

## Conclusions

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This book illustrates that tantric ideas of “taming,” or *dülwa*, are at the core of how Tibetan physicians process and refine poisonous or harmful substances into beneficial medicines and understand and articulate their safety and toxicity. I explored why and how mercury, or *ngülchu*, is considered a strong poison when unprocessed and the best elixir when refined into *tsotel* (an organometallic mercury sulfide compound) for use in complex medicines, such as precious pills. The practice of making *tsotel* is known as the Great Mercury Refinement, or *ngülchu tsodru chenmo*, which was introduced to Tibet by Orgyenpa Rinchenpel in the thirteenth century. In order to understand such a long-standing practice, my data combines the translation and analysis of classical and contemporary Tibetan medical texts and interviews with Sowa Rigpa practitioners in India and Nepal. The central argument of this book is that poisons become powerful agents not only in the making of rejuvenating and precious medicines, but also in the purification and control of social relationships (e.g. political patronage) and physical environments (e.g. processing mercury benefitting crop harvests). My findings show that Sowa Rigpa paradigms involved in assessing the inherent safety of liquid mercury and its transformed mercury sulfide compound *tsotel* are based on a direct sensory engagement with mercury as a “rough” substance and a figurative “enemy” that needs to be confronted and tamed but not eradicated, and instead refined into something beneficial—medicine. This book does not address questions of the efficacy of *tsotel*. Essentially, it explores what is at stake when asking questions cross-culturally about mercury’s safety and toxicity.

The following conclusions highlight key findings, draw attention to seminal issues, and suggest topics for further research. I also draw conclusions about *tsodru chenmo* itself and why it has been such an enduring practice in Tibetan societies. What is its potential future, specifically in India, which signed the UNEP mercury ban in 2014 to be implemented by 2020? The material also offers an opportunity to raise questions of relevance beyond the field of Tibetan medicine: what constitutes a poison, culturally, symbolically, as a concept, and in practice? When do science and global regulations of toxic substances become “beneficial,” *men*, and when are they “harmful,” *duk*, for the continuation of traditional practice? Furthermore, how is the expanded pharmaceutical nexus as an analytical tool

relevant for the wider fields of medical and pharmaceutical anthropology? And what does all of this tell us about transculturality?

## Enlarging the pharmaceutical nexus

This book introduced the pharmaceutical nexus (Petryna and Kleinman 2006) as an analytic framework that allows for complex anthropological analysis of how the state, physicians, religious institutions (e.g. Buddhist monasteries, ritual specialists, and their lineage holders), surrounding communities, and so forth, all contribute to the manufacturing of a pharmaceutical compound and perceptions of its safety and potency. It widens our understanding of what constitutes a medicine and how to approach pharmaceuticals anthropologically. My modifications to the pharmaceutical nexus highlight new avenues of historical inquiries and self-reflexivity. Some key findings are reviewed below.

### LONG-STANDING PHARMACEUTICAL PRACTICES

Historical inquiries are specifically relevant when analyzing multi-compounds in Asian medicine that have been in use for a very long time. I approached the *tsotel* practice not only as a contemporary but as a historical phenomenon—even though its documentation is often sketchy and based on few textual sources. Embedding its textual history as an important additional element into the pharmaceutical nexus led to two findings.

First, it was possible to detect the specific *chöyön* social patronage relationships as a recurring pattern of *tsotel* manufacturing over several centuries and thus better understand its current practice in changing exile contexts. Second, by comparing Tibetan *tsotel* manuals of the eighteenth and nineteenth centuries with translated Sanskrit sources on rejuvenating *rasāyana* practices (some of which were translated into Tibetan), it became evident that past transcultural encounters and exchanges between India and Tibet led to fluid translations of notions of place and purity, adding to the gendered interpretations of *tsodru chenmo*. In Tibetan cultural contexts, such text passages have contributed over time to the exclusion of women from making *tsotel* (Chapter 5). It would have been difficult to make sense of the place of women in contemporary *tsotel* practices (which is quite different from Ayurveda) without this textual and historical analysis.

Furthermore, this work provides several examples of how mercury is perceived differently by different stakeholders following different “risk formulas” (Cordner 2015, 2016). These are based on different perceptions of mercury as a poisonous (and potent) substance in various forms. The UNEP mercury ban focuses on reducing risk globally, aiming at the large-scale protection of both the environment and entire populations, which Tibetan physicians I spoke with understand and support. There is no doubt

that from the perspective of the Minamata Convention, a loss of mercurial medicines in Asia would be considered negligible when compared to the global health and environmental benefits of discontinuing the mining and industrial use of forms of mercury with high toxicity.

