pollution factor. The focus is not on the toxicity of mercury in medicines (except for the use of thiomersal in vaccines, which has been exempted from the ban). Traditional medical use of mercury is insignificant compared to the environmental pollution caused during mercury's mining and industrial use. In 2016, shortly after the Dharamsala conference, I discussed this with the Tibetan physician Dr. Tsering Thakchoe Drungtso, who was well aware of the UNEP mercury ban at that time. He said:

We are doing some research that says *tsotel* is not toxic; that is one thing, but the question raised by the Minamata Convention, which India signed and if implemented by 2020 will phase out mercury, is different. The issue is not whether our medicine is toxic or not toxic. They say that while we get mercury from the ore, this will pollute the water and air, and that is an important concern. It is not of concern whether our *tsotel* is toxic or not. Mercury is an environmental problem; this is a global concern. There we have to take responsibility. It is not about medicine at all. I think it will be difficult to get an exemption because of the global environment concern. We are not so powerful to lobby this.³⁹⁴

Dr. Tsering Thakchoe Drungtso here points to the limits of “taming” global regulations. While mercury in the pharmacy can be tamed and controlled through Sowa Rigpa skills, taming its toxicity while mining mercury refers to a different skill that goes beyond the taming myths; it becomes a global concern beyond the power of small exile communities.

Furthermore, Asian medical practitioners face an environmental turn in the mercury toxicity debate in terms of contamination. Such environmental and consequently human health concerns emerge in the form of heavy metal and other pollutants that could potentially contaminate raw materials used for making medicines.

Sowa Rigpa physicians consider the cleaning of raw materials as one specific part of *dukdön*. This is also thought of in terms of taming since the harmful parts are considered rough in nature and need to be either removed (such as a bark or seed) or processed (e.g. cooked in other substances or burned to ash), and transformed into smooth characteristics in order to become beneficial.

Studies of Indian and Chinese herbal medicinal products (HMPs) show that they can easily be adulterated and contaminated with all kind of pollutants, including mercury, arsenic, lead, and other heavy metals (Posadzki, Watson, and Ernst 2013; Bolan et al. 2017). International regulatory bodies increasingly address traditional medicine products in terms of regulations and safety (WHO 2013). The WHO specifically gives out guidelines on how

394 Interview, McLeod Ganj, March 25, 2016.

to assess contaminants and residues in raw and finished herbal products (WHO 2007).

For amchi, contamination of *materia medica* through heavy metal pollutants is a new dilemma. Every pharmacy I visited in the Dharamsala area relied on the large wholesale herb markets of Amritsar and/or Delhi to procure a considerable amount of those raw ingredients that could not be collected or bought directly from collectors or suppliers in the Himalayan regions. Except the Men-Tsee-Khang, none of the small-scale pharmacies has a laboratory to check for fungus and bacteria. None of them have facilities for heavy metal testing, which has to be outsourced to specialized laboratories and is expensive.³⁹⁵ Physicians source whatever they can locally, but they have to rely on mass markets for the vast majority of ingredients (see van der Valk 2017, 84–85). They often expressed their helplessness at the increasing invisible pollutants from the environment and their inability to do anything about it. Dr. Namgyal Qusar, who founded the Qusar Tibetan Healing Center near Dharamsala where he makes his own medicines, pointed out the economic dilemma and how addressing issues of environmental pollution might turn Sowa Rigpa into an elite medicine:

Introducing lab tests is a good idea but it would increase the price of the medicines to such an extent that my patients won't be able to afford it. Then, Tibetan medicine would be only for the rich and elite.

Visible contamination is taken very seriously by Tibetan *menjor* specialists. When I visited the private pharmacy of Dr. Kelsang Dhonden, he showed me the bags of myrobalan as they come from the large sellers in Amritsar. "The sellers say this is ready to use and clean," he said. "But this is not at all true. We spent many days cleaning each bag and take out dirt and stones; often ten kilos out of fifty kilos are unusable" (see Fig. 43). This adds to labor and production cost but is done with an ethical attitude to produce clean medicines, understood as an integral part of *menjor* (pre-)processing, an important *choga*, something that has to be done. Dr. Kelsang summarized his attitude:

We do this because we have to save the lives of our patients. We want to produce clean medicines. As a Tibetan doctor and as a Buddhist I have to make good and clean medicines. This is very important. My main target is to serve others and serve Tibetan culture. If my main focus is just business, it is dangerous. Then I will lose my attention to clean the raw material because it costs a lot. If I don't practice compassion here in my pharmacy, making good medicines, I should also not go to pray at the temple. Our texts also talk about the ethical qualities of a physician. I also pray over the medicines

395 Testing one pill for heavy metals in a laboratory in Delhi costs approximately 5,000 Indian rupees (approx. 67 euros in July 2017).



