TAMING THE POISONOUS

Mercury, Toxicity, and Safety in Tibetan Medical Practice

Barbara Gerke

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UNIVERSITY PUBLISHING

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Heidelberg Studies on Transculturality – 7

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Bibliographic information published by the Deutsche Nationalbibliothek
The Deutsche Nationalbibliothek lists this publication in the Deutsche Nationalbibliografie. Detailed bibliographic data are available on the Internet at http://dnb.dnb.de.

Published by Heidelberg University Publishing (heiUP)
Heidelberg 2021.

The electronic, open access version of this work is permanently available on Heidelberg University Publishing's website: https://heiup.uni-heidelberg.de.
urn: urn:nbn:de:bsz:16-heiup-book-746-2
doi: https://doi.org/10.17885/heiup.746

Cover image: A piece of artificial cinnabar, Dehradun, 2013 (© Thomas K. Shor).

ISSN 2365-7987 (Print)
ISSN 2365-7995 (eISSN)

ISBN 978-3-96822-043-7 (Softcover)
ISBN 978-3-96822-042-0 (Hardcover)
ISBN 978-3-96822-041-3 (PDF)

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A Note on Tibetan and Sanskrit Terms

In this book, Tibetan terms are introduced with a phonetic transcription (if used more than once), followed by the transliteration in Wylie (1959) according to "THL's Extended Wylie Transliteration Scheme" (Chandler et al. 2004) at first use. Thereafter, only the phoneticized term is used. The phonetic transcription follows the "THL Simplified Phonetic Transcription of Standard Tibetan" by David Germano and Nicolas Tournadre (2003) as closely as possible. However, the phonetic transcription for proper Tibetan names, which have previously been published in secondary literature, does not follow THL. Thus: Lobsang not Lozang, Tenzin Chödrak, not Tendzin Chödrak, Tashi Tenzin, and not Trashi Tendzin, Ngawang and not Ngakwang (and in Ladakh: Nawang). The names of contemporary physicians are transcribed according to their own usage, for example: Tenzin Thaye, Tashi Tsering. Phonetics of previously published place names also do not follow the THL system, for example: Powo Tramo, not Pobo Tramok (Spo bo kra mog); Kyirong, not Kyidrong (Skyid grong); Phagri, not Pakri (Phag ri). Tibetan names, places, names of formulas, and general terms that occur more than once are listed alphabetically with their Wylie transliterations and explanations in the glossaries. Well-known Tibetan terms, such as lama or amchi, are used in their anglicized forms, without a plural -s. Sanskrit terms are transliterated following the "International Alphabet of Sanskrit Transliteration" (IAST) scheme (Wikipedia 2019). All Sanskrit terms are explained in the glossary.

Translations from the Tibetan are my own unless otherwise indicated.

Published in: Gerke, Barbara, 2021. *Taming the Poisonous. Mercury, Toxicity, and Safety in Tibetan Medical Practice.* Heidelberg Studies on Transculturality 7. Heidelberg: Heidelberg University Publishing. DOI: https://doi.org/10.17885/heiup.746

List of Abbreviations

AYUSH	The Indian ministry of Ayurveda, Yoga and Naturopathy, Unani, Siddha, Sowa Rigpa, and Homoeopathy
BHU	Banaras Hindu University
BMTK	Bod rang skyong ljongs sman rtsis khang (Mentsikhang of the Tibet Autonomous Region)
BSRMS	Bachelor of Sowa Rigpa Medicine and Surgery, previously BTMS (Bachelor of Tibetan Medicine and Surgery)
CCTM	Central Council of Tibetan Medicine
CIBS	Central Institute of Buddhist Studies
CIHTS	Central Institute of Higher Tibetan Studies, previously CUTS (Central University of Tibetan Studies)
CTA	Central Tibetan Administration
CTMI	Chagpori Tibetan Medical Institute
DFG	German Research Foundation (Deutsche Forschungsgemeinschaft)
EDX	energy-dispersive x-ray analysis (detects the elements in a substance)
EPA	Environmental Protection Agency
EU	European Union
FWF	Austrian Science Fund, Wissenschaftsfonds (Fonds zur Förderung der wissenschaftlichen Forschung)
GMP	Good Manufacturing Practice
Hg	elemental (metallic) mercury
HgS	mercury sulfide
HMPs	herbal medicinal products
IISD	International Institute for Sustainable Development
LTWA	Library of Tibetan Works and Archives
MTK	"Medicine-Astrology-House," spelled Men-Tsee-Khang when referring to the Tibetan medical institute in Dharamsala and Mentsikhang for Lhasa
NGO	non-governmental organization
OTC	over-the-counter
PRC	People's Republic of China
SARS	severe acute respiratory syndrome, a viral disease of the respiratory tract
STEDT	The Sino-Tibetan Etymological Dictionary and Thesaurus
TAR	Tibet Autonomous Region
TCM	Traditional Chinese Medicine
THL	The Tibetan & Himalayan Library
TMAI	Tibetan Medical and Astrological Institute (now Men-Tsee-Khang)
TM / CAM	traditional, complementary, and alternative medicine

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TMPs	traditional medicine products
TNN	Times News Network
TTM	traditional Tibetan medicine
UNEP	United Nations Environment Programme
US	United States
WHO	World Health Organization

List of Illustrations

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Acknowledgements

While writing is a solitary affair, creating a book rarely is. For this long-term project, which stretched over three research grants, thanking everyone involved is one of the more pleasant activities of the last stage of getting the book to press, revisiting the various stages, faces, exchanges, and travels with a deep sense of gratitude.

I begin by gratefully acknowledging the grants that made the research and writing of this book possible in the first place. The Deutsche Forschungsgesellschaft (DFG) funded the main bulk of the research through an "Eigene Stelle" (2011–2015, project GE 2235/1-2) at the Institute for Asian and African Studies at Humboldt University, Berlin. The Austrian Science Fund (FWF) supported me during a Lise-Meitner senior post doc project on Tibetan precious pills (2015–2018, project M1870) and my current FWF-project on potent substances in Tibetan medical and Buddhist ritual practices (2018–2022, project 30804) at the Department of South Asian, Tibetan, and Buddhist Studies, University of Vienna. Throughout these projects, I developed new ideas and publications, broadened the scope of the book, and completed the research and writing of the chapters. I thank Prof. Dr. Toni Huber in Berlin and Prof. Dr. Klaus-Dieter Mathes in Vienna for their institutional support and guidance. Additionally, a generous fellowship by the Centro Incontri Umani, in the summer of 2015, allowed for quiet writing time and feedback from fellows-in-residence in Ascona, Switzerland.

While my training is mainly in medical and social anthropology, this book demanded an interdisciplinary approach, venturing into the history of the use of mercury in India and Tibet as well as understanding its modern chemistry and governmental regulations. In this I benefited greatly from talks with Michael Widhalm (Institute of Organic Chemistry, University of Vienna), Alexandra and Herbert Schwabl (PADMA AG, Switzerland), the biological chemist Anthony Butler (University of St. Andrews), the chemist Shiam Sharma in India, and historian of science Daniel Trambaiolo (University of Hong Kong) . Trambaiolo read and commented on a full book draft and answered many questions along the way.

For the history sections I am indebted to Tashi Tsering Josayma, director of the Amnye Machen Institute, Dharamsala, India. I benefitted greatly from his having collated and published the *Collected Works on Mercury Formulations* in 1986 (see Appendix D). He liberally shared his expertise, time, and textual resources on the history of *tsotel* over many visits to Dharamsala.

This book would not exist without the many Tibetan physicians who generously shared their personal views, memoirs, experience, and knowledge over the years. For their voices to emerge from this book matters

most, and I dedicate this book to them and the lineage holders of their medical traditions.

In Dharamsala, I am very grateful to the Men-Tsee-Khang (MTK) director Tashi Tsering Phuri, for several discussions on mercury, his kind permission to provide old photographs of the 1982 *tsotel* event from the MTK archive, access to the MTK library (thanks to the always helpful librarian Migmar), and to grant follow-up interviews with Tibetan physicians. I am also thankful to Dr. Dawa, who was MTK director in 2009 when the second *tsotel* study took place, for his permission to interview the research team, whom I also thank for their cooperation. Special thanks go to the lead researcher of the *tsotel* studies, Sarah Sallon.

I thank all the MTK-trained physicians, who since my early visits to Dharamsala in 2008, have been supportive of my research in so many ways. I am specifically grateful to (the late) Pema Dorjee, Dawa Dolma, Tenzin Thaye, Tsewang Tamdin, Pasang Yonten Arya, Jamyang Tashi, Choelothar, Penpa Tsering, Sonam Dolma, Epa Sonam Rinchen, Namgyal Qusar, Tsering Thakchoe Drungtso, Ngawang Soepa, Yeshe Gelek, Tokmey Paljor, Tsering Norbu, Rigzin Sangmo, Tenzin Lhundup, Wangdue, Jamyang Dolma, Pempa, Tenzin Namdul, Kelsang Dhonden, Namdul Lhamo, Choying Pema Dorjee, and all the other amchi who might not appear by name in this book (but in my other related publications) and whose informal conversations inspired my research throughout. Special thanks go to Tenzin Thaye and Penpa Tsering for reading and offering corrections to several draft sections, and to Kelsang Dhonden for showing me the processing of roasted cinnabar at his private pharmacy. Some of the MTK-trained Tibetan physicians have settled in New York, where I went to interview Namgyal Tsering and Dawa Ridrak; I thank them for sharing their time and answering my questions. I also thank Kunchog Tseten of Amdo for discussions, and Namgyal Lhamo Taklha for her email conversation.

In Sarnath, at the Central Institute of Higher Tibetan Studies, previously CUTS (Central University of Tibetan Studies), I am very grateful to Gen Rinpoche Rakdo Lobsang Tenzin, Dorje Damdul, and Zamyou Penpa Tsering and their students for interviews and interesting discussions. Gen Rinpoche and Zamyou Penpa Tsering were always open to answer my follow-up questions by email and reading and correcting draft sections.

I also thank the amchi trained by Sampel Norbu Trogawa Rinpoche (1932–2005) at the Chagpori Tibetan Medical Institute (CTMI) in Darjeeling, especially the CTMI director Teinlay Palsang Trogawa, as well as Sherab Tenzin and Ngawang Thinle, whom I interviewed in Kathmandu. In Nepal, I also thank all the amchi who attended the one-week Sowa Rigpa workshop in Kathmandu in December 2011 (and my organizing colleagues Calum Blaikie, Sienna Craig, and Theresia Hofer). Discussing mercury was high on the agenda, and I am especially grateful to Gen Gojo Wangdu from Lhasa, Tsultrim Gyatso, Amchi Nyima Sampel and the students of the Bonpo medical school in Dhorpatan, Kathmandu, as well as the other amchi from Tibet, Mustang, Dolpo, and Ladakh. I thank Amchi Wangchuk

Lama in Kathmandu for additional conversations and Katharina Ortner and Jan van der Valk for following up on my earlier interviews with him.

In Dharamsala, I researched the history of family lineage traditions of mercury practices. I am grateful to the late Dr. Yeshi Dhonden, Chöphel Kalsang, Lobsang Tenzin, and Kelsang Dhonden, as well as the family and physicians of Ama Lobsang Dolma's Khangkar clinic in McLeod Ganj (especially Norbu Chöpel, Pasang Gyelmo Khangkar, and her husband Tenzin Dargyas). Amchi Tashi Yangpel Tashigang in Delhi and Amchi Lama Rigzin and Amchi Nawang in Nee, Ladakh, were greatly helpful in reconstructing some of the historical *tsotel* events.

Tibetan medical texts have numerous technical terms and pose continuous translation challenges. I thank Shedup Tenzin (Dept. of Indo-Tibetan Studies, Visva-Bharati University, Santiniketan) for his help, the translator Tenzin Demey in Dharamsala for translating sections from the video recording of the Kathmandu workshop and assistance with complicated text passages, and Tenzin Choezom Khortsa in Kathmandu and Katrin Jäger in Kassel, Germany, for translations and editorial support.

Ayurvedic practitioners opened my eyes to the practical aspects of distilling mercury from cinnabar rock. Vaidya Balendu Prakash in Dehradun was exceptional with his hospitality and openness to share his mercury processing techniques. I am also very grateful to Anand Chaudhary, head of the Department of Ayurvedic Pharmaceutics (Rasa Shastra & Bhaishajya Kalpana) at Banaras Hindu University (BHU), and his colleagues and students for inspiring discussions. I also thank Dagmar Wujastyk for stimulating talks on Indian alchemy and her repeated feedback, especially on Sanskrit related sections, and for the enjoyable collaboration in co-organising workshops and conference panels on the topic over the years. And thanks to Andrew Mason for fascinating conversations on the alchemy of mercury and Ayurveda while walking the streets of Brighton, and in Vienna.

Further, thanks go to Robert Mayer for insightful discussions on Buddhist taming issues. Thanks go as well to Vincanne Adams, Sienna Craig, and Diana Lange for discussions and suggestions, especially on how to navigate the complex world of publishing. Thanks also to Jürgen Aschoff, Michael Balk, Madhulika Banerjee, Cathy Cantwell, Mingji Cuomu, Eric Jacobson, Brenda Li, Harilal Madhavan, Katharina Sabernig, Mona Schrempf, Anna Sehnalova, and Markus Viehbeck for the help they gave along the way.

Receiving critical feedback from academic colleagues and friends during the process of writing is invaluable, and in the following I collectively thank my colleagues who read through various draft chapters or sections at different stages in the process of writing this book. This work has benefitted considerably from their suggestions, and all remaining errors are my own. I am grateful to Vincanne Adams, Calum Blaikie, Olaf Czaja, Theresia Hofer, Stephan Kloos, Dylan Lott, William McGrath, Tenzin Namdul, Florian Ploberger, Herbert and Alexandra Schwabl, Susanne Strässle, Daniel Trambaiolo, Dagmar Wujastyk, and my current project collaborator Jan van der Valk. Special thanks also go to Tawni Tidwell, who commented on

the entire manuscript. I treasure that Tawni Tidwell, a biological anthropologist and qualified amchi herself, also shared many of her insights from working with amchi on the Tibetan plateau, which was outside my research area. Our discussions have always been enriching and have made me realize the broadness and variety of the Sowa Rigpa traditions across different geographical regions, as well as the mountain of research that still needs to be done, for which this book lays some of the groundwork.

Not all results of this long-term research are included in this book. Numerous details found their way into separately published papers, book chapters, and conference presentations. I acknowledge the valuable feedback I received at the numerous guest lectures I gave on the topic. Here, special thanks go to Robbie Barnett (University of Columbia), Nadine Beckmann (University of Roehampton London), Daniel Berounský and Anna Sehnalova (Charles University, Prague), Cathy Cantwell and Carmen Meinert (Ruhr Universität Bochum), Elisabeth Hsu and Ulrike Roesler (University of Oxford), Stephan Kloos and Calum Blaikie (Austrian Academy of Sciences), Leonard van der Kuijp (Harvard University), Benedetta Lomi (SOAS), Geoffrey Samuel (Cardiff University), and others.

Extra thanks to the two anonymous reviewers and the editorial team of the Heidelberg University Publishing series on Transculturality at Heidelberg University, who with great patience saw this book to press.

Books get partially written at home, and partners are often the closest witnesses of the struggles and joys entailed. For partners of anthropologists, fieldwork adds another layer of adventure. First, I am grateful to my family in Germany for putting up with my long absences. Most of all, I am enormously thankful to my husband Thomas K. Shor, a writer and photographer, for joining me on many bumpy jeep rides on dusty roads in India and Nepal, being by my side through phases of enthusiasm and doubts when developing analytical ideas from messy field notes, sharing deep writing retreats in various places of this world, and reading what I write with a critical, loving eye. May there be many more journeys ahead.

Maps

The national boundaries on these maps have not been authenticated and may not be correct. These maps were modified by the author from: https://commons.wikimedia.org/wiki/File:Himalaya_Map.jpg, which is licensed under: https://creativecommons.org/licenses/by-sa/4.0/deed.en.

Map 1: Overview of the geographic regions mentioned in the book.

The place names in maps 2 and 3 are listed alphabetically in two sets. The first set refers to the author's fieldsites in India and Nepal (see numbers 1–8 with a white background) and the second set points to the main historical places mentioned in the book (see numbers 1–15 with a black background). They are spread across maps 2 and 3.