I showed how multiple and varying narratives and risk formulas are constructed around the use of mercury. In these narratives, the evidence of safety is based on different parameters and metrics. While international legislation bases its risk assessment of mercury as a health hazard on the atomic view (which counts mercury's atoms instead of detecting its bonds), Sowa Rigpa practitioners in India base their evidence of safety on their authoritative texts, their own practical medicine making, or *menjor*, experience while refining and taming mercury, and on their clinical know-how with patients who improve under their treatment with *tsotel*-containing medicines.

The examples reveal that risk formulas vary greatly and might appear unconnected. However, I suggest that the perceived environmental and occupational health risks voiced by international bodies regulating mercury toxicity (e.g. EU laws, the UNEP ban), as well as perceived risks of Tibetan medical authors instructing against women participating in *tsodru chenmo* need to be equally recognized and addressed as valid risk formulas because they impact contemporary medical practices on the ground.

The confidence that Tibetan physicians draw from centuries of accumulated medical experience defines the platform from which they meet current scientific challenges. Together, the chapters illustrate that the atomic view does not offer Tibetan physicians an epistemic framework that would encompass their cultural and *menjor* ideas of taming. A scientific orientation that considers mercury's various bonds, such as the specific type of mercury sulfide as black metacinnabar ( $\beta$ -HgS) in *tsotel*, its bioavailability, as well as the definitions of the various technical terms required to talk across *menjor* and biomedical pharmacology concepts, are just beginning to be worked out among researchers and Tibetan physicians. Such a dialogue should in time contribute to a better scientific and transcultural understanding of what taming mercury in Sowa Rigpa is all about. While these developments are not going to change legislation concerning mercury—which is based on the mercury atom irrespective of how it is chemically bonded—my examples essentially call for more engaged and nuanced analysis of the complex pharmaceutical nexus of poisonous substances used in traditional medicines.

## RETHINKING “BIG PHARMA”

Petryna and Kleinman (2006) argue that when approaching the pharmaceutical nexus as a tool of ethnographic inquiry, micro-ethnographies can inform debates on rethinking “Big Pharma.” This book contributes ethnographic examples from Asian medical traditions to these debates, specifically with regard to issues of safety and toxicity.

Making *tsotel* is closely linked to manufacturing *tsotel*-containing medicines. Today, precious pills are reaching more patients than at any time in the history of Sowa Rigpa. As described in Chapters 3 and 4, *tsodru chenmo* in pre-1959 Tibet was largely a small-scale elite practice, often supported by the state, powerful monasteries, and local rulers. Since the 1990s, precious pills have become a driving force in the development of the Sowa Rigpa pharmaceutical industry, leading to their commodification in the PRC, in India, and abroad via online sales, with rising production numbers, especially in the PRC (Saxer 2013), but also in India, where the Men-Tsee-Khang has been the largest producer of *tsotel* and precious pills. Thus, *tsodru chenmo* constitutes a case in which a traditional drug manufacturing practice that has continued over centuries as a rare event has more recently entered the nexus of “Big Pharma,” specifically in China where the Sowa Rigpa industry largely meets international GMP standards. The mass-manufacture of precious pills raises many concerns, not only on the sustainability of precious substances and related *materia medica* resources, but also on mercury-related environmental pollution and occupational safety.

Chapter 6 gives examples from India of amchi’s experiences with exposure to mercury fumes during processing. Without upgrading manufacturing technologies (fume hoods, mercury vapor protection masks, mercury waste management, etc.), more frequent and large-scale production of *tsotel* is likely to lead to chronic exposure for those processing it, specifically during the steps involving heat and before the trituration of pre-processed mercury with sulfur.

Another point to consider is the increased commodification and over-the-counter (OTC) sales of precious pills, found largely in the PRC but also at certain clinics in India. Financial gain as a main strategy seems to undercut the therapeutic purpose of precious pills as potent medicines. Uninformed consumers who buy OTC precious pills as tonics, supplements, or when self-medicating can easily underestimate their effects and overuse them. Since there is no data on actual precious pill consumption, one of the unforeseen consequences of such OTC practices has been that uninformed scientists base their calculations of potential mercury toxicity on daily precious pill intake as suggested on OTC packages (e.g. Liu, He, Ge, et al. 2018), which does not reflect the much more limited and actual use of precious pills prescribed by qualified physicians.<sup>400</sup> The (un)ethical and political implications of these aspects of “Big Pharma” provide ample research opportunities, specifically in the PRC, where more than 90% of the Sowa Rigpa industry is based (Kloos et al. 2020).

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400 This seems to have been the case in the recent study by Liu, He, Baumann, et al. (2018), who based their calculations on a daily intake of precious pills over long periods of time, which could have easily distorted their findings, but cannot be discussed here in detail.