Figure 43: Unusable seeds, stones, and dirt that Dr. Kelsang Dhonden cleaned from a bag of myrobalan fruits bought in Amritsar.

Photo by author (Gerke 2016/CC-BY-SA 4.0).

while preparing them; I pray that they should help the patients. The most important is to make clean medicines, and that takes time.

The invisible contaminants require equipment that remains out of reach for small-scale pharmacies. Sowa Rigpa traditional ways of looking, tasting, and smelling substances cannot detect heavy metal contamination. The Men-Tsee-Khang in Dharamsala has taken steps towards more quality control, and they now test raw materials and finished products for bacteria and fungus. More recently, they have sent samples to Indian laboratories to test for heavy metal contamination, specifically mercury, arsenic, and lead.³⁹⁶

Dr. Namgyal Qusar thought that contamination of raw materials is also a political issue:

This contamination issue should be addressed by AYUSH. If AYUSH could provide laboratory facilities for small-scale pharmacies to test their samples for a reasonable fee, there would be much better chances to improve the quality control among these pharmacies.

396 Dr. Rigzin Sangmo, personal communication, Dharamsala, June 5, 2019.

To date, there have been no combined efforts by private Sowa Rigpa pharmacies to approach AYUSH on this issue. Tibetan physicians in exile are not a united front. They work privately, following their individual lineages. Moreover, the lack of Sowa Rigpa recognition in most countries (except in China, India, Mongolia, and Bhutan) as well as the Tibetans' sense of being refugees (even though they do not hold refugee status in India) and related political disadvantages do not make them feel empowered enough to lobby for such ventures.

The only apex body for Sowa Rigpa in India, the Central Council of Tibetan Medicine (CCTM), was established in 2004 under the Ministry of Health, CTA, to improve and ensure higher standards of medical education and ethics, as well as register Tibetan medical practitioners from various training backgrounds across the vast Himalayan region (Blaikie 2016).³⁹⁷ CCTM has addressed issues of contamination by issuing recommendations for Tibetan pharmacies and registering them after satisfactory inspections, but they do not have the power or finances to support the implementation of their suggestions. The demon of heavy metal contamination of raw materials will be a difficult one to tame.

By emphasizing that the UNEP ban focuses on stopping industrial environmental pollution, Dr. Tsering Thakchoe Drungtso moves monitoring toxicity outside of Sowa Rigpa practices. The toxicity involved in the sourcing of the raw materials (e.g. mercury mining) or contaminating raw ingredients with heavy metals during the phases of growing, harvesting, or transport to the Indian urban markets, are aspects of toxicity that Tibetan physicians have no control over. I left our conversation, thinking that by framing the pollution in this way, practitioners might be tempted to point to "the other" and avoid taking responsibility for potential toxicity and contamination occurring within their own pharmacies.

The Men-Tsee-Khang has been aware of potential contamination from outside sources for a long time and established a quality control committee in 2018 headed by Dr. Tsewang Tamdin. Dr. Tsering Thakchoe Drungtso explained that when they prepared a special batch of medicines for the European market, at that time it was made in a different facility where mercury was not used.³⁹⁸ New Men-Tsee-Khang pharmacy building projects for herbal medicines are under way in Himachal Pradesh and Bangalore, Karnataka. However, at the present, mercury-related pharmacy constructions and renovations are on hold because no one knows how the UNEP ban on mercury, once implemented by India, will affect the production of precious pills and other processed mercury sulfide-containing Tibetan medicines.

397 As of October 2018, 500 medical practitioners registered with the CCTM, 351 under the category of Qualified Medical Practitioners (QMP) and 149 as Registered Qualified Medical Practitioners (RMP), which includes non-institutionally trained practitioners. For a list of these practitioners, see CCTM (2018).

398 Personal communication, McLeod Ganj, March 25, 2016.

I spent many hours discussing issues of mercury toxicity and safety with Dr. Tenzin Thaye, who summed up his suggestion for how scientists could assess mercury's use in Sowa Rigpa. His quote reveals his trust in the potency of science to fulfill its role as the patron of Sowa Rigpa and his own cultural and medical approach to poisonous substances having beneficial potential after being tamed. At the same time, it asks for a transcultural approach to different poison cultures, pointing to the importance of "developing a Sowa Rigpa medical theory-based approach to pharmaceutical research" (see Tidwell and Nettles 2019). Dr. Tenzin Thaye said:

From our point of view, it is not necessary to check the efficacy of *tsotel*. We already know this from our clinical work. It is more important to prove its safety. They [scientists] should not look at it [*tsotel*] as an enemy but as a friend, then go deeper and investigate it. If they think it is poisonous then half of their mind is already closed and they cannot see what is real. I am sure there are many ways to check it. They are shocked by the poison and don't see the benefit. And they will be against it. They should change their view. How to open their mind to take a fresh look?³⁹⁹

399 Personal communication, McLeod Ganj, May 10, 2015.