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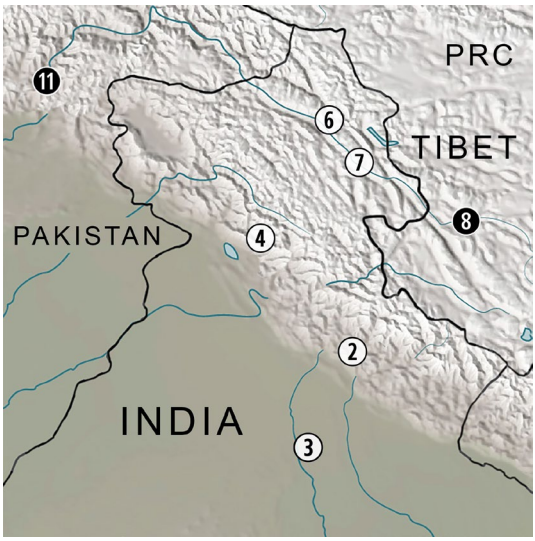
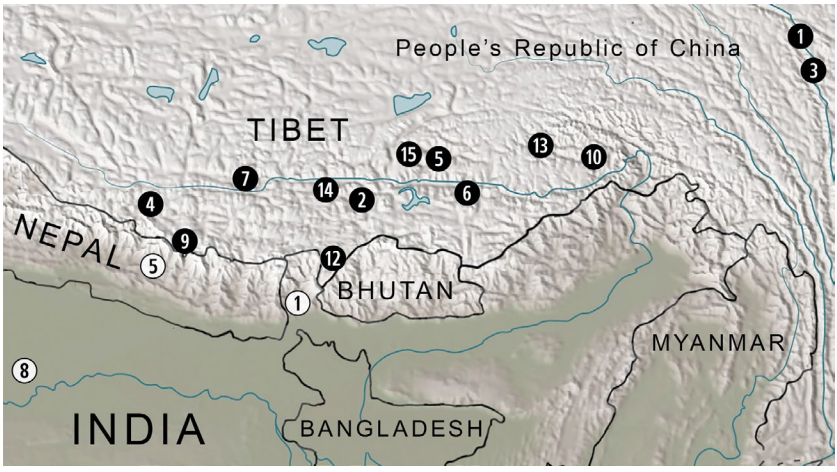


Map 2: Relevant places in the western Himalayan region.



Map 3: Relevant places in the central and eastern Himalayan and Tibetan plateau regions.

○ Fieldsites:
1. Darjeeling; 2. Dehradun; 3. Delhi; 4. Dharamsala; 5. Kathmandu; 6. Leh, Ladakh; 7. Nee, Ladakh; 8. Sarnath and Varanasi

● Historical sites:
1. Degé; 2. Gyantsé; 3. Katok Monastery; 4. Kyirong; 5. Lhasa; 6. Lhokha; 7. Ngamring; 8. Ngari, western Tibet; 9. Nyalam; 10. Kongpo; 11. Oḍḍiyāna, presumably located in the Upper Swat Valley, today's Pakistan; 12. Phagri; 13. Powo; 14. Shigatse; 15. Tsurpu Monastery

Chapter 1

Introduction: "It takes time to tame a wild horse"

One day I asked Dr.[1] Tenzin Thaye, one of the visiting physicians of the Fourteenth Dalai Lama and a senior Tibetan physician at the Men-Tsee-Khang[2] in Dharamsala, northwestern India, about the Tibetan medical meaning of *dülwa ('dul ba)*, or "taming." His simple examples summarize the central theme of this book:

> *Dülwa* actually means taming. When we get a wild animal and slowly train it, we call it *dülwa*. In the same way we also calm down the roughness of a plant and the poisons of mercury. It takes time to tame a wild horse. [...] Taming mercury takes many steps. Taming takes time. Likewise, you cannot tame the mind instantly; it takes time to tame negativities.[3]

Tenzin Thaye here speaks of Tibetan medical ideas of taming that involve subduing and controlling a substance and utilizing the poisonous as a vitalizing agent, and shaping its special potency, in Tibetan called *nüpa (nus pa)*.[4] Tenzin Thaye alludes to several contexts in the Tibetan world where the term *dülwa* is used, not only in relation to taming mercury. The historical period of the introduction of Buddhism into Tibet is filled with stories of

1 In India, Tibetan physicians often call themselves doctor and use Dr. as their title for their traditional *menpa kachupa (sman pa dka' bcu pa)* degree, which they are legally allowed to do when registered under the Central Council of Indian Medicine. However, *menpa kachupa* is not equivalent to a biomedical Doctor of Medicine (MD) degree. For various reasons, some Tibetan medical practitioners prefer to be called doctor, others use *menpa (sman pa)*, the Tibetan term for physician, or amchi *(am chi)*, the Mongolian-derived word for a Tibetan medical practitioner. Due to its common usage, and convention in Tibetan language, amchi is not italicized and is only used in the singular. In this book, I address physicians with their preferred title, usually Dr., or with their full names. I use doctor, physician, and amchi interchangeably.

2 The Men-Tsee-Khang is the largest Tibetan medical institute in India. See the Fieldsite section below for details.

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

4 *Nüpa* generally refers to the capacity of a substance to have an effect. Several different definitions and types of *nüpa* are mentioned in Tibetan medical texts. See Chapter 2 and Gerke (2019b) for more details.

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how the construction of monasteries was aimed at "taming" local demons into protectors during a religious and political movement of Buddhist dominance over "wild" Tibetan landscapes and local beliefs (Gyatso 1987). The term *dülwa* also means discipline and refers to monastic regulations of fully ordained monks. In Buddhist mindfulness practices the five mental poisons *(sems dug lnga)*—desire, hatred, ignorance, pride, and envy—are also "tamed," i.e. transformed into compassion.

In this book, I follow the story of mercury ethnographically, textually, and metaphorically through several centuries of Tibetan medical histories. I also trace its sources of contemporary trade in the Khari Baoli market in Old Delhi to its use in processed forms by Sowa Rigpa medical practitioners in India and Nepal. I present various positions of Tibetan physicians to highlight the story of mercury and its transformation into an elixir used in their medical traditions, widely known under the name of Tibetan medicine or Sowa Rigpa (*gso ba rig pa*, the science of healing).[5]

Recently, debates regarding the toxicity and safety of mercury as a strong neurotoxin and environmental pollutant have received greater attention globally, especially after the initiation of the global mercury ban by the United Nations Environment Programme (UNEP, founded in 1972) which was signed by many countries, including India in 2014. In turn, these debates have intensified the existing discussions within Asian medical systems (e.g. Sowa Rigpa, Ayurveda, Unani, Siddha, Traditional Chinese Medicine, etc.), which use processed mercury composite compounds (largely in the form of mercury sulfide) in some of their medicines. It is important to note that most Tibetan medical formulas are plant and mineral based and contain no mercury or other metal ingredients.

This book does not answer the question of whether the use of certain mercury compounds in Tibetan medicines is safe. Rather, it analyzes what is at stake in asking such a question. I explore what questioning mercury's safety in Sowa Rigpa medicines entails in terms of the politics of toxicity, the social construction of safety, and the ways in which medical epistemologies are translated cross-culturally, adopted, resisted, and used for different purposes by different stakeholders.

To situate the positionality of Tibetan medical practitioners within these contemporary contexts, I first trace the history of mercury practices in Tibet, beginning in the thirteenth century. I then sketch the larger picture of Sowa Rigpa mercurial medicines beyond Tibet's cultural borders and into the diaspora in India and Nepal into the twenty-first century. The material presented is diverse and complex, drawing on both textual research and ethnographic encounters, addressing issues of historical narrative, lineage, gender, embodied practices, poison myths, and pharmacological

5 Sowa Rigpa was recognized by the Indian government under the ministry of AYUSH in 2010, representing Ayurveda, Yoga and Naturopathy, Unani, Siddha, Sowa Rigpa, and Homeopathy. See Craig and Gerke (2016) on a critical discussion of the naming of Sowa Rigpa; see also Blaikie (2016) and Kloos (2016) on the recognition process in India.

techniques of taming mercury, as well as the use of science. All of these are linked by the overarching question of what is involved in the social construction of toxicity and safety, and what this tells us about the heuristic concept of transculturality as a form of cultural translation and medical knowledge production.

This book is also about contested definitions of toxicity in general and how notions of toxicity vary across cultural contexts and are contingent on different interpretations of science.[6] It questions how global regulations based on biomedical frameworks often disregard emic medical understandings of toxicity in the pursuit of public health. In Sowa Rigpa theory mercury is recognized as a toxic substance when left unprocessed. Since it continues to be used in Tibetan practices of transforming poisons into elixirs (therapeutically considered highly potent), the global condemnation of elemental mercury and its various derivatives as a neurotoxin and environmental pollutant has stirred critical debates on its safety. Following how notions of mercury as a toxic substance shift both globally and locally within these geopolitical debates raises important questions beyond the field of Asian medicine: what happens if a poisonous substance can also be considered therapeutic once medical practitioners refine and process it? How do such notions of toxicity change (even among Sowa Rigpa practitioners) as global health regulations come to the forefront? The case of Sowa Rigpa mercury practices illustrates this complex and contested interface between biomedical and indigenous epistemologies of toxicity, thus offering a timely contribution to studies in transculturality.

Over eight chapters, *Taming the Poisonous* follows mercury through these larger global forms of governance, legislation, and control, and investigates how they affect Tibetan medical practice on the ground. For centuries, Tibetan physicians have recognized the toxicity of this enigmatic silvery heavy metal, which is volatile and liquid at room temperature and is visibly transformed in its color, mobility, and form when processed with other metals and precious substances, herbs, and minerals. I analyze Tibetan medical approaches to toxicity, potency, and safety and what happens when these approaches are translated, negotiated, and evaluated in local and global contexts, which are influenced by definitions of toxicity and safety steered by scientific hegemonies. I also describe how—in this increasingly globalized world—those who politically, legally, and economically control definitions of "toxicity" also hold power over the perceived potency of poisonous substances (see Cordner 2016). Toxicity thus becomes more than a medical concept; it is also a platform for hegemonic powers to impact acts of cultural translation (see below). By following the poison, so to speak, this book explores how the noxiousness of mercury

6 For definitions of science and what constitutes modern science in Tibetan medical contexts, see Adams, Dongzhu, and Le (2010), Adams, Schrempf, and Craig (2011b, 1–3), Craig (2012), and Kloos (2011). For different interpretations of toxicity and purity in pharmaceutical science and Sowa Rigpa, see Tidwell and Nettles (2019).

Figure 1: Various precious pills from India and Nepal wrapped in different colored silk cloth. Many of them contain processed mercury in the form of an organometallic mercury sulfide compound. Photo: Brigitta Gerke-Jork (Gerke-Jork 2013 / CC-BY-SA 4.0).

has been perceived and negotiated by different players both historically and in the present period of globalization of Sowa Rigpa.

As we shall see, the transformation of a base substance into something potent is a theme that Tibetans made their own, not only in the development of tantric Buddhist ideas of taming but also in their medical traditions of making precious medicines with refined mercury as one of the key ingredients. While unpacking ideas of taming, or *dülwa*, I argue that poisons become powerful agents not only in the making of rejuvenating and precious medicines, but also in the purification and control of social and physical environments as well as in the cultural construction of toxicity and safety. This involves notions of ritual and environmental pollution and poisoning fears and practices, as well as negotiating the power of potent poisons during encounters with modern science. This book thus also explores the ways in which mercury processing practices parallel social, historical, and religious ideas of taming in Tibetan societies. Today, as in the past, mercury processing practices have created prestige and power for those securing, patenting, and preserving the pharmaceutical skills of taming elemental mercury and preparing what are considered and valued as the most precious medicines—precious pills or *rinchen rilbu (rin chen ril bu)* (Fig. 1).

Precious pills, also called jewel pills because of their precious and semi-precious gemstone content, are among the most well-known Tibetan

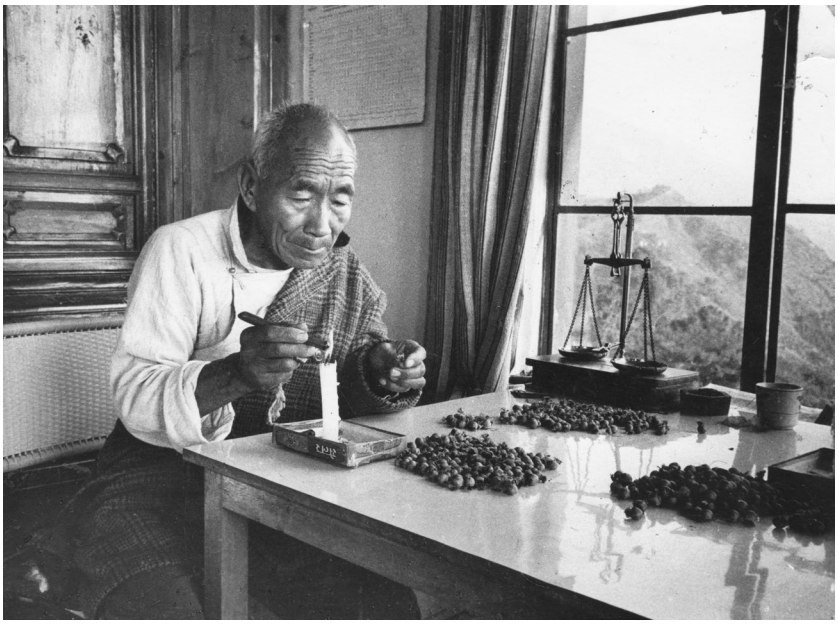

Figure 2: Precious pills were wrapped in silk cloth and sealed with wax by hand at the Men-Tsee-Khang in Dharamsala, India, before the introduction of machine-made blister packs in 2009.
Photo: Men-Tsee-Khang (Men-Tsee-Khang 1990s / CC-BY-SA 4.0).

medicines today. They are multi-compounds, each of which contains from twenty-five to about 160 plants and minerals as well as pre-processed precious ingredients, for example gold, silver, rubies, diamonds, corals, turquoise, pearls, and sapphires. For centuries, they have held a special place in Tibetan societies. They have been used for treating poisoning, fevers, malignant tumors, infections, neural disorders, strokes, and epilepsy (Sonam Dolma 2013), and have also been regarded as providing protection from epidemics, such as SARS (Craig and Adams 2008). Before the advent of Good Manufacturing Practice (GMP) and machine-made pill sachets in the People's Republic of China (PRC) in 2001 (Saxer 2013), their preciousness used to be—and in some cases still is—culturally marked by the pills' individual silk wrapping (Fig. 1 and Fig. 2).[7]

The most precious composite added to many precious pills as a catalyst is called *tsotel* (*btso thal*, meaning cooked or refined ash).[8] *Tsotel* is a com-

7 The Men-Tsee-Khang in Dharamsala replaced traditional wrapping with machine-made blister packs in 2009. See MTK (2010).

8 *Tsotel* is also translated as "cooked powder," since it contains not only several metals that have been calcined into ash but also many other ingredients that were cooked or triturated. After processing, the *tsotel* compound appears more like a black powder. Dr. Pasang Yonten, personal communication through Jan van der Valk, October 2017.

plex organometallic mercury sulfide compound, containing eight metals and eight minerals that are all processed over several weeks with numerous plants and other ingredients. The process of making *tsotel* is known as *ngülchu tsodru chenmo (dngul chu btso bkru chen mo)*, or "Great Mercury Refinement," briefly referred to as *tsodru chenmo*.

Its complex manufacturing process is the pride of Tibetan medical experts. While there are shared resemblances to Indian and Chinese alchemical techniques of transforming poisonous mercury through trituration with sulphur and using metals in the form of ash (Skt. *bhasma*), the complex ways of making *tsotel* appear to be a uniquely Tibetan practice. This book sketches some of the historical trajectories of the *tsodru chenmo* practice, its transmission via medical lineages, and some of the contestations of its knowledge transmission and safety concerns in the twentieth and twenty-first centuries. Making *tsotel*, however, is not the only way that mercury has been processed in Tibet's past. Medical texts list numerous ways of taming mercury, but preparing *tsotel* is the most elaborate, prestigious, and popular method in today's Tibetan medical manufacturing units, and is considered the safest.