## SELF-REFLEXIVE PROCESSES

Self-reflexivity on the part of the researcher is a known element in anthropological methodology. Studying cultural approaches to poisons can be challenging, specifically when informants handle substances that we consider toxic in our own poison culture with greater ease. In conclusion, I would like to highlight two points that illustrate how the pharmaceutical nexus of a drug benefits from including elements of self-reflexivity. As van der Geest (2006) points out, researchers need to realize that they themselves are part of the pharmaceutical nexus of the drug under study. My hope is that this work encourages researchers to reflect on where they position themselves in a specific field situation that challenges their own poison culture and critically reflect on how the perceived universality of our own notions of toxicity easily creep into the writing process (including my own). Clearly, definitions of toxicity remain contested variables transculturally. However, that does not mean that self-reflexivity advocates a mere culture-bound view of toxicity. Based on my experience researching and writing this book, it rather created a deeper understanding of mercury in its varying toxic forms and a trans-cultural exchange on its perceived safety within and across different medical epistemologies.

Second, as researchers we need to become aware of where informants place us in the pharmaceutical nexus of the drug under study. In a Sowa Rigpa context, foreign researchers might be expected to conform to the role of a beneficent patron (similar to the scientists in the *tsotel* study in Chapter 7). Some Tibetans might anticipate that this book will show to the world that Tibetans know how to process mercury safely and thus fulfill its role as a patron. As an open-access publication it will enter the global pharmaceutical nexus of Sowa Rigpa, generating new networks, debates, and also critique. Throughout the book my aim has been to give space to medical practitioners' voices and explain their taming practices, concerns, and perceptions of mercury toxicity as much as possible in their own words, while at the same time engaging with the material with an analytic frame reflective of my own toxicity and gender perspectives.

Bridging divergences in toxicity perceptions transculturally has its limitations, but can be addressed through dialogue. Whether ethnographic encounters changed perceptions of mercury toxicity among medical practitioners working with different forms of mercury, I cannot judge. Nevertheless, our conversations made us all think about the issue, which is current, transcultural, provocative, and needs to be addressed for the continuation of Sowa Rigpa medical practice in more regulated and environmentally sensitive ways. I hope that the critical anthropological and textual analyses will not only speak to academics but also benefit those practicing Sowa Rigpa in their creative endeavors to continue their medical practices in a changing world.

## The poison-medicine spectrum

Scholars have begun to address the need for broader frameworks that transcend narrow dichotomies of medicine versus poisons and a limited focus on dose-response dependencies and “side-effects.” In the anthropology of Sowa Rigpa (Craig 2012; van der Valk 2017, 2019) as well as in works by medical historians (e.g. Pieters 2018), authors have emphasized the complex dynamics of (and between) drugs as both medicines and poisons. *Taming the Poisonous* adds several examples from the Tibetan world to the cross-disciplinary scholarship on poisons and antidotes.

First, the taming narrative, addressed below, adds a tantric component to the understanding of poisons as elixirs. It also conflates tantric ideas with the hands-on experience of a visible transformation of silvery mercury into a black mercury sulfide ash on a substance level.

The second example is gender-related. Women—frequently socially condemned as poisoners (Arnold 2016)—in their role as healers have also been linked to the creation of antidotes, as Rankin (2018) shows for early modern Europe. In the case of *tsotel*, the mythological stories from India and Tibet talk about a woman providing the missing substance—menstrual blood representing sulfur—to successfully tame the poisonousness of mercury. Chapter 5 showed that the female substance—sulfur—has equal status to the male—mercury—and is essential in the taming process. However, women embody the ambiguous spaces of having the power of arousing mercury (representing Śiva’s semen), polluting the place, and causing the entire taming process to fail—reasons why women, for the most part, have been barred from making *tsotel*. Evidently, the gender component in the complexity of manufacturing *tsotel* further expands the poison-medicine spectrum of a pharmaceutical drug beyond its dose-dependent purpose as a medicine through this more intricate definition of a risk formula. While the tantric component makes *tsotel* a supreme antidote to poisoning, considering women as harmful components and barring them from processing sites, intensifies both the perceived risks and secrecy surrounding the *tsodru chenmo* practice. We learned that secrecy is already one of its hallmarks, not only because tantric substances are believed to be more potent when kept hidden, but also to ensure its lineage transmissions. The combined effect is that *tsodru chenmo* to this day has remained almost exclusively in the hands of Tibetan male practitioners (with a few exceptions discussed in Chapter 5).

The third example refers to Sowa Rigpa physiology regarding the “digestion” of poisonous substances. Here, the study on *tsotel* asks for a re-assessment of the poison-medicine spectrum in that it shows that it is not only the dose that makes the poison but also the ways it is processed, and how it is “digested.” The way amchi protect themselves while refining mercury also includes strengthening their individual ability to “digest” the

potential poisons they are exposed to through keeping a certain diet and increasing their digestive heat, *méd-rö*.<sup>401</sup>

Fourth, ideas on what comprises a poison, a medicine, or an antidote are also impacted by the cultural usage of substances along the food-medicine spectrum, thus enlarging definitions of potency (Lo et al. 2015; Lo 2019). Chapter 6 showed that skills used in hands-on *men-jor* techniques are often found in daily lives. Here we find parallels between Tibetan culturally-specific ways of preparing food (e.g. churning butter and tea or kneading the Tibetan staple *tsampa*) and mercury processing techniques (kneading mercury in skin bags similar to those used to store *tsampa* and mixing it in metal churns similar to butter churning vessels). Several quotes by Tibetan physicians also reveal that their ways of thinking about making medicines is similar to food processing; staple foods and spices, such as *tsampa* (roasted barley flour), *chang* (fermented barley beer), salt, ginger, and pepper become powerful ingredients in mercury processing and—in the case of ginger, types of pepper, raw meat, and *chang*—even antidotes to poisoning. These ways of doing things with substances are not only characteristic of the small-scale artisan craft of medicine making, but also offer us culturally-specific insights into how daily foods easily blur the boundaries between medicines, food, and antidotes.

Last, as shown in Chapter 7, the Anthropocene brings new challenges of contamination and pollution to traditional practitioners. Here, the Sowa Rigpa poison-medicine spectrum expressed in terms of *duk* and *men* has to be enlarged to include new concepts of contaminants and pollutants, including invisible heavy metals that cannot be assessed by traditional methods of tasting and smelling, but require a laboratory.

Central to the poison-medicine spectrum of the use of mercury in Tibetan medicine is the idea of taming, which requires a separate section for a succinct summary and conclusion.

## The taming narrative

The book's analysis of the taming narrative emphasized that throughout their history, Tibetans have had an ambiguous relationship with demons, which resulted in wide-spread practices of Tibetans ritually taming demons into powerful Buddhist protectors. Handling mercury in Sowa Rigpa has a similar status: amchi fear and recognize its poison (when unprocessed or wrongly handled) and revere its power (in the form of *tsotel*, which enhances the potency of other ingredients in multi-compounds). Overall, the textual examples and ethnographies show that the taming idea is deeply imbedded in tantric understandings of actively engaging with and transforming

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401 In Tibet, monastics would perform specific meditative practices to protect themselves from poisoning during mercury processing (Tawni Tidwell, personal communication, December 2019). I did not hear about this in India.

negativities, *duk*, into something beneficial, *men*. The tantric aspects of this poison-medicine spectrum has clearly impacted Sowa Rigpa's approaches to dealing with substances considered poisonous in unprocessed form. Within that body of thought, which is frequently expressed in the Indic origin myths of poisons in Sowa Rigpa texts, the key paradigm is: the stronger the poison, the more potent its elixir. *Ngülchu*, with its several types of *duk*, presents a challenging case for subjugation.

In conclusion, we can recognize that in Sowa Rigpa the Great Mercury Refinement, *ngülchu tsodru chenmo*, is considered the pinnacle of Tibetan *menjor* skills for a reason: it is a superior achievement of taming. It undoubtedly parallels tantric Buddhist practices of converting fierce demons to the Dharma, "even those hard cases particularly resistant to taming (such as Maheśvara/Rudra)" (Mayer 1998, 275), which refers to the non-Buddhist god Śiva, whose semen represents mercury. Some of the translated myths presented in the book reveal key elements of tantric demon taming—digesting, killing, and resurrecting. For example, in the "myth of the eight sages and the queen of poison" (translated in Chapter 6), the eight serpents died from eating mercury, but their corpses were resurrected into the eight devouring demons, symbolizing the eight minerals able to bind mercury during processing.

We also learned that Orgyenpa's translation of the text titled *The Powerful Lord's [Śiva's] Chülen that, Pacifying all Diseases, Promotes Physical Strength* is non-Buddhist in nature. In Tibetan mercury texts, Śiva appears as Wangchuk, Īśvara, or Shabari, and his female consort Parvatī as "queen," or *tsünmo* (*mtsun mo*), details of which will make for further fascinating textual research.

While we can conclude that the *tsodru chenmo* practice reveals Śaivite elements, we need to ask whether this has any significance today, beyond amchi attributing symbolic and mythical roles to mercury and sulfur as Śiva and Parvatī, symbolizing a transformative encounter when making *tsotel*. Recycling and incorporating ideas from older narratives into revived or new practices has been an integral part of transcultural exchanges in Asia. As such, historical "origins" are often diffuse and ambiguous. As we have seen, Tibetan authors frequently blur tradition, myth, and origin narratives in their historical writing, for their own reasons. My enquiries revealed that questions of history are of little concern to contemporary Tibetan physicians; knowing and following one's lineage is more important. When adding the origin myths of poison to their texts, Tibetan medical authors rather pay homage to Indic taming narratives that metaphorically stand for the conquering of all forces resisting the introduction of Buddhism to Tibet. We might find some parallels here in Robert Mayer's discussion of Vajrayāna Buddhists' responses to their Śaivite influences (Mayer 1998), or in William McGrath's (2017a) analysis of Sowa Rigpa origin narratives, which can be contradictory, but were used at certain points in history to reconcile and establish the Buddhist pedigree of Sowa Rigpa.