During my ethnographic encounters with Tibetan medical practitioners in India and Nepal, I explored how practitioners who currently use processed mercury in their medicines have been affected by the global mercury ban recently initiated by the UNEP. How do they translate global environmental and public health concerns, which have been intensified by the ban, into their local worlds of medicine making, called *menjor (sman sbyor)*? How do they explain the safety that their medical texts have ascribed to the use of processed mercury—largely as mercury sulfide—in a variety of medicines for hundreds of years and which is currently being questioned through the policies developed by environmental protection agencies?

This book does not question that liquid metallic (or elemental) mercury is highly toxic, especially when heated and inhaled. Tibetan authors do not contest its toxicity either and have described this "silver fluid"—which translates into Tibetan as *ngülchu (dngul chu)*—as highly poisonous in medical texts dating back to the twelfth century. However, in this book I raise issues surrounding the social construction and perceptions of toxicity and safety as well as the transculturality of notions of what constitutes and lends power to a poison.

Transculturality in acts of translation

> *We also studied science, I understand what they [Western scientists] feel about research, but they also need to understand us, to know our ways of thinking, so we have an integration, so we have a bridge between us. I feel that only one way is not good (Sonam Yangdon, research assistant and translator on the Tibetan–Israeli research team during the second mercury toxicity study at the Men-Tsee-Khang in Dharamsala).*[9]
>
> *The act of translation is itself very much involved in the creation of knowledge" (Tymoczko and Gentzler 2002, xxi).*

This book offers a contribution to the cross-disciplinary scholarship on transculturality, or transculturation, attesting to the growing trend in the social sciences and humanities to view and approach cultures as dynamic, heterogeneous, fluid processes with porous borders, rather than as stable entities marked by demarcated lines of practice. To date, multiple definitions of the transcultural paradigm exist across many disciplines, demanding interdisciplinary approaches, but serving "different needs in different fields of research" (König and Rakow 2016, 93–95). From a historical perspective, transculturality "renounces comparatism and focuses on contact zones, adaptation and exchange processes, modes of translation, and moments of crossing borders in a global context" (Herren, Rüesch, and Sibille 2012, 6). Thus, methodologically, transculturality becomes "an analytical tool to overcome an essentialist understanding of cultures, which is, if nothing else, helpful for a globalised twenty-first century" (2012, 70). For anthropologists, transculturality is a form of practice, which is continually produced and marked by plurality, entanglements, and discontent. As a heuristic concept, it is "good to think with" when trying to make sense of the ways in which knowledge is produced in cross-cultural encounters and in vibrant social spaces, or "contact zones," frequently marked by disparate power structures (Pratt 2008). These multiple approaches to transculturality all share an emphasis on better understanding transcultural encounters in the globalized worlds we live in.

Taming the Poisonous contributes a specific example from the Tibetan world to studies in transculturality with a focus on how ideas of toxicity are translated, negotiated, and applied in different epistemological contexts. Anthropological studies on Sowa Rigpa increasingly view "translation of scientific epistemologies as practices between and across cultures" (Adams, Schrempf, and Craig 2011b, 1). In this book, Tibetan medical mercury refinement practices meet modern science in various ways. The terms modern or Western science are in themselves difficult to define. They are deeply embedded in the politics of knowledge shaped by the Enlightenment and colonialism (e.g. Prakash 1999, in Adams, Schrempf, and Craig 2011b, 2).

9 Interview, Dharamsala, November 27, 2009. The two mercury studies are discussed in Chapter 7.

The widespread accepted dominance of science as the main framework in which to understand the world has its limitations when it comes to complex healing encounters in indigenous medical contexts.

Young Tibetans in India, like Sonam Yangdon in her opening quote above, who live in a pluralistic society in which they constantly bridge and translate between different epistemologies, wish for an exchange between Sowa Rigpa and science that is not one way, but is like "a bridge," leading to some form of "integration." As we shall see, the encounters between Tibetan medical and scientific paradigms of mercury toxicity offer ample examples of transculturality in practice: they are dynamic, political, and scatter in multiple directions, just like liquid mercury. They are continuously (re)shaped by religious ideas, well-established social networks, pharmacological practice, and varying expectations of what science could or should achieve for Sowa Rigpa.

The research presented here draws on more than two decades of personal involvement and studies with practitioners of Sowa Rigpa in India, the DFG-funded research on Tibetan pharmacological detoxification practices (2011–2015), a Lise-Meitner FWF-funded project on Tibetan precious pills (2015–2018), and my current FWF project on potent substances (2018–2022). My research focus has been specifically on the use of mercury in Tibetan medical traditions, its social history, its contemporary application in *menjor* practices, and the contested views of its safety. I followed these issues through twenty-one months of fieldwork between 2011 and 2017, during which time I conducted approximately 200 interviews as well as translated and analyzed relevant classical and contemporary Tibetan medical texts. My research traces the story of mercury back to the thirteenth century CE, when complex mercury processing techniques came to Tibet, largely from the Swat Valley regions of what today is Pakistan and northwestern India. I will analyze some of these texts with the following questions in mind: Which issues of toxicity are raised in Tibetan medical works? How did Tibetan authors describe the processing of mercury? How were mercury processing events embedded in political, economic, and religious life in Tibet? How has this changed since 1959, in exile in India and Nepal, and—more recently—with the global UNEP mercury ban to be implemented in India in 2020?

My approach has been to integrate Tibetan medical texts (translated and untranslated) into the ethnographic encounter, understanding cultures as constituting "themselves *in* translation and *as* translation," being the components as well as part of the results of translation processes (Bachmann-Medick 2006, 37). When it comes to translating medical meanings across different medical epistemologies and in anthropological contexts, theoretical analysis needs to be placed in a framework that grounds "interpretations in people's own forms of discourse and the concepts they use in their daily lives" (Wikan 1992, 464). Thus, an examination and analysis of contemporary uses of Tibetan medical texts and their translations and transmissions of meanings have been an integral part of my

ethnographic fieldwork, to arrive at a deeper understanding of Tibetan practitioners' discourses surrounding mercury toxicity.

Anthropologists have used texts and translated ideas across societies from the early days of the discipline, and "cultural translation" has frequently been included in the definition of their work descriptions, although often in controversial colonial contexts (see Rubel and Rosman 2003). While thinking through and working with translations of texts and meanings, I have been especially inspired by critical anthropological debates on cultural translations (Asad 1986) as well as new approaches in translation studies that have come to the forefront since the "translational turn" (Bachmann-Medick 2009). This has placed more emphasis on transculturality and shifting power relations between texts and ideas in their translation across cultures; in other words, it has shifted the focus to the politics of translation (e.g. Gal 2015; Hermans 2003; Tymoczko and Gentzler 2002). The trajectories, interfaces, and politics surrounding translation and power have been explored by Maria Tymoczko and Edwin Gentzler in their edited volume *Translation and Power* (2002):

> Translation is not simply a process of faithful reproduction but invariably involves deliberate acts of selection, construction, and omission. It is inextricably linked to issues of cultural dominance, assertion, and resistance—in short, to power (Tymoczko and Gentzler 2002, cover).

How does power play a role in the translation and politics of toxicity? To give an example: the translations of toxicity, risk, and science have recently been explored in *Toxic Safety* (Cordner 2016), a study on the safety of flame retardants in the US. It shows how interpretations of science and risk assessments of toxic substances can vary among different stakeholders in pursuit of different goals. Sociologist Alissa Cordner introduces the notion of "strategic science translation," which she defines as "the process of interpreting and communicating scientific evidence to an intended audience in order to advance certain goals and interests" (2016, 915). Her approach explains how risk can either be downplayed or highlighted, depending on the group's interest and how they consequently translate scientific materials and data.

Linguistic anthropologist Susan Gal (2015) points to the need for reflexivity when writing about translational processes. Gal cautions: "It is useful to remember that translations [...] rely on ideological framings of comparison. And comparison—as many thinkers have noted—is always positioned, never politically neutral, never innocent" (2015, 236). At several places in this book, I reflect on my positionality as the ethnographer and my own embodied sense of toxicity, which, I am aware, has impacted my ways of translating between different epistemologies of poisons.

I also elucidate, across several chapters with numerous ethnographic examples, how acts of translation are embedded in transcultural practices

that reassert power and involve a certain cultural hegemony when dealing with mercury toxicity. This sometimes involves Tibetan medical practitioners explaining their views of toxicity and safety to international audiences (including myself), which are strongly influenced by biomedical science and prominent ideas of toxicity embedded in it. In some cases, Tibetan physicians and their institutes have employed science to valorize the safety of *tsotel*-containing precious pills, e.g. through controlled pilot studies (Sallon et al. 2006, 2017; see Chapter 7). We also find acts of translation in the ways in which Tibetan medical authors have described and authenticated medical lineages of mercury processing in their writings and across their complex socio-economic, religious, and political networks in which the *tsodru chenmo* practice has and continues to take place (Chapters 3 and 4).

Today, almost all forms of mercury seem universally considered poisonous, although to varying degrees (see Appendix A); therefore any analysis of a possibly cultural construction of mercury's poisonousness at first sight might appear ridiculous and could immediately be critiqued as relativist or charitable anthropology. This book takes a different angle, building upon and extending beyond what Talal Asad expresses well in his essay on "The Concepts of Cultural Translation." He writes:

> My point is only that the process of "cultural translation" is inevitably enmeshed in conditions of power—professional, national, international. And among these conditions is the authority of ethnographers to uncover the implicit meanings of [']subordinate societies.['] Given that that is so, the interesting question for enquiry is not whether, and if so to what extent, anthropologists should be relativists or rationalists, critical or charitable, toward other cultures, but how power enters into the process of "cultural translation" (Asad 1986, 163).

A major objective of this book is to show how power enters practices of transculturality through specific forms of the translation of toxicity in numerous contexts, and how toxicity and safety are expressed, negotiated, and defined by the various players (e.g. Tibetan doctors, medical institutions, international regulators, the ethnographer, biomedical researchers, chemists, etc.). I am interested in investigating how acts of translation are (re)created in ethnographic and other encounters and how they influence the ways in which Tibetan physicians, who have been exposed to biomedical ideas of toxicity, explain their usage and detoxification processes of mercury to different audiences. In light of a global ban on mercury and an influx of scientific studies that attempt to prove that Tibetan medicines are safe, Tibetan physicians have to negotiate a variety of toxicity epistemologies. How are the powers and dangers of poisons and the skills to tame them translated in this complex, contemporary situation? My argument here is that this translation process is largely about "taming." Not only do Tibetan physicians need to tame the toxic substance of mercury into

something beneficial, they also need to tame the biomedical understanding of toxicity and the global politics surrounding it to make sense of and to justify their continuous use of mercury in their medicines.

Moreover, I link acts of translation to forms of embodiment of toxicity and to power. How is the positioning of the various players (including the anthropologist) affected by the ways in which each actor has embodied individual perceptions of toxicity, and how are economic and power structures involved in their efforts to translate different cultural perceptions of toxicity and safety between them? My situatedness as a researcher, purposely staying upwind of the mercury fumes while observing certain processing techniques, configured a particular positionality during participant observation. I often asked myself how my judgment of safety would affect my presentation of the material and my translation of medical practitioners' ideas of toxicity. Would my own embodied sense of toxicity distort my translation of theirs? How would I turn these experiences into text?

What weaves each chapter of this book into a coherent narrative is an exploration of what is at stake in translating toxicity transculturally. With clear relevance beyond the Tibetan world, the book teaches us something about how, in a world facing global health and environmental concerns, we must address questions of toxicity and the safety of traditional pharmaceuticals in new and innovative ways. Such questions refer not only to well-established processing techniques of poisonous substances and their use in traditional medicines, but also to an increasing concern with the contamination of nontoxic raw medicinal substances through environmental pollution. It is my contention that a careful analysis of indigenous medical practice can add significantly to our understanding of how ideas of the poisonous are deeply embedded in religious and medical notions of toxicity, our own distinctive "poison culture" (Arnold 2016), and pharmacological practices over time.

After the chapter outline below, I introduce the fieldsite and methodological and ethnographic challenges in the field, which led me to reflect on my own embodied sense of toxicity.

Chapter outline

Following this Introduction, Chapter 2 sets the scene with a Tibetan origin myth of poisons, which appears in several instances and with variations in Tibetan medical textbook chapters on poisons and mercury processing. This myth illustrates that in a religious and cultural environment where evil is not cast out or banished but actively engaged with and transformed, poisons are more easily considered living agents that have a social life of their own. How does a poison become an elixir? Why is *tsotel* considered the "king of elixirs" in Sowa Rigpa?

After introducing the sources of mercury, I take the reader through an ethnographic journey into the narrow market alleys of Old Delhi where elemental mercury is sold and traded in liquid form (including to Tibetan and

Ayurvedic physicians). I then analyze mercury-related technical terms and what is at stake when translating the meanings of terms such as safety, toxicity, poison, purification, essence, detoxification, processing, and taming in Sowa Rigpa socio-cultural contexts. The second part of the chapter thematically introduces the politics of mercury toxicity, including the cultural story of mercury's chemistry, mercury's different chemical forms and their varied toxicity, and global policies and regulations such as the UNEP mercury ban, which are based on the atomic model (see Schwabl 2013). I then present several existing toxicity studies of mercury in Tibetan and Ayurvedic medicines and discuss them in terms of the politics of toxicity.

Chapter 3 explores how political and religious climates have affected the *tsodru chenmo* practice, beginning in Tibet at the time of the Fifth Dalai Lama in the seventeenth century and extending into today's Tibetan exile in India and Nepal. The lived experience of Tibetan physicians processing mercury from the 1950s onwards—including once in a Chinese labor camp in 1977—is presented through ethnographic material, oral and textual accounts, and interviews. My analysis here builds on the theoretical approach of the "pharmaceutical nexus" by Petryna and Kleinman (2006), which addresses political, economic, and ethical dimensions of biomedical pharmaceuticals from production to consumption. I modify this approach to make it applicable to Asian medicines by including long-term historical processes and self-reflective elements of an embodied sense of toxicity (explained further below), which is conditioned by what I refer to as our own poison culture. My modifications to the pharmaceutical nexus as an anthropological approach to pharmaceuticals contributes new avenues of more self-reflective and historical inquiries when analyzing classical medical multi-compounds in Asian medicine, including the long-term use of processed poisonous substances.

I further analyze historical and contemporary *tsotel* events in the light of Tibetan social support systems, i.e. the priest-patron relationships, and show how these socio-political-religious networks involve elite financial support, specialized knowledge, and sometimes sectarian struggle, shaping the ways *tsotel* techniques have been and continue to be taught and practiced in exile. I also ask what happens if such support fails to materialize and if knowledge is not transmitted, offering historical and contemporary examples.

Chapter 4 centers on taming, secrecy, and knowledge transmission. It traces the appearance of mercury as a poison, a medical ingredient, and an antidote to poisoning in Tibetan textual traditions from the twelfth to nineteenth century and analyzes where we can place the *tsodru chenmo* practice in the debate on medicine between science and religion (Adams, Schrempf, and Craig 2011a; Gyatso 2015). The answer is neither simple nor straightforward, since when making *tsotel*, tantric notions of taming and medical skills of processing go hand in hand.

The central theme of taming and its surrounding secrecy has affected knowledge transmissions of the practice over time. This is contextualized

by the three key themes that appear in historical narratives on mercury knowledge transmissions from India to Tibet: poisoning, Buddhism, and the importance of lineage. Based on interviews, I discuss contemporary attitudes of knowledge transmission, especially in the publishing of *tsotel* manuals, and how physicians deal with the secrecy attached to these texts.

Small-scale mercury practices mentioned in Sowa Rigpa medical texts reveal a heterogeneous picture due to an active exchange of medical ideas between Tibet and its neighbors. I discuss why among the numerous mercury practices circulating in Tibet, the technique of making *tsotel*—which came to Tibet from the Swat Valley in the thirteenth century and has survived until today—is considered the safest and most prestigious mercury processing technique.

Taken together, Chapters 3 and 4 provide not only the first scholarly documentation of the history of Tibetan mercury practices, but also give insight into the social and political importance given to *tsotel* knowledge transmission and manufacturing events. They also illustrate how taming mercury involves the translation of economic and political prestige into medical practice, as well as the expansion of the cosmological and spiritual benefits of the taming process for the surrounding communities, their environments, and social relations.