The Śaivite character of early tantric mercury texts adds interesting elements to the overall discussion of where to place the *tsodru chenmo* practice in the medico-religious empiricism debate (discussed in Chapter 4). *Ngülchu tsodru chenmo* holds a special place in Sowa Rigpa precisely because it straddles the fine line between divine revelation (by Vajrayoginī to Orgyenpa Rinchenpel), Śaivite tantric ideas, and *menjor* processing instructions passed on through direct seeing transmissions, or *tongwé gyü*.

First, the narrative of Orgyenpa receiving the *tsodru chenmo* practice from Vajrayoginī in the land of Oḍḍiyāna makes it a divine revelation and endorses the practice with a high level of authority, which can only be passed on through recognized lineage holders. Second, while perfectly conceived by an all-knowing mind, it exists in complex fields of *menjor* practice, taught through apprenticeship and hands-on instructions through seeing transmissions. In Chapter 6 we learned how in *menjor* practice, the taming narrative—no matter where it came from—becomes a sensory experience of transforming and changing the properties of substances. Amchi can observe these changes directly with their senses during the many steps of turning metallic liquid mercury into the black mercury sulfide ash *tsotel*. It is through *menjor* practice that these entanglements of a spiritually perfected empiricism merge visibly in the transformation of a poisonous substance into a potent medicine, and begin to make sense.

This is supported by findings that illustrate that empirical observation of mercury's transformation during processing confirms tantric notions of taming on a substance level: Mercury not only turns black during the final step of trituration with sulfur, through processing it also becomes visibly and irrevocably tamed—transforming its mobility and heaviness into stable, unmovable, and light modalities. While there is no doubt that taming is a sign of the tantric nature of *menjor* practice, in the case of mercury processing, taming also becomes an empirical practice, based on artisanal technologies of, for example, trituration or calcination.

Mercury is a special case since it reacts so readily with other substances, devouring them and changing form. It presents an “elective affinity [...] at the interface between chemistry and theology” (White 1996, 5). Therefore, what we would define as “religious” and “medical” elements merge so deeply with each other—like a trituration of mercury with sulfur—that it becomes an artificial enterprise to separate the religious from the medical (the use of the term medico-religious is but an apologetic attempt to label such close interrelationships). That said, the domains of ritual and medical experts and related transmission of specialized skills, while they overlap in certain ways, also remain specialized fields of knowledge. Secrecy and selective knowledge transmission through lineages seem to have been more important to practitioners than distinctions between “religious” and “medical” elements of the practice.

Overall, the key finding that the changes observed during the many steps of transformation of mercury into *tsotel* define the amchi's ideas regarding its toxicity and safety, reassert an empiricism that merges sense-based observations of chemical reagents with familiar Buddhist and tantric ideas of taming, forming a comprehensive, culture-specific *menjor* practice. I therefore suggest that the *tsotel* practice and the notion of taming mercury should be approached within a complex pharmaceutical nexus and a broadened poison-medicine spectrum, beyond a medicine/religion dichotomy, in which Buddhist and tantric ideas are not a domain distinct from medical skills and empirical knowledge but actually inform them.

Further, the pharmaceutical nexus as a method of ethnographic inquiry inspires us to re-think how combined and overlapping aspects of cosmological and medico-religious empiricism constitute the complex manufacture of a drug. Such elements and their historical entanglements need to be taken into account in the assessment of contemporary Asian medical industries (Sowa Rigpa or otherwise). This should especially be considered if such interfaces appear to have impacted similar drug manufacturing events in the past, were passed on through authoritative lineage holders who were both practicing physicians and religious teachers, and are based on toxicity concepts emerging from a specific poison culture of a society at large. *Tsotel* thus makes us rethink not only what constitutes a medical compound, but also how medico-religious aspects—for example, through lineage transmissions—might shape an entire industry (see Kloos et al. 2020; Tidwell, in preparation).

My conclusions here also raise broader questions of what makes a formula endure over time beyond its therapeutic benefits (which would require a separate study). *Tsotel* and the precious pills containing it are more than just pharmaceutical products; they have strong spiritual, medical, economic, and political values. The survival of the *tsotel* practice over eight centuries cannot be ascribed solely to its skillful use of sulfur in binding mercury's toxicity, which transforms it into an almost insoluble black mercury sulfide ash. Its survival is also founded on strictly adhering to what is considered potent in Tibetan terms: an authoritative lineage and the continuous transmission of *menjor* skills (through *wang*, *lung*, *tri*, *men ngak*, and *tongwé gyü*), which tie together medical and Buddhist ways of knowledge transmission (explained in Chapter 4)—all in the pursuit of successfully treating disease. Moreover, such combined skills are based on what is experienced as effective medical practice on the ground, together with a deep appreciation of the cosmological ideas underlining *menjor* practices, such as tantric demon taming. In summary, it is the combination of these varied aspects of *tsotel*'s manufacture, transmission, status, and perceived therapeutic benefits that define its preciousness and potency and have made *tsodru chenmo* such an enduring practice in Tibetan societies, even surviving the Cultural Revolution and adapting to new conditions in exile and in the PRC.

## Patronized practice

The historical explorations in this book showed that during most of the centuries of its existence the knowledge of making *tsotel* was passed on through monastic representatives of Buddhist schools. Initially, transmissions passed through the Kagyü traditions, largely in eastern Tibet, and later, from the seventeenth century onwards also in the Gelukpa school in central Tibet. Essentially, pre-1959 *tsodru chenmo* was a patronized practice, which relied strongly on *chöyön* networks—the priest-patron relationship described in Chapter 3. Since the thirteenth century, these networks have shaped the socio-political and economic contexts of *tsodru chenmo*.

Thus, this book also shows that the process of making *tsotel* creates not only what are believed to be very potent medicines but also more beneficial relationships among the groups of people sponsoring and preparing *tsotel* across history. Here we find a communal partaking in the benefits of a *menjor* practice that reaches out to common people (beyond those few elites of society who in the past were able to actually receive and take a precious pill). In conclusion, I suggest that this is not dissimilar to large Tibetan tantric ritual performances of consecrating “accomplished medicines” known as *mendrup*, such as those described by Cantwell (2015) and Sehnalova (2018). These have a strong communal element and are at the core of pan-Tibetan healing practices ascribing benefits to heal the body, speech, and mind. When seen in this context, *tsodru chenmo* is more than a drug manufacturing process. Since it is believed to directly affect the environment and community in which it is produced, it enlarges our ideas of the varied benefits a drug might carry within a given society beyond its oral consumption.

Textually, there is still a lot to discover. In Chapter 4, I emphasize Carmen Simioli’s (2016) findings of notable parallels between the nine mercury processing techniques mentioned in the *Four Treatises* and a Nyingma *terma* text, which apparently influenced Sowa Rigpa medical thinking from the fourteenth to seventeenth centuries. It would be valuable to explore intertextualities and shared histories of early Nyingma subjugation texts—where the practitioner visualizes himself as a demon tamer and ritually consumes refined mercury—and compare them with the *tsodru chenmo* technique. This, along with comparing the eighteen *samskāras* in Sanskrit alchemical texts with the processing steps in the canonical *tsodru chenmo* texts might generate a deeper understanding of the early medico-religious entanglements and the spiritual nature of the *tsotel* practice.

The Tibetan canonical texts emphasize that mercurial elixirs were meant for those who had achieved spiritual realization, and that “ordinary persons must not consume it” (Simioli 2015, 45). So at some point, certain mercury practices were not necessarily used therapeutically for patients, but aimed at spiritual activities undertaken by those processing and/or consuming it. Beyond the rituals and mantra recitations required to protect the processing place and the event from obstacles, none of the

Men-Tsee-Khang trained physicians I spoke with mentioned specific internal tantric practices to be carried out while making *tsotel*. We have to keep in mind here that individual tantric practices are mostly beyond the reach of the ethnographer, since speaking of them would break the practitioners' religious vows.

Dr. Pasang Yonten Arya, who took part in the first *tsotel* processing in Dharamsala in 1982 and now teaches Sowa Rigpa in Italy, was disappointed that these inner spiritual practices were not practiced or taught when he was a student at the Men-Tsee-Khang. He understands *ngülchu tsodru chenmo*, the Great Mercury Refinement, to mean something very revered and spiritual in nature with a soteriological intent geared towards enlightenment. Pasang Yonten Arya thought that the inner alchemical transformative practices seem to have been lost in the institutionalized settings of making *tsotel*.<sup>402</sup>

This loss is not really surprising considering that today's institutionally trained amchi are not necessarily monastics or lay tantric practitioners. The inner alchemical knowledge of mercury preparations is mentioned in the *Kālacakratāntra* and was also transmitted through Nyingma literature related to *chülen* and *mendrup* practices, but is only described in certain medical manuals. One would have to receive extensive medical and Buddhist training to access both the medical and inner alchemical practices. The late Trogawa Rinpoche, following the Chakpori tradition, still combined medical knowledge with Buddhist Nyingma practices while making *tsotel* in Nee (see Chapter 3) and might have transmitted some of the inner spiritual practices to his close students. Among all the Tibetan physicians presented in this book, only the senior physician Gen Gojo Wangdu from Lhasa hinted at the potential of internal transformation for amchi making *tsotel* (see Chapter 4).