The processing of mercury is a gendered practice, in that women have for the most part not been allowed to be present during *tsodru chenmo.* Chapter 5 explores why this has been the case and to what extent it is changing. I analyze the reasons behind the subdued role of women in Tibetan mercury processing and present oral histories of three exceptional women physicians who processed mercury despite these restrictions. This chapter also presents the Indic myth of the missing ingredient to process mercury, representing Śiva's semen: sulfur, which symbolizes the menstrual blood of his consort Parvatī. I discuss how as the arousing element, the female risks diverting mercury's potency away from the successful trituration with sulfur. How does this ambivalent role of the female as depicted in Sanskrit and Tibetan medical literature, translate into the restrictions currently in place at Sowa Rigpa institutions in India?

Chapter 6 explores how tantric ideas of taming parallel pharmacological processing techniques. How did physicians who made *tsotel* describe and perceive the transformative nature of mercury during processing through their own observations without chemical concepts and laboratory analysis? In analyzing how the "three poisons" of mercury are detected, tamed, and—after their transformation—tested for safety, I argue that the physician's sensory engagement with the transforming substance not only resembles early tantric Buddhist demon taming myths but are also at the core of the construction of safety.

This chapter also unpacks notions of risk and safety including questions of how evidence of safety is created and what the concept is based on. What are the signs of a successful processing into a "safe" substance? What protection measures do Tibetan physicians take when working with mercury

(ranging from wearing masks, drinking a lot of alcohol, and maintaining special diets)? How do notions of taming and risk assessment go together?

In Chapter 7, the translation of toxicity turns more global and also political in contemporary ethnographic contexts, in which Tibetan doctors articulate and translate their ideas of safety and toxicity in research projects, conference presentations, and in their responses to the UNEP mercury ban. What if terms such as toxic and pure, safe and unsafe, are interpreted differently in different local, global, and legal settings? Who defines what is toxic, and how is it supposed to be measured? What does this tell us about the cultural construction of toxicity, and how could global health advocates better understand indigenous conceptions of toxicity? The increasing global demands for safety in traditional medicines, and a series of scandals and publications on the toxicity of Ayurvedic, Tibetan, and Chinese medicine, led the main Tibetan medical institute in India, the Men-Tsee-Khang, to request foreign research teams to investigate the safety of *tsotel*. Two such toxicity studies were carried out in Dharamsala (Sallon et al. 2006, 2017). I sketch the contexts of these studies, and provide ethnographies of the interactions between foreign and Tibetan researchers during the second study. How did they translate concepts of toxicity to each other? How were the results presented during two conferences in Dharamsala? I show how in the effort to establish the safety of Tibetan medicines, the translation of toxicity between Sowa Rigpa and biomedical epistemologies were constantly negotiated. I demonstrate how these negotiations were influenced by certain expectations towards science that intersect with long-established social dynamics of support mechanisms that have been in place throughout the history of *tsotel* practices.

This chapter also addresses the ecological turn of the mercury toxicity debate and how amchi respond to mercury toxicity as an environmental problem. How does the concept of taming poisons translate into dealing with toxic substances that might creep into amchi's herbal medicines through environmental pollution, with no means to test for contamination of their medicines?

In the Conclusions, while examining the Tibetan material in a wider context and looking at the broader aspects of what constitutes poisons culturally and symbolically, both conceptually and in practice, I ask who "tames" whom through government regulations, local politics, and hegemonic concepts of safety? When do science and global regulations become "potent" and when are they "poisonous" for the continuation of traditional practice? Also, I look ahead at how a full implementation of the UNEP mercury ban in India might affect Sowa Rigpa practice. What alternatives do Tibetan physicians envision for their medical heritage as well as a future medical practice without refined mercury?

The findings of this book challenge the universality that is often attributed to accepted notions of toxicity in scientific thought today. They demonstrate how what is considered toxic is influenced also by the powers at play when translating varying concepts of toxicity and the social construction of

pharmacological ideas over time. Overall, this book asks for more nuanced analyses of notions of toxicity in traditional medical systems.

The fieldsites

Dharamsala lies in the northwestern Indian state of Himachal Pradesh, which has a large Tibetan community of 13,701 Tibetans (out of 94,203 Tibetans living in India; Planning Commission 2010, 27).[10] The Tibetan enclave of McLeod Ganj in upper Dharamsala—a British hill station from the 1860s—is one of the centers of the Tibetan exile community in India and the home of the Fourteenth Dalai Lama, Tenzin Gyatso. He settled in McLeod Ganj in April 1960, and since then the area has developed far beyond a mere settlement for Tibetan refugees.[11] The hillside between Dharamsala and McLeod Ganj—an area called Gangchen Kyishong, briefly Gangkyi—was developed into the Central Tibetan Administration (CTA). Although not officially recognized by the government of India or any other government, the CTA has been overseeing the welfare of Tibetans in the over thirty-five settlements across India through its ministries and various administrative offices (Kauffmann 2015, 51–53). The Gangkyi area also houses the impressive Library of Tibetan Works and Archives (LTWA) and institutions that provide medical care: the Men-Tsee-Khang, offering traditional Tibetan medicines, and the Delek Hospital, offering biomedical care.

The Men-Tsee-Khang is the largest medical institution in Tibetan exile, having grown in size from a few huts in the 1960s to an impressive institution housing the main medical college, a pharmacy, a museum, several other departments, and a clinic (see Fig. 3).[12]

The Men-Tsee-Khang College, which educated approximately 263 Tibetan physicians between 1961 and 2013,[13] allows only a few foreign students per batch to enter the rigorous five-year program (largely from Mongolia, Russia, and Buryatia). The Men-Tsee-Khang, however, offers regular short-term introductory courses on Tibetan medicine for foreigners and has frequently sent medical teams across India and abroad. Consequently, the Men-Tsee-Khang has increasingly catered to foreign and Indian patients, not only in their clinics and with their pharmaceuticals

10 We need to be aware of the fluidity of this kind of demographic data considering widespread migration of Tibetans abroad and the fact that Tibetans in India do not constitute a single unified community (Gerke 2012a, 61).

11 For more detailed descriptions of Dharamsala and McLeod Ganj by anthropologists see, for example, Hess (2009, 32–39) and Swank (2014, 12–16).

12 The history of the Men-Tsee-Khang and its contemporary developments have been studied in detail by Kloos (2008, 2010, 2015). On a history of the Men-Tsee-Khang in Tibetan, see Choelothar (2000).

13 According to the Men-Tsee-Khang website (MTK 2017b), 263 physicians and forty-seven astrologers graduated from fifteen medical batches and seven astrological batches in the past fifty-three years. As of 2013, 114 doctors and sixteen astrologers were working at the Men-Tsee-Khang.

Figure 3: View of the Men-Tsee-Khang complex from the circuit below the Dalai Lama's temple, overlooking the Kangra Valley, May 2016. Photo: Thomas K. Shor (Shor 2016 / CC-BY-SA 4.0).

(Kloos 2017a), but also through their tonics, Sorig supplements, and other wellness products that are sold locally, in the over fifty branch clinics across India and Nepal, and online (Gerke 2012b).

The Delek Hospital has been catering to the biomedical needs of local Tibetans since 1971. Passing the hospital on my way downhill to the Men-Tsee-Khang, I frequently saw foreign doctors, with their white coats and stethoscopes, who had come to volunteer at Delek for a few months and contribute their expertise to the community's health needs. While at the Delek Hospital the medical epistemological approaches to health, disease, and the body differ considerably from the Men-Tsee-Khang, Tibetans utilize both institutions quite pragmatically, depending on their needs (Prost 2007). Delek Hospital provides facilities for lab tests, minor surgery, and emergencies, and organizes immunization and treatments for wide-spread infectious diseases such as tuberculosis, Hepatitis B, and gastroenterological infections. Patients suffering from those diseases might also go to the Men-Tsee-Khang clinics to have their pulse checked and receive a course of Tibetan pills. Patients with long-term chronic disorders often prefer the Men-Tsee-Khang. They also queue for the restricted distribution of precious pills, which they take as tonics on full and / or new moon days, in preparation for long journeys, or when they are seriously ill (Gerke 2017a; Sonam Dolma 2013). Most Tibetan patients have no problem using both facilities simultaneously.[14]

14 This is similar to what I observed about Tibetan treatment choices in Darjeeling and Kalimpong (Gerke 2012).

The Men-Tsee-Khang and Delek Hospital also work together on certain occasions. During the first-ever study on mercury toxicity at the Men-Tsee-Khang (Sallon et al. 2006), a volunteer non-randomized sample of nine patients taking Tibetan medicines with processed mercury were selected from the Outpatient Department at Delek Hospital; they were taking biomedical prescriptions alongside traditional Tibetan medicines (Sallon et al. 2006, 406). Both medical institutions approved the ethical standards of the two *tsotel* studies according to the declaration of Helsinki; Delek physicians performed medical examinations checking for signs of toxicity, and the Delek laboratory performed some of the urine and blood tests (Sallon et al. 2006, 406–407; Sallon 2017, 319).

My field visits focused on Tibetan pharmacies working with mercury and on physicians who had practical experience in this field or knowledge of its history. Most of them at some point in their lives were trained at or involved with the Men-Tsee-Khang and later opened their own clinics and pharmacies in the area, or moved abroad (two were interviewed in New York). I met the leading physicians and their assistants of seven privately run pharmacies near Dharamsala, some of whom have made *tsotel* in the past but have decided to operate their pharmacies without mercury, and some of whom continue to use mercury sulfide in the form of roasted cinnabar, called *choklama (cog la ma)* or briefly *chokla (cog la)*, as an ingredient and/or to coat their pills (see Chapter 6). Some use *tsotel* that was produced elsewhere. Their views appear throughout this book.

Apart from these private pharmacies, there are four Tibetan medical institutions operating in the Tibetan diaspora in India today, of which I visited the two that prepare *tsotel* and precious pills: the Men-Tsee-Khang in Dharamsala (founded in 1961), and the Department of Sowa Rigpa at the Central Institute of Higher Tibetan Studies (CIHTS) in Sarnath (founded in 1993). The Chagpori Tibetan Medical Institute (CTMI), founded in 1992 in Darjeeling, does not produce *tsotel*, but its founder, the Late Sampel Norbu Trogawa Rinpoche (1932–2005), prepared it twice in Ladakh (in 1994 and 2004, see Chapter 3). Some of this *tsotel* is still used in the rare preparation of precious pills at the CTMI pharmacy. The medical faculty at the Central Institute of Buddhist Studies (CIBS) in Choglamsar, Ladakh, is the fourth official Tibetan medical institution in India, but their pharmacy does not make *tsotel* (Blaikie 2014). CIHTS has a strong focus on university research, while the Men-Tsee-Khang is oriented towards producing pharmaceuticals, training doctors, and establishing clinics. The pharmacy of the Department of Sowa Rigpa at CIHTS produces *tsotel* and medicines solely for pedagogical purposes and for their single clinic on campus.

The Tibetan physicians I met in Kathmandu, Nepal, were either trained in Tibet pre-1959, at the Men-Tsee-Khang in Dharamsala, or the Chagpori Tibetan Medical Institute in Darjeeling, and have set up independent clinics with their own pharmacies. None of them makes *tsotel* today, but some (largely trained in Tibet) have experience in other mercury preparations. The oldest private Tibetan medical establishment in Kathmandu,

the Khunpen clinic, makes its *tsotel* preparation in its factory across the northern border, but is preparing precious pills in Kathmandu.[15] I also interviewed the leading expert on Tibetan medical literature in exile, Amchi Tashi Yangpel Tashigang, who is based in Delhi and produces precious pills without *tsotel* for the European market and with *tsotel* for his patients in Delhi. Most of these physicians and institutions making *tsotel* are introduced in Chapter 3. On historical questions I frequently consulted Tashi Tsering Josayma at the Amnye Machen Institute in Dharamsala.

DHARAMSALA AND THE MEN-TSEE-KHANG AS A FIELDSITE

Dharamsala, specifically McLeod Ganj, is known as a popular tourist destination and Tibetan Buddhist *dharma* hub among foreigners (Anand 2002). It has often been discredited by scholars as "an adulterated field of anthropological inquiry" (Prost 2006a, 235). Thus, I approached it as a complex fieldsite. The complexity arises from the multifaceted exchanges between Tibetans and foreigners, with many long-term foreigners living in the area to study Buddhism, Tibetan language, yoga, and meditation, or working as "volunteer tourists" with one of the many NGOs (Frilund 2018). My encounters with local Tibetans were constantly influenced by their frequent exchanges with foreigners, who often take on active roles as sponsors or as Tibetan Buddhist disciples, political activists, students, and researchers of all kinds—all of whom leave various impressions on local Tibetans and vice versa (Kauffmann 2015; Klieger 1992; Prost 2006a). With new encounters, I often felt put into a box shaped by previous experiences with foreigners, but long-term engagements with Tibetan physicians through my visits to the area since 2008 have helped me develop a certain trust and rapport over time. However, because the Men-Tsee-Khang has been increasingly flooded with young research students pursuing study abroad projects on Tibetan medicine, tighter rules have been put into place, which in turn inhibits access, even for senior researchers.

Dharamsala as the seat of the CTA also has a strong symbolic and political influence on Tibetan place and identity (Anand 2002; Diehl 2002), especially with the proximity to the Dalai Lama (Klieger 2002). Thus, scholars have rightfully critiqued Dharamsala as a hot spot for the construction of Tibetan culture, while other Tibetan communities remain understudied (Huber 2001). The encounters between Tibetans and local Indians have been both supportive and tense, as well as having affected migration, literacy, education, and Tibetan identity (Lau 2009; Swank 2014). The two distinct groups of Tibetan refugees that moved to India from their homes across the Tibetan plateau have also led to tension between factions of "old" and "new" Tibetans (DeVoe 2005). In Dharamsala, old arrivals mainly came from central Tibet to escape persecution between 1959 and 1962; "newcomers"—largely young Tibetans from Amdo but also from other

15 Calum Blaikie, email communication March 16, 2016.

areas—arrived after 1986 when China relaxed its border controls. They typically look for education and a way to move further West (DeVoe 2005 in Swank 2014, 16). Their backgrounds and migration history are quite distinct and question simple definitions of what entails "Tibetanness" (Hess 2009) and being a refugee (Prost 2006a).[16] More recently, Chinese Buddhists have made Dharamsala their spiritual destination and—along with disciples from Hong Kong and Taiwan—have changed the image of foreign sponsors.

The Men-Tsee-Khang is an equally complex fieldsite for many reasons. Specific encounters between fields of science and medicine as steered by the Men-Tsee-Khang have played a strong part in the cultural and economic survival of Tibetans in Dharamsala (Kloos 2010, 2011, 2015; Prost 2004, 2008). After years of negotiating government recognition (Blaikie 2013, 2016), the development of Sowa Rigpa as a recognized "medical system" (Kloos 2016) has also impacted Tibetan doctors in the ways they reinvent Tibetan medical ethics and medical practice. This has become an important tool to preserve Tibetan culture through the "politics of compassion" (Kloos 2011, 2019). At the Men-Tsee-Khang, Tibetan medical students speak English, Tibetan, and Hindi, and while following the traditional curriculum of memorizing large parts of the *Four Treatises (Rgyud bzhi)* in Tibetan, they are also taught background knowledge in biomedical anatomy, chemistry, and biology. Practitioners are largely able to communicate with Tibetan, foreign, and Indian patients in all three languages and thus translate their medical ideas not only between languages but also between various cultures. Many Men-Tsee-Khang graduates lecture on Tibetan medicine to foreigners visiting Dharamsala or while abroad. This provides constant opportunities for complex encounters between various medical and scientific epistemologies across cultures. The ways they are understood, expressed, and negotiated by the physicians I met in the Dharamsala area are clearly influenced by the larger diasporic context of Dharamsala as an international hub and a center of Tibetan exile, and have shaped the data presented here. This defies simple generalizations of outcomes, but provides specific examples that speak to larger issues of encounters with toxicity in Asian medicines.