## Science as a patron

Several chapters in this book elaborate on how the power of poisons and their taming reverberate in the ways in which Tibetans in India have viewed and approached science during *tsotel* research studies as part of their larger *chöyön* networks. These dynamics of support from Tibet's past (Chapters 3 and 4) are still applied in the present (Chapter 7) and illustrate how Tibetan medical practitioners translate and negotiate specific ideas of toxicity in different contexts. In conclusion, I point out three trajectories that *chöyön* dynamics have taken in India and Nepal, each affecting Sowa Rigpa in different ways.

First, Kloos' work on Sowa Rigpa and the "humanitarianism from below" (2019), demonstrates how the *chöyön* narrative seems to hold on a global scale, from a Tibetan exile perspective. Here, the "subaltern politics of

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402 Personal communication via Jan van der Valk, July 2017.

compassion" (2019, 4) that marks the development of Sowa Rigpa in exile, is a contemporary form of *chöyön* patronage so to speak, in which Sowa Rigpa becomes worthy of global support while demonstrating its value to humanity. This move is supported by the Fourteenth Dalai Lama, who has frequently noted a "growing global interest in Tibetan medicine" in his talks, underlining the strategic importance of Sowa Rigpa serving Tibetan culture (2019, 3).

Second, in Chapter 3 I presented ethnographic evidence illustrating how the lack of *chöyön* support in more recent times has contributed to the inability among the institutionally trained amchi in India and Nepal to make their own *tsotel*. Those amchi able to make *tsotel* had received personal lineage training and support. We can see that in the long run, the lack of training and support for amchi (beyond their institutional degree) to independently make their own medicines (including *tsotel*) will impact the continuation of Sowa Rigpa in exile, probably leading to further divisions between pharmacy and clinical practice, sidelining small-scale cottage industries.

Third, I assumed that financial independence of medical institutions in exile implied that *chöyön* networks were no longer required to make *tsotel*. Ethnographic examples in Chapters 3 and 7 reveal that while the increasing economic independence of the Men-Tsee-Khang in India has led to independent production of larger amounts of *tsotel*, it clearly did not translate into the abandonment of *chöyön* patterns when working with scientists investigating *tsotel*'s safety. Chapter 7 presents examples where the *chöyön* structure enabled Tibetan physicians to resist scientific hegemony and also potential criticism by regarding science in the known role of a patron who generates support that is supposed to be beneficial for Sowa Rigpa. Such forms of resistance should be highlighted during transcultural research on Sowa Rigpa because they directly impact efforts of integrating biomedical and traditional research approaches.

In conclusion, the shifting *chöyön* dynamics of *tsodru chenmo* in exile should make us question simplistic ways of thinking about how biomedical science can be applied to test traditional medical practices. As is characteristic for transcultural exchanges, interactions might intensify existing paradigms on all sides—such as scientists looking at *tsotel* basically as mercury sulfide or Tibetans expecting science to take the role of a benefactor (to prove what they have known all along). One of this book's objectives has been to highlight how knowledge of mercury toxicity is produced, exchanged, appropriated, and resisted in such encounters. The ways Tibetans have employed *chöyön* dynamics in exile is an example of transculturality (when seen as a form of cultural translation and medical knowledge production), in which long-standing, established social relationships and ideas of patronage are (re)enacted on new contemporary platforms with diverse players (including biomedical scientists).

## The demons of the Anthropocene and the limits of taming

Now that new “demons” have appeared at Sowa Rigpa’s doorstep, the long-standing *tsodru chenmo* practice is under threat. One demon is the “toxic discourse” (Buell 1998) itself, which made a strong global appearance through the UNEP mercury ban. The second is the environmental turn in the Anthropocene, with a growing awareness and concern for how raw medicinal materials are increasingly contaminated with pollutants, including heavy metals, as well as the increased scientific ability to detect, measure, and regulate such contaminants. In these global regulatory contexts, can science still be tamed and made into a protector of Sowa Rigpa practice? What is the future of *tsotel*?

Implementations of the Minamata Convention will most probably affect the Sowa Rigpa pharmaceutical industry wherever *tsotel* is made (currently only in India and Tibetan areas of the PRC; not in Bhutan, Nepal, or Mongolia).