Thomas Kauffmann, in *The Agendas of Tibetan Refugees* (2015), explores the relationships between religion and politics in Dharamsala, to which the contemporary changes in mercury processing at the Men-Tsee-Khang provide a noticeable contrast. Kauffmann describes the current social relationships of gift giving and patronage (through the Tibetan priest–patron model), which have made Tibetans one of the most successful groups of refugees worldwide when it comes to procuring financial support over decades. As will become clear in Chapter 3, this priest–patron model was also

16 For a recent study on the rehabilitation of Tibetan refugees and the development of the Tibetan diaspora and their financial aid see Kauffmann (2015). For a detailed study on the Tibetan diaspora see Hess (2009).

instrumental in the dissemination and preservation of mercury processing practices in Tibet pre-1959. The Men-Tsee-Khang in India has dislodged itself from this strategy, developing into a market-oriented enterprise that has allowed it to process mercury and produce precious pills independent of the priest-patron relationships that these practices previously were—and in some cases still are—embedded in. Nevertheless, as I will argue in Chapter 7, this social relationship dynamic affects the ways in which Tibetan physicians view science as well as their expectations of what science should achieve for Sowa Rigpa.

Methodological and ethnographic challenges in the field

Each fieldwork situation poses its own challenges when it comes to positioning oneself as an ethnographer. My major challenges in the study of the processing of mercury have been threefold. The first was to collect data while respecting the secrecy surrounding the practice. The second was facing the general rule that women are not allowed to take part or even watch *tsodru chenmo* (which was the case at all Tibetan medical institutions, except one). The third challenge concerned my own culturally determined perceptions of safety and embodied sense of toxicity, which led me to be more reflective about my own poison culture. All of these issues required a certain reflexivity as an ethnographer and the employment of different strategies when it came to anthropological fieldwork methods, which are discussed in this section.

As a woman, I faced established gender barriers prohibiting me from observing mercury processing related to *tsotel*, and therefore my fieldwork did not include much traditional participant-observation. I was simply not allowed to be present, with two exceptions, described below. It is questionable whether even a male foreign researcher would have been allowed to observe *tsodru chenmo*, given the general secrecy surrounding *tsotel* preparations. The Men-Tsee-Khang has made *tsotel* six times since 1982, with only one occurrence during the course of this project, which was announced once the event was over in October 2014. How do you ethnographically study something you are not allowed to see?

Fieldwork often had the nature of approaching the topic through informal and semi-structured interviews with Tibetan physicians who themselves had made *tsotel* or other forms of processed mercury. I also steered discussions to the topic during lectures on mercury that I gave at the Men-Tsee-Khang in Dharamsala and at CIHTS in Sarnath. While attending two international conferences organized by the Men-Tsee-Khang, in 2012 and 2016, I documented how they publicly presented their views on *tsotel* studies and mercury safety debates. Despite the secretive nature of *tsodru chenmo*, its pharmacological achievement is rated so highly in Tibetan communities that this mercury practice featured prominently at both conferences, not only in the choice of invited keynote speakers, but also

during the press conference and in the public speech by the Dalai Lama. These public events thus became important fieldsites (see Chapter 7).

Collaborative event ethnography as an anthropological method was explored with three anthropology colleagues in Kathmandu, during a single event: a workshop with over forty amchi (from Nepal, Ladakh, and Tibetan regions in the PRC) on "Producing Efficacious Medicine: Quality, Potency, Lineage, and Critically Endangered Knowledge" (Blaikie et al. 2015). During this workshop (which was not attended by institutionally trained practitioners from India), the access to and lack of knowledge transmission of making *tsotel* revealed how certain amchi in the Himalayan periphery remain at the margins of such practices and thus have limited access to precious pills, while Lhasa is viewed by those amchi as the center of Tibetan medical knowledge and authority (2015, 190–191; see also Chapters 4 and 5). The Tibetan medical institutional perspectives in India were quite different, which I explored through interviews and by translating the biographies of Tibetan physicians, who were instrumental in the knowledge transmission of making *tsotel* in India (Gerke 2015a; see also Chapter 4).

This project did not involve fieldwork in the PRC, but I hope this book encourages future researchers to ethnographically study the many places where *tsotel* is now made in Tibetan areas of China.

EMBODIED SENSE OF TOXICITY

I felt fortunate to be invited to an Ayurveda clinic where I observed mercury distillation from cinnabar and the trituration of mercury with gold and sulfur. Moreover, a private Tibetan medical practitioner allowed me to document the roasting of cinnabar used for pill coating (Chapter 6). These were simple processing techniques not linked to *tsodru chenmo*, but they provided some first-hand experience of handling and transforming mercury. Even though I had translated relevant excerpts from Tibetan medical texts on mercury processing and had an idea of how they understood and practiced the taming of mercury, it was only when I was present when mercury was processed that I more fully realized the limitation of textual translations in cultural understandings of toxicity. Although I tried to be open minded, I found myself physically demonstrating my own embodied sense of toxicity by spontaneously holding my breath, stepping back, and staying upwind. This contrasted with the physicians' own cultural habitus of toxicity when they touched and handled mercury and heated cinnabar without the safeguards modern science would deem prudent.

In September 2013, I visited the clinic and pharmacy of the Ayurvedic physician Vaidya Balendu Prakash, who had been one of the main guest speakers at the Second International Conference on Tibetan Medicine in Dharamsala in October 2012. I contacted him before the conference, requesting an interview, which he kindly granted and after which he invited me to visit his clinic in Dehradun. He graciously hosted my husband

and me for several days and showed us around his compound. He had prepared a display of ingredients that he used for his metal ash preparations, called *bhasmas*, and not only distilled liquid mercury from artificial cinnabar in the traditional way that his father had taught him (Fig. 4–8), but also showed us how he triturated the distilled mercury with gold and other substances (Prakash 2013). He had no obvious secrets with regard to ingredients and processing techniques, and both men and women were working on his compound. His wife had supervised the mercury processing in his family-owned pharmacy for years, just as his mother had helped his father in making *bhasmas* when he was young.

The following is a visual summary of an Ayurvedic form of mercury distillation, described in detail in Prakash (2013).

Balendu Prakash and I worked together on a publication on his family tradition (Prakash 2013), where he describes growing up in a family where liquid mercury and cinnabar were common, day-to-day ingredients in his father's clinic. Prakash remembers of the mercury distillation that,

> the entire process was always conducted without using any masks or gloves, and all my siblings as well as family guests were exposed to this process. Neither my mother, Shashi Mukhi, who helped in the manufacturing of medicines, nor any of us ever felt uneasy about this; rather we were quite happy and excited to see our faces reflected in the shining mercury (Prakash 2013, 215).

When I saw Balendu Prakash scraping liquid mercury from a blackened clay bowl (Fig. 6) and later triturating mercury with gold and herbal juices, or pressing liquid mercury through a clean cloth into a bowl, I was struck by his physical expression of familiarity with handling the substance. I noticed him holding his breath or not answering my questions when his head was directly over the mercury bowl only a few times. Otherwise, he had no inhibitions in touching or handling mercury, while I was holding my breath, staying upwind when taking close-up photographs (Fig. 9).

Since he was open to discussing mercury, I also questioned him on issues of safety. He made his position quite clear:

> You in the West are hypersensitive when it comes to mercury toxicity. But making such a hype against mercury is also a political statement to stop good things, including mercury medicines. I *know* mercury is toxic, and I *know* my medicines work and are safe. In between the two is the "don't know" part. I cannot explain what happens during processing, but I would be open to take part in any scientific study that wants to explore this.[17]

17 Personal communication, Dehradun, September 19, 2013. Italics are my own and were added to highlight his vocal emphasis.

Figure 4: Pre-processed cinnabar is wrapped in a cotton ball *(kanduk)* and heated over a tray of cow dung with the help of a hand-operated bellows. It is then covered with a clay bowl and kept overnight, smoldering. Dehradun, 2013. Photo: Thomas K. Shor (Shor 2013 / CC-BY-SA 4.0).

Figure 5: Balendu Prakash opens the Kanduk Yantra (a ball-like apparatus to distill mercury from cinnabar) the next morning; the wrapped-up pre-processed cinnabar had smoldered inside the cotton ball all night. Dehradun, 2013. Photo: Thomas K. Shor (Shor 2013 / CC-BY-SA 4.0).

Figure 6: Mercury pellets form and collect at the bottom of the earthen bowl as Balendu Prakash scrapes the evaporated mercury dust off the sides. Dehradun, 2013. Photo: Thomas K. Shor (Shor 2013 / CC-BY-SA 4.0).

Figure 7: The amount of mercury distilled through the Kanduk Yantra. Dehradun, 2013. This method extracts about 700 grams of mercury from one kilogram of mercury sulfide ore (Prakash 2013, 212). Photo: Thomas K. Shor (Shor 2013 / CC-BY-SA 4.0).

Figure 8: The distilled mercury is collected and further filtered and processed before use. Dehradun, 2013. Photo: Thomas K. Shor (Shor 2013 / CC-BY-SA 4.0).

Figure 9: Embodied sense of toxicity. The author is holding her breath while Balendu Prakash distills mercury. Dehradun, 2013. Photo: Thomas K. Shor (Shor 2013 / CC-BY-SA 4.0).

The ethnographic positionality of safety

Often, both Ayurvedic and Tibetan doctors perceived my positionality as a "Westerner" as someone who most likely would be critical of mercury. In several situations, I was expected to hold the position that mercury-containing medicine are unsafe (for example, my encounter with Dr. Khangkar, see Chapter 5). The opposite was the case with my long-term contacts among Tibetan physicians, who were familiar with my long association with Tibetan medicine. They expected me to show the world through my writing that their medicines were safe. At times, these opposing expectations caused conflicts between my trained ethnographic eye, my own perception of toxicity, and the responsibility I felt to point out occupational safety issues to physicians processing mercury. Not reacting required some training and conscious choices on my part, but was it ethical? Should I point out the dangers of mercury toxicity when and where I saw them and become an "advocate anthropologist"? (Hastrup and Elsass 1990). Hastrup and Elsass argue that "ethnography is legitimated by established canons of scholarship and the *creation* of knowledge, while advocacy rests on moral commitment and the *use* of knowledge" (1990, 302, original emphasis). My responses to a moral standpoint varied in different situations. For example, I had to wait a year for the opportunity to watch the preparation of roasted *chokla*, used as an ingredient and for coating pills, in a small, private Tibetan pharmacy (Chapter 6). When the moment finally came, my interest in understanding and documenting the technique outweighed the fear of exposure to mercury and sulfur fumes, which I partially escaped through holding my breath and keeping a distance. Although I was convinced of the dangers, I felt grateful for the physician's generosity but found it difficult to voice my concerns over the safety of his technique based on my "scientific" worldview.

I can testify from the ethnographic and writing process that my own poison culture deeply affected my ways of approaching mercury. I constantly had to question my own preconceptions concerning science, the atomic model, and UNEP regulations in order not to overlook what Tibetan physicians really meant by taming mercury. I want to emphasize that what I describe as embodied sense of toxicity is deeply interwoven with the power that emerges from cultural translations on poisonousness and thus contributes (often unconsciously) to our cultural constructions of toxicity. As we see in the descriptions of physicians processing mercury, what could also be called a cultural *habitus* of toxicity—or embodied sense of toxicity—contributes to the social making of toxicity as a cultural category. In the Tibetan example, the social propagation of toxicity as a cultural category develops in conjunction with medico-religious ideas of taming and their direct sense perceptions while touching and working with mercury. Only when I became conscious of my own acculturated instincts of mercury's toxicity through my spontaneous gestures of holding my breath, moving upwind, keeping a distance, and so forth, did I realize that our embodied

actions also define toxic substances as toxic in conjunction with authoritative statements (scientific, historical, political, or otherwise), thus defining their risks. In Chapter 3, I explore how this influences the ways researchers themselves become part of the pharmaceutical nexus of a drug.

Entering the field, I was aware that elemental mercury, particularly in the form of methylmercury, is one of the strongest neurotoxins known, and that exposure, especially to mercury fumes, can cause all kinds of toxicity symptoms (see Appendix A). Over the course of several challenging toxicity encounters, I developed an approach of sharing information, data, and knowledge on biomedical knowledge of mercury toxicity while also making a real effort to understand their views of toxicity. I did not go as far as giving mercury masks to physicians handling mercury, but I told them about their existence, their availability, and practicality. I also carried ideas of fume hoods into discussions, as an option that would allow their processing practice to remain traditional, but for the mercury fumes to be contained and thus provide more occupational safety and environmental protection (see Chapters 6 and 7). I shared printed information on the approaching global UNEP ban on mercury and its potential effect on Asian medicine, as well as published studies on lead and mercury contamination in Ayurvedic medicine. Their feedback furthered my understanding of their positions on safety and toxicity. What began as an ethnographic method—offering lectures, distributing articles, showing educational videos on how to handle mercury spills—turned not just into data, but into rewarding encounters of reciprocity as well.

In 2012, I presented a lecture to students and teachers at both the Men-Tsee-Khang in Dharamsala and the Sowa Rigpa Department at CIHTS in Sarnath on the historical medical use of mercury in Europe. The lecture focused on early mercury mining and signs of mercurialism among miners in Europe, the different chemical compounds of mercury, and the use of mercury in the treatment of syphilis, in other words, the European poison culture I grew up with and which had used mercury for centuries, for the most part in forms which caused more harm than benefit to patients (e.g. calomel, heated cinnabar) (Cunningham 2018a, b). It included images of the cinnabar fumigation therapies for syphilitic patients. The obvious message was that many patients were affected by severe mercury poisoning when inhaling heated cinnabar. The presentation concluded with a ten-minute video produced by The Nepal Health Care Waste Management Program[18] to teach nurses in hospitals how to safely clean up mercury spills from broken thermometers by evacuating the area, donning gloves and masks, opening windows, and disposing of the mercury as an extreme hazardous waste. The lecture also included a quote from the Tibet expedition report by Samuel Turner and his accompanying physician, Robert Saunders, who

18 This video was also shown to the amchi participants during the Sowa Rigpa workshop in Kathmandu in December 2011, where we discussed mercury processing (mentioned in Chapters 3 and 4).

described the processing of mercury into a pill (possibly red mercury(II) oxide) to treat venereal disease at the monastery of Tashilhünpo in Tibet in 1783.[19] Saunders was impressed by Tibetan ways of preparing mercury and thought they were well equipped to treat venereal diseases (Saunders and Banks 1789, 100–102). I was curious to find out whether his description of the processing technique resembled any of the methods still practiced today. The results of these investigations—that mercurial medicines for treating venereal diseases in Tibet were very different from preparing *tsotel*—were published elsewhere (Gerke 2015b). More interestingly, the type of questions students asked after the lecture revealed the discrepancies between the different epistemologies at work among the younger generations of Sowa Rigpa students, who were exposed to both chemistry and Tibetan medicine, and the older generation of amchi.

At the Men-Tsee-Khang, students were interested to understand how mercury worked in thermometers and sphygmomanometers. They were keen to learn about the different levels of toxicity of organic and inorganic mercury compounds (see Chapter 2), a distinction not made in Sowa Rigpa. They were wondering whether and how mercury was detoxified for the European treatments of syphilis; there was noticeable surprise in the audience that it was typically administered without purification, i.e. as cinnabar fumigations.[20] One student asked, "Why didn't they purify the mercury?" In Sowa Rigpa, the rule is that mercury should never be given raw. Another student revealed his perplexity concerning the concept of mercury as an element (Hg) by remarking: "In Tibetan medicine we hold that mercury can be detoxified. But in modern science it cannot be detoxified because it is an element, and we learn in chemistry that elements cannot be changed." This comment illustrates how perplexing it is for young Tibetan medical students to align their traditional practices with their knowledge of chemistry, in which ideas of "taming" do not easily find a place.

At CIHTS, a student asked an intriguing question, having reflected on what purifying could possibly mean in the Tibetan tradition. "I thought that purifying mercury means to take out the mercury," he said. "But now I see that mercury is still there at the end, so what is purified?" In response, I explained the chemical meaning of what I thought paralleled Tibetan understandings of purification, the result of which is a largely stable and insoluble mercury sulfide compound. As I said this, I realized the limitations of my own chemical gaze that gave no attention to the other substances and techniques applied to the complex task of making *tsotel*, nor to the ways Tibetan physicians explain the transformation of mercury during processing, several of whom argued that "*tsotel* should not be reduced to mercury sulfide ash" (see Chapter 6).

19 For the entire description see Saunders and Banks (1789, 100–102) and Turner ([1800] 1971).

20 There were many different mercury preparations in circulation in Europe, but purified mercury just referred to liquid mercury, which was drunk straight and acted by its weight (Cunningham 2018b, 184–185).