In India, especially since its recognition under AYUSH in 2010, Sowa Rigpa has become a part of the often subaltern, plural Indian medical landscape, which is still dominated by biomedically oriented policies, but challenged by neo-traditional medical systems and a large Ayurvedic pharmaceutical industry (Bode 2018; Hardiman and Mukharji 2012). If the Indian government moves forward with phasing out mercury without exemptions, Sowa Rigpa medical institutions will have to adapt to new regulations. The sales sheets of precious pills will probably not change considerably if they are made without *tsotel*. However, many physicians I interviewed perceive that not being able to use *tsotel* in their medicines would be a tremendous loss, particularly for their patients, and for Tibetan culture and humanity as a whole.

China signed the UNEP mercury ban in 2013, agreeing to implement it by 2020, with a ban on mercury mining by 2032 (Xu and Stanway 2017). Recent studies written in support of the implementation of the Minamata Convention in China (Liu, Du, et al. 2018, 126) link methylmercury release from municipal sewage into the environment in Tibet to the consumption of precious pills by Tibetans (Liu, He, Baumann, et al. 2018, and Liu, He, Ge, et al. 2018). These studies are creating a stir among Tibetan medical practitioners in both India and Tibetan areas of the PRC as this manuscript is readied for press. These studies raise many questions—including on the politics of toxicity—that still require nuanced and critical assessments.

We learned that what is considered toxic in a given society is influenced by power structures involved in the interpretation of “risk formulas” (Cordner 2016). This translates into certain toxicity paradigms and ultimately into governmental legislation, which pragmatically, and for understandable reasons, advocate biomedical concepts of toxicity and safety. To only detect mercury atoms in compounds is unfortunately inappropriate for the evaluation of the toxicity and bioavailability of complex multi-compounds, such as *tsotel*-containing precious pills. Rigorously applying

such metrics to regulate Asian medicines would result in the discontinuance of mercury practices across Asian medical systems, including those in India registered under AYUSH.

Ayurvedic practitioners have lobbied for an exemption for Ayurveda under the UNEP mercury ban. My discussions on how Tibetans in India have not felt empowered to join them as a minority group living in exile illustrate that issues of identity, exile, and citizenship affect the ways in which marginalized groups respond to state regulation of their medical practices. For Tibetans in India, the state—which had been a powerful *chöyön* supporter of *tsotel* practices back in Tibet—has not (as yet) provided such support in India. Overall, this lack of state support has contributed to the Sowa Rigpa industry's slower development in India when compared to China, which generates 97.5% of the worldwide Sowa Rigpa industry sales value (Kloos et al. 2020).

Thus, this book also offers an example of how a medical practice that moves across borders and nations might become vulnerable due to different governmental controls. In sum, the transcultural nature of mercury toxicity is both complex and messy, and not to be reconciled or understood by any single line of argument. The stakes are very high for *tsodru chenmo* and other Asian mercury practices. The global debates and increased regulations could lead to various outcomes (singly and in combination): the end of a long-standing pharmacological practice (not dissimilar to theriac, which was phased out after 1,000 years of popular use due to drug regulations, Chapter 7); its fundamental reforms (making precious pills without *tsotel*, or applying occupational and environmental safety measures when using mercury); its continued existence in the gray zones of global regulations, such as in the PRC; or in more official AYUSH exemption zones that currently promote Ayurvedic practices as “national medicine” (Khalikova 2018).

Maybe we can better understand the Tibetan dilemma with a metaphor of poison and potency that emerges from all the data presented here. If science could validate what Tibetans have held to be true and safe for a long time—that mercury can be tamed into potent elixirs and beneficial medicines—science would fulfill its potential in the role of a patron. If scientific tests detect Hg beyond permissible levels in Sowa Rigpa pharmacies and medicines, the results might turn toxic in terms of the discontinuation of their mercury practices.

In India, a continuation of practices might be possible with a governmental exemption from the UNEP mercury ban under “products used in traditional or religious practices.” This might necessitate pharmacies to conform to requirements of quality control, environmental protection, and standardization, all of which require financial investment (separate production units for herbal and metallic medicines, fume hoods, mercury fume masks, regular laboratory testing for heavy metals, and so forth). Here, science could be beneficial for Sowa Rigpa by making heavy metal testing facilities available and affordable for small-scale pharmacies through

## CONCLUSIONS

AYUSH government support. Implementing effective technologies that contain mercury fumes, and adopting international standards for mercury waste management when processing mercury, would reduce occupational risks and protect workers and the environment. It will be the new generation of Sowa Rigpa experts who will find ways to modify their practices in this direction and into what Dr. Rigzin Sangmo called “modernized traditional Tibetan medicine” (Chapter 6).

The ways in which India will implement the UNEP mercury ban will show who is taming whom and to what extent. For the Tibetan physicians I met, biomedical scientific paradigms are potential poisons in themselves, but they are also potent. It all depends on how they can be tamed and turned into protectors for the benefit and continuation of their trusted medical practices.