My aim in this book is to go beyond the chemical perspective and explain the central underlying ideas and the experiential epistemologies of Tibetan mercury processing. How did physicians who made *tsotel* describe and perceive the transformative nature of mercury during processing through their own observations without chemical analysis? In respect for the secrecy surrounding the *tsodru chenmo* practice, I will not describe in detail certain sequences of the processing, nor will I identify all the ingredients. My aim is to present the Tibetan medical rationale for taming mercury and how they determine the safety of different processing methods, relying on *their* texts and *their* terminology. This anthropological analysis of taming mercury does not exclude the biological effects of mercury in certain forms as a known neurotoxin (see Appendix A). In fact, the ethnographies show a very multifaceted picture of toxicity perceptions across the spectrum of Tibetan physicians interviewed. As we shall see, for practitioners in their medical practice and thinking within multiple epistemologies, toxicity takes on different shapes and hues depending on their individual engagement with mercury and their cultural translations of toxicity and ideas of safety.

SECRECY AND GENDER

Even though books and reprinted manuscripts explaining the process of *tsodru chenmo* have been more widely available in Tibetan since the mid-1980s (e.g. Dawa Ridrak 2003; Sönam Bakdrö 2006; Tashi Tsering 1986; Troru Tsénam 2001), Tibetan physicians and their institutions are largely secretive about it. There are several reasons for this. First, specialized skills are very selectively transmitted and are not easily shared with non-professionals. For example, Calum Blaikie (2014, 276) reports from Ladakh how Trogawa Rinpoche shared his handwritten book on *tsotel* but never let anyone "write anything down." This way of passing on specialized knowledge is not only linked to the protection of trade secrets, but also to the tantric nature of the secret knowledge that is transmitted. As Tony Chui (2019, 100) succinctly states: "[...] tantric substances are believed to exhibit their full strength when used in a hidden way—in other words, the need for secrecy is to uphold the 'potency' of the medicine." That said, not all ingredients used to make *tsotel* are considered tantric in nature, but as we shall see, the entire practice is considered a tantric revelation from the land of the *ḍākinīs*.

Second, the Men-Tsee-Khang in Dharamsala took a more conservative and secretive approach to teaching *tsotel* production techniques, especially in the early 1990s after Tibetan precious pill production was affected by concerns of counterfeit pills during a phase of weak administration with frequent change of directors (Kloos 2010, 88). Apparently, some Men-Tsee-Khang precious pills "began to disappear as personal gifts or on international tours" and counterfeit pills made from genuine precious pills, "crushed and multiplied," were sold by private amchi "in exile-Tibetan

settlements, border areas, and in China" (2010, 88). Moreover, the Dalai Lama himself strongly criticized the profit-oriented marketing of Tibetan medical products through Tibetan physicians travelling abroad privately, selling medicines at high rates (2010, 89–90). When Tashi Tsering Phuri took over as the new Men-Tsee-Khang director in July 1994, the newly made precious pills of that year (they made 110 kg of *tsotel* in 1994), were packaged in plastic boxes, sealed with special hologram stickers, and their production and sales were tightly controlled (2010, 95). The counterfeiting of precious pills also led to tighter rules and restrictions around who was taught and what knowledge was shared.

Third, secrecy also has to do with Tibetan cultural ideas of how obstacles, *barché (bar chad)*, can affect difficult undertakings. When a car accident happened during the first manufacturing of *tsotel* at the Men-Tsee-Khang in 1982, Tibetans at the Men-Tsee-Khang thought too many people were talking about *tsotel* preparation, thus causing *barché*. Nowadays, even though it is difficult to keep *tsotel* manufacturing completely secret, the Men-Tsee-Khang officially announces its occurrence only after it has been successfully completed.

Fourth, maintaining secret knowledge in Tibetan culture—even beyond the realm of medicine—often involves the exclusion of women. Taming mercury has such a strong gendered component that I devote an entire chapter to it (see Chapter 5). The ambiguous attitude towards women processing mercury is evident in the tantric symbolism of female menstrual blood and male semen as an equivalent to sulfur and mercury, respectively. Although sulfur is a powerful key ingredient when processing mercury, the presence of women is traditionally considered to endanger the process by "disturbing" and "arousing" the mercury. As a result, women are excluded to various degrees from touching and processing it. In Chapter 5, I trace the roots of this ambiguity in medical and Buddhist literature. Moreover, considering that half of current Sowa Rigpa medical students are women, I discuss gender inequalities in terms of how contemporary Sowa Rigpa institutions in India deal with the exclusion or selective participation of female amchi during *tsodru chenmo*.

Only at CIHTS in Sarnath were female students allowed to participate in making *tsotel*—except on the day when pre-processed mercury is triturated with pre-processed sulfur. The Sowa Rigpa Department at CIHTS has made *tsotel* only three times since its establishment in 1992, the last time in 2008. Gen Rinpoche Rakdo Lobsang Tenzin, briefly called Rakdo Rinpoche, now dean of the CIHTS Sowa Rigpa Department, invited me to observe parts of the process when I first visited the institute in December 2012, but they have not made *tsotel* since.[21] Rakdo Rinpoche holds more

21 Twice the event was cancelled on very short notice, and to date I have not been able to witness the manufacturing of *tsotel*. Being a full-fledged central university, it has been difficult for the department to carve out forty days during the cooler winter months (the only time of the year when the climate supports the burning and cooking of metals) with their other university responsibilities.

liberal views on the participation of women in mercury processing, which influences the construction and transmission of secret medical knowledge in different ways (see Chapters 4 and 5).

These four issues surrounding secrecy (selective knowledge transmission, concerns regarding intellectual property, obstacles, and gender) impacted my methodology in several ways. During fieldwork, asking questions about past events made it easier for Tibetan physicians not to have to part with their (secret) knowledge and speak of events that they were involved in at present, but to talk with some distance about the practice as done in the past.

I prepared tables of key *tsotel* events in India (1982–2014), highlighting the places where it was produced and the names of doctors making it, along with the tradition or lineage they followed (see Appendix B, C). Sharing these tables with numerous Tibetan physicians and scholars during fieldwork revealed that they themselves often did not know much about other physicians and institutions making *tsotel* and were curious to hear from me who had made *tsotel* when and where. These encounters over time made them more comfortable to talk about their own experience with mercury processing practices. It also provided extensive data on the historical and political contexts of this practice, of which we know very little. Translating Tibetan biographies also allowed for a critical analysis of how contemporary knowledge transmission is created and linked to certain lineages and authoritative figures of the past as well as appraise the role contemporary biographies play in such lineage creation (see Chapters 3 and 4).

The secrecy surrounding the actual practice of *tsodru chenmo* has changed to some extent with modern Sowa Rigpa publications, largely coming out of Tibetan regions in the PRC, which describe the process of making *tsotel*, often with illustrations. Using these texts and published photos in discussion with Tibetan physicians, carefully asking specific questions, often resulted in more detailed and open explanations. It also revealed that many things remain unwritten in Tibetan *menjor* practice. For example, I translated and compared several textual accounts on the making of *kardül (dkar 'dul)* and *tsadül (tsha 'dul)*, the shorter forms of mercury processing, and interviewed several Tibetan physicians about it in India and Nepal. I found that physicians prepared *kardül* and *tsadül* based on certain published formulations but changed their methods according to experience—without updating the literature (see Chapter 6). Because of the gender and secrecy issues, ethnographic research alone would have been limiting. Likewise, mere textual analysis would reveal a bizarre and partial picture of how mercury was used and processed and could easily lead to wrong conclusions about the toxicity of certain processed products since texts often differ from actual practice. Thus, combining texts with oral instructions through interviews and informal conversations was necessary to arrive at a more thorough understanding of Sowa Rigpa mercury practices.

Chapter 2

Setting the Scene: Poison and Potency

> *Desire, hatred, and ignorance, these are the three worldly poisons. The victorious Buddha does not have poisons. The authentic Buddha conquers poisons*[22] *(Tibetan Saying).*
>
> *Mercury has great potential. They call it* pārada *[in Sanskrit].* [...] *a person who has suffering also has the potential to liberate himself from suffering. Mercury has many poisons* [...] *some have to be washed away and some have to be bound, and tamed. Then the potential comes out and then it is "liberated mercury,"* dröl (sgrol) pārada*; we say "mercury, the king of* rasāyana*,"* (dngul chu bcud kyi rgyal po)*. If you have a little bit of* chü [rasāyana] *inside your body, then you do not attract disease* [...]*. Ju Mipam says if you have some* ngülchu *inside your body your elements will be shiny. He refers to the tamed* ngülchu *(Gen Rinpoche Rakdo Lobsang Tenzin [Rakdo Rinpoche], Dean of the Sowa Rigpa Department, CIHTS, Sarnath).*[23]

Taming substances and the origin myth of poisons

Tibetan notions of mercury as both a poison and a potent substance are often anchored in Indic myths about the churning of the milky ocean, the creating of the universe along with good and evil, antidotes and poisons, and the idea that the strongest poison can also become the best elixir. Tibetan medical texts—for example, the seventeenth century *Blue Beryl (Bai ḍūrya sngon po)* commentary by Dési Sangyé Gyatso (1653–1705)—frequently include an origin myth of poison. This myth is also depicted on the related medical scroll painting (Fig. 10), which illustrates the chapters on poisons in the *Four Treatises*, the fundamental Tibetan medical work which was compiled by Yutok Yönten Gönpo (fl. twelfth century) and his students in the twelfth and thirteenth century (McGrath 2017a, 296).[24]

22 Translated from Jampa Trinlé and Tseten Jigme (2006, 778 / 10–11): *'dod chags zhe sdang gti mug gsum/ 'di dag 'jig rten dug gsum ste/ bcom ldan sangs rgyas dug mi mnga'/ sangs rgyas bden pas dug bcom mo/.*

23 Interview, Sarnath, March 16, 2015.

24 For the Tibetan version of the *Four Treatises* see, for example, Yutok Yönten Gönpo (1982). For recent publications on the history, content, and commentaries of the *Four Treatises* see Gyatso (2015), McGrath (2017b), and Yang Ga (2010,

Published in: Gerke, Barbara, 2021. *Taming the Poisonous. Mercury, Toxicity, and Safety in Tibetan Medical Practice.* Heidelberg Studies on Transculturality 7. Heidelberg: Heidelberg University Publishing. DOI: https://doi.org/10.17885/heiup.746

Figure 10: This Tibetan medical thangka illustrates the chapters on poisons from the *Four Treatises* and its *Blue Beryl* commentary. Photo: Scroll paintings created by Dharmapala Thangka Center, School of Thangka Painting, Kathmandu, Nepal, www.thangka.de (Dharmapala Thangka Center 2019 / CC-BY-SA 4.0).

> In their desire for immortality, the gods and demons churned the milky ocean of the universe at the bottom of which lay a vase of immortality. A terrible creature, the manifestation of poison called Halāhala, emerged from the ocean and had to be subdued with the power of mantras. Its body shattered and various types of poison—including mercury—dispersed around the world. The gods and demons fought for the vase of immortality, which also arose from the ocean and contained the elixir. During the fight, the demon Rahu was killed. His blood mixed with some drops of the elixir that also fell to earth, giving rise to potent substances that can be used as antidotes to poisoning, for example, myrobalan and garlic (summarized from Parfionovitch, Dorje, and Meyer 1992, 117).

The basic idea of this myth is that both elixirs and poisons arise from the same source; therefore, medicinal substances that were formed from both good and evil can be used not only to transform poisons into elixirs, but also to make antidotes to treat poisoning. This fundamental premise is essential in understanding the use of poisonous substances—specifically mercury—in Sowa Rigpa medicine compounding or *menjor* practices.

The method of achieving the transformation of mercury is known as "taming" or *dülwa*. The idea of taming demons into protectors of Buddhism is such a pervasive approach to negativities in Tibetan culture that it is not surprising to find parallel notions of taming in Sowa Rigpa, where *dülwa* is the larger umbrella term for all kinds of processing that transform or tame the nature of substances.[25] One of these methods is called *dukdön (dug 'don)*, which translates as taking out the poison or harmful parts and deals with the pre-processing or cleaning of substances having *duk (dug)*.

Notably, the Tibetan term for poison, *duk*, shows parallel linguistic histories in the Sino-Tibetan and Tibeto-Burmese language families. The Old Chinese root of the Modern Chinese *du* 毒 is cognate with the Tibetan *duk*.[26] Paul Unschuld (1975) analyzed the origins of the Chinese pictogram for *du* and how meanings of *du* changed over time. Originally, the pictogram meant "snake in the grass"; in early Chinese literature the term stood for both poison and suffering; and in Buddhism it acquired the figurative meaning of suffering (Unschuld 1975, 182). Ulrike Unschuld (1977) pointed out that the Chinese term *du* not only means poison but also a potent drug. It is linked to ideas of strength and power. In earlier Chinese pharmaceutical literature *du* mainly meant "active curative strength."[27] In modern

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2014). Parts of the *Four Treatises* have been translated into English. See, for example, Clark (1995) and MTK (2011c, 2015, 2017a).

25 Tenzin Thaye, personal communication, McLeod Ganj, October 30, 2012.

26 The Sino-Tibetan Etymological Dictionary and Thesaurus (STEDT 2016) cites Coblin (1986) for the Sino-Tibetan reconstruction and Matisoff (2003) and Chou (1972) for the Tibeto-Burman reconstruction.

27 In many societies the same term is used to denote the strength as well as the poisonousness of a substance. See, for example, Shepard (2004).

Chinese pharmacology, however, *du* apparently only refers to the poisonous character of a substance (Unschuld 1975, 180). In his extensive studies on drugs and poisons in ancient and medieval China, Obringer (1997) elaborates on how Chinese drugs were supposed to have a certain toxicity in order to be considered effective, thus linking ideas of poisons and potency.

While a detailed comparison with Chinese concepts of poisonousness is beyond the scope of this book, I note that Tibetan concepts of *duk* go beyond notions of substances being poisonous. Since in Sowa Rigpa, *duk* is polysemous, careful contextual translations are necessary. In Sowa Rigpa, *duk* is not always equal to poison. *Duk* might refer to harmful parts but also to "rough" and indigestible matter, which would weaken the digestive fire, *médrö (me drod)*, and therefore has to be removed or made "smooth."[28] Substances might have various types of *duk* that can easily be removed through washing, or, for example, by removing the bark of a root, or taking out flower sepals or fruit stones.[29]

Despite the close linguistic link to the Chinese term *du*, the Chinese meaning of *du* as a classification of drugs that are "potent medicines" (Unschuld 1975) is not explicitly found in the Sowa Rigpa contexts presented here, even though Tibetan processing practices are aimed at enhancing the power or *nüpa* of the substance or compound. Substances having *duk* (e.g. aconite, mercury) can be transformed into strong medicines through transforming and taming *duk*.

The notion of taming is fundamentally a Buddhist one with clear tantric parallels. The subjugation idea goes back to the well-known Indian Buddhist myth in which Śiva in the form of the demon Rudra, along with his entire entourage, is subdued by Buddhist deities and transformed into protectors of Buddhism (Mayer 1996, 104–128). This process is twofold and involves killing and reviving the demon (or negativities) into transformed protectors or Bodhisattvas (equaling wisdom; Mayer 1996, 104). This is similar to the above origin myth of poisons, where Rahu is killed but some of his blood is revived and becomes an antidote to poisons, for example, in the form of garlic. Thus, demons becoming protectors parallel poisons becoming potent medicines.

The conversion of Śiva (in the form of Rudra or Maheśvara) into a Bodhisattva is an important topic and narrated with great variations in Vajrayāna literature and other yoga and tantric traditions in Tibet.[30] Such processes of taming are not necessarily described as peaceful affairs, which Dalton (2011) shows for the Mahāyāna culture of Tibet during the post-imperial period.

28 For details on making substances "smooth" in Sowa Rigpa see Blaikie (2014, 267–270), Saxer (2013, 63–75), and van der Valk (2017, 241; 2019).

29 This is described in the twelfth chapter of the Subsequent Tantra of the *Four Treatises* (MTK 2015, 139).

30 Buddhist myths of taming Śiva are manifold. See, for example, Mayer (1996, 1998) on the taming of Śiva in the form of Rudra in Vajrayāna, and Davidson (1991, 1995) on the taming of Śiva in the form of Maheśvara by the Bodhisattva Vajrapāṇi, transforming him into the wrathful deity Heruka. See also Samuel (2008).

While his writings on violent rituals have stirred contentious debate among scholars, his translation and analysis of the founding myth of Buddhist tantrism reveals that the struggle to subdue Śiva, in the form of Rudra, is filled with violent imagery (Dalton 2011, 2–5, 18–43, 159–206).

Also later, during the eleventh century and the introduction of Buddhism from India to Tibet, *dülwa* was a central theme in the context of the "wild" land that had to be tamed, illustrated in the various myths in which the "supine demoness" was geographically pinned down through building Buddhist monasteries at her central vital points (Dalton 2011, 113–125; Gyatso 1987; Miller 1998). In Buddhism, *dülwa* also refers to monastic discipline, a translation of the Sanskrit *vinaya*. The so-called three mental poisons of desire, hatred, and ignorance in Buddhist philosophy equally need to be tamed through Buddhist mind training—employing vocabulary quite similar to the taming of poisons in Sowa Rigpa.

Mercury also appears in metaphors of Buddhist mind training. For example, the Indian master Atisha (fl. eleventh century CE) translated some Indian tantras into Tibetan in which processes of mental purification parallel the alchemy of mercury. As the contemporary Buddhist teacher Geshe Lhundup Sopa explains: "The alchemical catalyst mercury *(rasadhātu)*, absorbs all the karmic and afflictive obscurations and turns them into the roots of virtue and omniscience" (Geshe Lhundup Sopa 2001, 18). Thus, mercury can transform almost everything: "As copper when touched by mercury turns into pure gold, so the afflictions when touched by pure gnosis become true causes of virtue" (2001, 18). While mercury here is mentioned in the context of its alchemical use in the making of gold and not necessarily medicines, the tantric understanding of poisons underlines their potency. In other words, the potency of poisons and negativities lies in their potential to be transformed.

Similarly, the subjugation myths hold a powerful message for Buddhist practitioners: "Maheśvara [Śiva] illustrates for the meditator that defilements, no matter how corrupt, are themselves the stuff of awakening" (Davidson 1995, 545). What these examples across the religious-medical fields show is that something being poisonous may also indicate its inherent strength and transformability into a beneficial substance. In a religious and cultural environment where themes of evil are actively engaged, poisons are more easily considered living agents that have a social life of their own. In some Tibetan areas, this still finds expression in poison fears and local beliefs of a "poison god" (e.g. Da Col 2012).

In this book I suggest that some of the processing techniques of calcining, triturating, and boiling mercury parallel these tantric and mythological taming ideas. Mercury is tamed by confronting it with substances that bind and transform its toxic characteristics and invoke its essence (*bcud du 'gugs pa*; Dawa Ridrak 2003, 420 / 14), which has the quality of an elixir, just as the essence of the mind has the Buddha nature.

These notions of poisons—their links to Buddhist ideas and their potential to transform into something helpful—deeply pervade Tibetan

medical ideas of *duk* as that which is harmful, and *men (sman)* as that which is beneficial. The making of medicine, called *menjor*, employs considerable time and effort to eliminate, clean, and process *duk*, the transformations of which are a time-consuming and important part of *menjor* processing. To understand mercury refinement techniques, we thus need to keep in mind this larger context of Tibetan cultural and religious approaches to taming. In Sowa Rigpa *menjor*, it is thus not primarily the Paracelsian dosage that makes a substance a poison or a remedy (Grell et al. 2018; Hedesan 2018; van der Valk 2019). The way a poison has been tamed, its synergy with other substances, and the ability of a person to digest a poison, also define poisonousness. All of the above deeply influence the cultural construction of toxicity and safety surrounding the use of mercury in Sowa Rigpa practices. This is also illustrated by the ways in which Tibetan physicians protect themselves from poisoning while refining mercury (see Chapter 6). Once the substance is fully tamed, it is considered safe, similar to a subjugated demon who has been tamed to safeguard Buddhism.

Now that we have an insight into how the taming of poisons is understood in the Tibetan world, the following chapters will situate various taming efforts by Sowa Rigpa specialists historically as well as in contemporary practice and analyze how they are debated, negotiated, and achieved or not. These explorations into taming will touch on issues of science, gender, pharmaceutical practices, medical knowledge transmission, and global regulatory efforts to phase-out the use of mercury. To provide the context for these explorations, I will introduce some of the sources of mercury in the mines of Central and South Asia. Then, an ethnographic vignette will take us to an Old Delhi market where mercury is traded—exploring some of the on-the-ground realities and risks of mercury trade in India and Nepal, which are countries without mercury mines. This is followed by an exploration of Tibetan terms for different forms of mercury and related processing procedures, before outlining the larger politics of toxicity affecting Sowa Rigpa mercury practices today.

Sourcing mercury

Chemically speaking, mercury is an element (Hg) that occurs naturally in ores, largely in a form bound by sulfur, as in cinnabar rock (HgS: mercury(II) sulfide, or red mercuric sulfide). Mercury as a heavy metal easily forms amalgams or alloys with other metals. Sourcing it from natural cinnabar ores causes pollution of the environment and occupational hazards for those mining it, because mercury vaporizes significantly when heated. “Raw” or elemental mercury is used in mining gold; once it has bound with the gold, it is again heated and evaporates into the atmosphere as elemental Hg. It is thus recognized not only as a toxic heavy metal but also as a significant environmental pollutant (Kim, Kabir, and Jahan 2016; Zuber and Newman 2012). Mercury has been used in India for centuries, but has to be imported.

A 2005 report by the Delhi-based non-governmental organization Toxics Link, which is devoted to raising awareness of toxic substances and to eradicating mercury from India, says: "Of the stated global demand of mercury of about 3,000 tonnes, India emerges as the single second largest consumer, importing approximately 250–300 tonnes annually" (Toxics Link 2005, 72).

Mercury ore is not naturally occurring in India, except in the Sitpur region of Gujarat (White 2013, 215). The nearest mines are in Dardistān (in northern Pakistan and northern Kashmir) and in Garmsir, Afghanistan (Baldissera 2014, 129, note 18). In Indian alchemy,[31] mercury is also known as *pārada*, referring to the "land of mercury"—the land of the Parthians or Persian Baluchistan (2014, 129)—from where it was sourced. Maxson (2009, 11) reports that today "there is no significant mercury mining in Asia except in mainland China, primarily in the region of Guizhou," which is in southwestern China. Large deposits were also found in its neighboring province Yunnan, and in the past cinnabar was traded from there to Tibet, as well as via maritime routes to south India where it is widely used in Tamil medicine (Fenner 1979, 98). White (1996, 65–66) also mentions that the mercury supply for Tibet came from Yunnan. The demand for mercury has traditionally been high in Tibet and Nepal, not because of mercurial medicines but because of the fire-gilding techniques required for making Buddhist statues (Lo Bue 1981, 33–34). Natural cinnabar rocks can be found and were probably sourced locally from various places in Tibet.[32]

Because of its long history of sourcing and trade, it is not surprising to find Chinese terms for mercury and cinnabar in classical Tibetan medical texts. A prime example is found in the *Four Treatises*. There, in addition to the Tibetan term for liquid metallic mercury, *ngülchu*, and for cinnabar, *tsel (mtshal)*,[33] we also find the Tibetan *chu shak (cu'u gshag)*, a phoneticised version of the Chinese term for cinnabar, *zhūshā* 朱砂, meaning red sand. *Chu shak* is a synonym for vermilion,[34] also known by the Tibetan term *gyatsel (rgya mtshal)*, meaning Chinese or foreign vermilion. Another frequently occurring polysemous Tibetan word for various forms of mercury is *dachu*

31 See Wujastyk (2019) for detailed definitions of alchemy in India. Alchemy is frequently "used as a synonym for *rasaśāstra*, the body of knowledge concerned with the methods for producing and using mercurials and its associated literature" (Wujastyk 2019). Transformation in Indian alchemy refers not only to the substances themselves, but also to the consumers taking them and the practitioners transmuting metals, who might attain well-being, health, and extraordinary powers *(siddhi)* in the process. Indian alchemy as a form of proto-chemistry includes metallurgical technology more broadly without soteriological aims.

32 Cinnabar ore has been reported by various authors to be found in some parts of Kham, e.g. lower Powo in Kongpo in eastern Tibet, near Mount Targo in central Tibet, in southeastern Tibet, and near Mount Kailash in western Tibet (summarized by Lo Bue 1981, 44).

33 The word *tsel* appears already in the Dunhuang manuscripts in descriptions of funeral rites of Tibetan kings, where it is an honorific term for blood, but could also mean cinnabar. Daniel Berounský, personal communication, Prague, November 11, 2016.

34 Jampa Trinlé and BMTK (2006, 202). Vermilion typically refers to the paint pigment or scarlet color of cinnabar, but also to artificial cinnabar.

(da chu), a term Tibetan doctors told me is of Chinese origin.[35] The appearance of such terms in Tibetan medical texts[36] might point to the trade of various types of cinnabar from China that were used in Tibetan medicines.

Another Tibetan term for cinnabar frequently appearing in medical texts and in my interviews with Tibetan physicians is *chokla* or *choklama* (Deumar Tendzin Püntsok 2009, 119/3–11). Some amchi identify *choklama* as the cinnabar rock and use *tsel* for cinnabar powder, but this is not consistent. *Chokla* is used for both natural and artificially made cinnabar rock, although artificial cinnabar is officially called *dachu*.[37] Some amchi use the term *chokla* for cinnabar rock as well as triturated and roasted cinnabar powder (see Chapter 6).

Today, the cinnabar available in Indian markets is largely artificial, produced in factories. The method is simple: in principle, liquid mercury is mixed with sulfur, which turns black, and is then heated in retort, vaporized, and condensed as a mercury sulfide rock, which when powdered is bright red in color. Tibetans process it further for use in their medicines and as a crimson-color coating for some of their pills, which has become controversial because of the high levels of Hg found in pills coated with or containing *chokla* (see Chapter 6).

Tibetan physicians in India today rely on traded mercury—in the form of liquid mercury bought in either metal or plastic containers. They do not distill mercury themselves from cinnabar, although relevant distillation techniques are described in the *Four Treatises*.[38] As mentioned in the Introduction, I observed the distillation of liquid mercury from artificial cinnabar only at the Ayurvedic pharmacy of Balendu Prakash in Dehradun, where distillation was considered one of the processing steps.

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35 *Dachu* is also called *tselkar (mtshal dkar)*, which Deumar Tendzin Püntsok describes as a color made from vermilion *(mtshal)* and white chalk *(dkar = ka rag)* used in *thanka (thang ka)* painting. See Onoda (2011, 184). *Dachu* is also a synonym for *ngülchu* and artificial cinnabar, *choklama*. A contemporary Tibetan medical dictionary describes *dachu* as a type of earth mineral medicine *(sa rdo'i sman)*, having "the shape of *chokla*, but it is more whitish in color than that" (*dbyibs cog la ma 'dra ba la kha dog de las dkar ba*; Jampa Trinlé and BMTK 2006, 347, quoting Deumar Tendzin Püntsok 2009, 119/14–15). Deumar Tendzin Püntsok classifies *dachu* under meltable mineral medicines and writes that it cures broken bones (*da chus rus pa chag pa sbyor bar byed*; 2009, 119/12). In some medical contexts, *dachu* appears to refer to calomel (mercurous chloride, Hg_2Cl_2) or corrosive sublimate (mercuric chloride, $HgCl_2$), see Gerke (2015b, 551). Gawé Dorjé (1995, 58) identifies *dachu* as Hydragyrum Sulphidum. For identifications and references, see also Czaja (2017, 125, note 21).

36 *Dachu* is mentioned in text Eight of the *Eighteen Additional Practices* (*Cha lag bco brgyad*; Yutok Yönten Gönpo 1999, 542/5). Deumar Tendzin Püntsok has a separate entry on *dachu* (2009, 119/12–120/5). Karma Ngélek Tendzin (b. 1700; 1973, 533/3–4) mentions *chu shak* in a formula to treat venereal diseases. See Gerke (2015b, 546).

37 Tsering Norbu, personal communication, Materia Medica Department, Men-Tsee-Khang, Dharamsala, May 14, 2015.

38 One method describes making cinnabar ash or *tsel tel (mtshal thal)*, which involves the extraction of mercury from cinnabar. Here, powdered cinnabar is burned in a sealed clay pot by heating it from below and cooling it from above; the condensed liquid mercury is collected from the top of the pot and the ash at the bottom is used in medicine. See Yutok Yönten Gönpo (1982, 597/5–9); MTK (2015, 114–115).

Following the poison: An ethnography

In 2011, I decided to "follow the poison" on one of its trading trails through the Khari Baoli market in Old Delhi, the largest market for medicinal plants in North India.[39] I had heard about it in Kathmandu a few weeks earlier when I interviewed Amchi Wangchuk Lama, a senior Tibetan physician who had settled in Nepal from Kyirong in southwestern Tibet. He had processed mercury and made *tsotel* and precious pills back in Tibet (see Chapter 4), but since becoming exiled in Nepal he was only able to do simple mercury processing, such as the "cold taming" called *kardül* or *drangdül (grang 'dul)*, and the "hot taming" called *tsadül* (see Chapter 6). He bought *tsotel* ready-made from the Dzongsar Monastery in Degé in eastern Tibet. When I met him in 2011, he said: "Ingredients are getting too expensive. Mercury used to cost 600 Nepali rupees a kilo in Kathmandu; now it costs 15,000 Nepali rupees.[40] It comes from Delhi by bus."

Imagining the transport of liquid mercury from Delhi all the way to Kathmandu by bus, I went to the Khari Baoli market, at Chandni Chowk in Old Delhi, where liquid mercury was sold, apparently in the dried fruit and herb section. Not knowing what to expect, I took a walk through the lanes of little shops, their goods piled high. Indian porters were carrying sacks of merchandise on their backs, mingling with the customers, who bought the products from the open stalls. I arrived at an area lined with shops selling dried fruit and herbs and asked around for mercury. A salesman pointed me to a shop with white-tiled walls, shelves on either side, a small sales counter, and a bench for customers. Signs stating "Fixed price! No bargaining!" gleamed on several walls. Hans Raj & Sons sold mostly dried fruits, and the counter was filled with stainless-steel bowls full of cardamom, raisins, and nutmeg. The shop was tiny, but business was good. I sat down on the tiny wooden bench, and we began talking. I asked for the price of mercury. He started at 7,000 Indian rupees. When I told him I was a researcher and not interested in actually buying it, he said the going sales price was 6,500 rupees per kilogram. I calculated that Amchi Wangchuk had paid around 3,000 rupees extra per kilogram for the transport to Kathmandu.

Hans Raj explained: "We used to sell a lot of mercury, also to Ayurvedic companies, but the price has gone up from 350 rupees per kilogram, twenty-five years ago, to 6,500 rupees now. The price went up drastically three to four years ago, but I don't know the reason. Three years ago [in 2008] it was around 1,600 rupees per kilogram." "Where do you get your mercury from?" I asked. He replied, "We just buy it down the road, at the

39 See Banerjee (1998) on the environment discourse concerning the medicinal plant trade in the Khari Baoli market. A survey of the mercury trade in this market was conducted by Toxics Link in 2005 (no longer online), but see Wankhade (2003, 53–54) on mercury sales in Tilak Bazaar, and Toxics Link's (2019) "Mercury Campaign."

40 In December 2011, 15,000 Nepali rupees were approximately 9,500 Indian rupees or 130 euros.

chemist market in Tilak Bazaar. Here, in Khari Baoli, about eight to ten shops sell mercury." I asked to see the mercury, and he showed me two small plastic bottles with white lids that screwed on, wrapped in a clear plastic bag (see Fig. 11). "We keep around two to four kilograms of mercury in stock," he said, handing me the bottles. I was struck by the weight of the high-density liquid (one kilogram easily fit into one approximately 250 ml bottle).

I continued into the bazaar and inquired in a few other shops that sold mercury. I discovered that herbs and chemicals were sold together; metals were sold in another specialized market. Herb shops also sold borax, potash, copper, and sulfur. I was surprised to see that mercury was sold alongside herbs and not at the metal market. I later learned that Ayurvedic physicians buy their raw materials here and since they often need mercury for their *bhasmas*, they want to buy everything together from one shop. I walked onwards to the Tilak Bazaar, where the shopkeeper had told me I would find the wholesalers for mercury and sulfur.

I entered the Baburam & Sons chemist shop. A sign at the shop entrance read: "Fine heavy industrial chemicals and pharmaceuticals, metals & shampoo." They were busy. The scene reflected the generational change gripping modern India: The father, Baburam, sat at the counter with an old phone and heavy, handwritten account books, while the son sat at the back of the shop with a laptop and mobile phone, typing numbers into an excel sheet. I asked the father, "How much mercury do you sell?" "About thirty to forty kilograms a month," he promptly replied. "We sell it to brokers, who then sell it to companies making light bulbs and thermometers. Only a few Ayurvedic companies come." The son then joined the conversation: "We sell pure mercury, others also sell commercial mercury." I had not heard of this distinction, and realized that there must be a variety of definitions of what is considered "pure," and by whom. "What is the difference?" I asked. He explained: "The pure one has a better shine, but we cannot really tell the difference and have to trust our dealers. That is why everyone here usually deals with the same dealer over many years."

Revisiting this encounter as I write, I see a parallel to what Tibetan physicians have told me. They describe pure mercury as having a better shine after the initial rust, in Tibetan called *ya* (*g.ya*, which refers to impurities, oxidation, dust particles, and the like), is removed during the many stages of processing, and the mercury becomes "similar to a cleaned mirror" (*me long phyis pa ltar*, Dawa Ridrak 2003, 424/11).

Baburam's mercury apparently came from Turkey, which was surprising since most of the mercury mines in Turkey were closed by the 1990s (UNEP 2010, 2). He himself could not tell the difference in quality and trusted his dealer. He showed me the one-kilogram plastic bottles of mercury, which were similar to the ones I saw at the herb market. Around the corner from Baburam's shop, I saw a standard wholesale mercury metal flask containing 34.5 kg (Fig. 12) outside a shop selling spices and wholesale *puja* ritual implements. A half-torn label read "Liquid mercury. Net (34.5 kg)," and on

Figure 11: Two bottles of liquid mercury sold at an herb and spice shop in Old Delhi, 2011. Photo by author (Gerke 2011 / CC-BY-SA 4.0).

Figure 12: Mercury flask (34.5 kg) from the US in front of a wholesale shop at Tilak Bazaar, Old Delhi, December 2011. Photo by author (Gerke 2011 / CC-BY-SA 4.0).

the side of the rusty can I deciphered "USA" on the dirty label. Interested in learning more, I settled down at the shop—Kamal Sales Corporation.

Kamal, a young man, was open for conversation and told me he sold ten to fifteen kilograms of mercury per month. Kamal's broker lived in Dubai and bought the mercury himself from Spain and Turkey, sometimes the USA. "Some brokers come to take the mercury to Ayurvedic companies," he said. "But I don't have direct contact with the doctors." I asked him how he poured the mercury from the large flask into the small plastic bottles and Kamal responded, "I do it myself," pointing to a white ceramic-coated metal bowl sitting on a shelf on top of a colorful carton of ritual camphor incense. What happened next is one of several examples I would encounter during fieldwork; my own perception of toxicity influenced the ethnographic encounter since I was unable to pretend neutrality—the ethnographic myth of objectivity. I was once again reminded that "fieldwork is [...] a personal encounter and ethnography [...] an intersubjective reality" (Hastrup and Elsass 1990, 302).

"Do you cover your mouth and nose when you handle the mercury?" I asked, my concern no doubt evident. "No," Kamal answered. "What do you do if you spill some?" He showed me how he would pick up the mercury globules with two sheets of paper and roll them back into the bowl. He noticed my obvious unease. I was thinking of his regular exposure to the invisible mercury vapor. At least his shop was open to the street. In response to my concern, he asserted, "But I mostly sell the 34.5 kilogram canisters for 2.10 lakhs rupees each [210,000 rupees, around 3,000 euros in 2011]." This was around 6,000 rupees per kilogram. He continued, "I don't fill the one kilogram bottles very often. Mostly companies buy it for making thermometers, light bulbs, [...]." He appeared not to have given much thought to mercury toxicity, occupational risk, and his exposure to a toxin, but was responding to my concerns spontaneously, as evident from his bodily expressions. This "embodied sense of toxicity" as I decided to call these bodily reflexes towards the differently perceived toxicity of mercury came up in several instances during fieldwork. They were among the most challenging moments of my ethnographic encounters with different forms of mercury.

Looking around his shop, I also noticed pieces of a shiny gray metal in a bowl next to various types of spices, mostly pepper and coriander seeds. "This is lead," he explained. "It comes from Morocco. They use it for cosmetics, especially to make *kajal* [eyeliner] for women." He also shared that he does not know his brokers, who were elusive and did not have a fixed location. This conversation revealed to me the difficult, somewhat untraceable path of this heavy metal.[41]

Pondering the perception of risk and toxicity among these wholesalers in Old Delhi, I now had a better idea of where the mercury that Amchi Wangchuk had mentioned had come from. Some other amchi in Nepal told me how they once bought a bottle of mercury in Kathmandu. It was

41 See, for example, Mohta (2010) on *kajal* as a dangerous cosmetic.

considered an expensive ingredient, and they proudly took it on a flight to the high mountains of Dolpo in western Nepal to make medicines there. Unfortunately, it was in a glass bottle and it broke during the flight, the little shiny pellets rolling across the floor of the small aircraft.[42]

After India signed the UNEP treaty to ban mercury in 2014, I visited the same market stalls at Khari Baoli and Tilak Bazaar again in March 2016 (five years after my previous visit), to see whether there were visible changes in the mercury trade. The brothers at Hans Raj & Sons were very welcoming when I reminded them of my previous visit. I asked how the mercury trade was going. One of the brothers said, "Trade is down. The price is down to 2,800 rupees per kilogram, and we sell only two to three bottles, maybe five a month to Ayurvedic doctors who come here to buy medicinal plants." The price they quoted was lower than in the other shops, which charged 4,000 rupees per kilogram. They still had the small plastic bottles readily filled from Tilak Bazaar, which was around the corner. The shopkeeper then said, "Mercury now comes from the African mines, not anymore from Spain." I asked about other forms of mercury; he responded that there used to be a white powder—called *rasakarpūra*—in the market, but that it was very toxic and had been banned. *Rasakarpūra* has been identified as calomel (Hg_2Cl_2, mercurous chloride)[43] and as mercuric chloride ($HgCl_2$, corrosive sublimate).[44] Other shopkeepers I talked to that day confirmed that calomel was very toxic and banned. He then showed me a piece of artificial cinnabar, of which he only knew the Urdu term *shingraf*.[45] It sold for the same price as mercury. Natural cinnabar rock is rare and not available in the markets.

I turned the corner and went to the same shops in Tilak Bazaar that I last visited in 2011. Baburam & Sons were busy with paperwork and not inclined to be interviewed in depth. On my inquiry about their mercury sales, they said, "Prices are down because companies who used mercury for thermometers and light bulbs are phasing out mercury. But you can buy a flask of mercury [34.5 kg] for 3,800 rupees per kilogram." The son explained further: "The current price drop of crude oil makes it cheaper

42 The story was told during the Sowa Rigpa workshop in Kathmandu in December 2011.

43 In tropical India calomel was used—especially after the 1750s—in "high doses to treat many common ailments, including dysentery and fevers," as well as common liver diseases among Europeans in India, and was widely used to treat syphilis (Harrison 2010, 149).

44 *Rasakarpūra* has not always been identified as the same substance. Note, for example, that Dutt identified "*rasakarpūra* as 'per-chloride of mercury' or 'corrosive sublimate', though he noted that the product available at medical markets at the time of his writing (in the 1870s) was not pure perchloride [= dichloride, $HgCl_2$] of mercury, but a mixture of calomel and corrosive sublimate" (Wujastyk 2015c, 1048, note 13, quoting Dutt 1877, 37).

45 It is called *hiṅgūla* in Sanskrit and Hindi. Unani medicine peaked in Delhi during the Mughal period (1526–1858). See Preckel (2015, 906). Many medicinal substances are still traded under their Urdu names. On mercury and cinnabar in Unani medicine, see Preckel (2015).

Figure 13: The shopkeeper offering the author a sample of liquid mercury in an enamel bowl to check its shine. Tilak Bazaar, Old Delhi, March 2016. Photo: Thomas K. Shor (Shor 2016 / CC-BY-SA 4.0).

to transport mercury, which is heavy, but still the demand is down in the industry." Their supply is now sourced mainly from China and Africa. I left them to their paperwork and walked across to Kamal's. In 2011, I was unprepared for his perception of safety. This time I consciously tried not to react to how he dealt with mercury exposure. In his shop of ritual supplies, incense, and spices, I again noticed a bowl of lead next to a bowl of cardamom. Asking what it was he answered, "This is lead, used for the *kajal* eye liners for women—only 280 rupees per kilogram." In the midst of his bowls of lead and spices, I noticed a little bottle of mercury and inquired about it. He immediately took the bottle, opened it, and poured some of the liquid mercury into an enamel bowl and handed it to me to check its shine (see Fig. 13).

"Mercury costs only 2,800 rupees per kilo if you buy a container," he said, pointing to a large metal container in the back of his shop. I noticed the Chinese characters (Fig. 14). He poured the mercury back into the bottle, spilling quite a bit. The silvery mercury globules moved quickly between his spice bowls. With his fingers, he playfully made the globules move together into one large drop, the size of a rupee coin, which he then scooped up with a piece of paper and back into the mercury bottle (Fig. 15). A few globules kept rolling around but he appeared to be unconcerned. "No problem," he said, "later." This time I did not react, but my mind went to the Nepali educational film on containing a mercury thermometer spill in a hospital that I had shown during my lectures to Tibetan medical students to initiate discussions on toxicity (see Introduction). The way the nurse in the film cleaned

Figure 14: A Chinese flask of elemental mercury (34.5 kg) at the same wholesale shop in March 2016. Photo: Thomas K. Shor (Shor 2016 / CC-BY-SA 4.0).

Figure 15: The shopkeeper containing a mercury spill with his fingers and a piece of paper at a wholesale shop at Tilak Bazaar, Old Delhi, March 2016. Photo: Thomas K. Shor (Shor 2016 / CC-BY-SA 4.0).

up the spill (wearing gloves and a mask) and the way in which Kamal did it illustrates strikingly different embodied approaches to mercury's toxicity.

"Sales are down because mercury is now available everywhere," he said. "You can buy it in the bazaars of Hyderabad, Mumbai, and Chennai. Previously, you could only buy it in Delhi; now so many shops have it, even here." I asked him who bought it and he said, "Ayurvedic companies still use it, but *rasakarpoor* [calomel][46] is banned. That is really bad; mercury is okay." He also informed me that he still filled the bottles himself. "No problem," he said, wiping his hands on a piece of cloth.

I learned more about the mercury sales when I dropped into an Ayurvedic herb shop that I had not seen previously. A young Indian man ran the shop, which he had taken over from his father, whose photo hung over the counter. He offered me a seat in the middle of the shop while we spoke. He proudly told me about the size of the Khari Baoli market, and that it was the largest wholesale spice market in Asia, with its 10,000 little shops in tiny lanes, and that huge business was conducted there. He was doing well and had travelled abroad, including a visit to Germany. Sellers kept their supplies in large warehouses outside Delhi and brought their daily orders by truck into the market. The shops only had the space to keep samples. He offered me a chair and placed a bottle of mercury in front of me. As a white woman, I did not remain unnoticed for long, and a crowd of his workers and some men stood around the shop to watch. Some of his workers made a joke about how mercury is like Śiva's semen, with the ability to give one power and make one younger. I added that they also needed sulfur, the blood of Parvatī, to make it work. They laughed and the shopkeeper then showed me samples of yellow sulfur.

I asked whether he sold *hingul* or *chokla* in his shop, using the Hindi and Tibetan names on purpose. To my surprise he said, "*Choklama* is a Tibetan name." He opened his drawer and took out five old typewritten sheets of Tibetan and Hindi *materia medica* names, each sheet individually laminated. They must have survived many years in his shop. "We are the suppliers for the Tibetan medical institute in Dharamsala," he said. "It all began when a Tibetan monk in red robes came to my father's shop one day in the 1970s. Now they come once a year, always look for the best quality, and pay on time." He showed me the Tibetan names for mercury *(ngülchu)* and for cinnabar *(chokla)* on the sheets. "They have a lab, and if samples are bad or if there is any moisture or fungus, they send back the whole lot. They always go for quality; they buy the best Kashmir saffron for 3,000 euros per kilogram." He pulled out his mobile phone and pointed to the name and contact number of the current amchi in charge of purchasing raw materials; they communicated through WhatsApp. I recognized his name, and we found common ground to talk, but he was careful not to divulge any of his business details, which I respected.

46 *Rasakarpoor* is the anglicized form of the Hindi word, which however derives from the Sanskrit *rasakarpūra,* and here refers to calomel.

I happily sat at the center of his shop holding my fieldwork treasures (Fig. 16): a bottle of mercury, some artificial cinnabar, and yellow sulfur (Fig. 17).

"How do you know the mercury you sell is pure?" I asked. "I don't. Now, sometimes they add lead to the mercury," he admitted. "Rumor has it that Chinese mercury is often adulterated. But how much lead can they add? One or two kilos maximum, it hardly matters," he speculated, not considering how lead in mercury might affect medicine making. If contaminated mercury were used to make artificial cinnabar, *chokla* would also have lead. "Ayurvedic companies and physicians come to buy from me," he said. "Mercury prices are down by half, but mercury sales are up." He was the only one of the four sellers I spoke with that day who said the sales were doing well. "Mercury is freely available everywhere; I could get you 500 large iron flasks right now from the surrounding shops if you needed them." Although this statement was probably an exaggeration, the shopkeeper sounded confident. Later in our conversation, he said that he had never heard of the UNEP ban on mercury, which India signed in 2014. Before we parted, he offered me a gift of liquid mercury in a small plastic bag. Considering my flight the next day, I declined, but gladly accepted a piece of *chokla*. "Tibetans process it and mix it with milk to treat broken bones," he explained; he had clearly picked up some traditional knowledge from his Tibetan customers. Afterwards, I stood outside his shop for a few moments, collecting my thoughts and looking around for a water tap to wash my hands, when an Indian man with a cloth bag around his shoulder addressed me in Hindi, asking whether I wanted some mercury. He hinted that he also had the adulterated kind, for cheaper. He must have watched me in the shop. Realizing I was not a buyer, he walked off. I wondered if he was one of the small junk dealers who collect mercury from hospital waste and resell it (Toxics Link 2005, 24–29).

On reflection, although I never did an exhaustive survey at Khari Baoli and only went twice to the same three shops and once to the Men-Tsee-Khang supplier, there were a few noticeable changes between 2011 and 2016: the price of mercury had halved, the demand in the industry seemed somewhat less, and the market was flooded with mercury. The demand for mercury among Ayurvedic companies and practitioners appeared to be ongoing. No more metallic mercury from mines in Europe or the USA were mentioned, but the supply at these shops in 2016 came from China[47] and Africa,[48] and there were some concerns regarding possible contamination of mercury with lead.

The visits to the Khari Baoli market triggered some basic questions: What was "pure" mercury? Who defined the term, and how was it defined?

47 China is already mentioned as a source of mercury in a report on the Delhi mercury trade in 2005 (Toxics Link 2005, 27).

48 Morocco and Algeria are also known exporters of mercury to India (Toxics Link 2005, 64).

Figure 16: Fieldwork treasures: the author holding an artificial cinnabar rock and a bottle of liquid mercury at Khari Baoli market, Old Delhi, March 2016. Photo: Thomas K. Shor (Shor 2016 / CC-BY-SA 4.0).

Figure 17: Artificial cinnabar *(chokla)*, liquid mercury, and yellow sulfur at a shop in Khari Baoli market, Old Delhi, March 2016. Photo: Thomas K. Shor (Shor 2016 / CC-BY-SA 4.0).

Exploring concepts: Pure or processed?

We can assume that there will be a different understanding of a substance such as mercury in societies with different conceptions of purity as it relates to basic components of matter.[49] Tibetan ideas of mercury toxicity cannot be understood merely within anthropological frameworks of representation, symbolism, or belief. What follows is *not* a description of different epistemologies or a binary comparison between the biomedical and Sowa Rigpa views. Rather, in this section I continue to "follow the poison" as I did in the Old Delhi market, but this time through the particular Tibetan terminology associated with mercury and its different interpretations.

What terms do Tibetan medical practitioners use when discussing the processing of mercury? During fieldwork, English-speaking Tibetan physicians in India expressed the necessity to detoxify or purify mercury before it can be used in medicines. They used these English terms freely and interchangeably, often referring to the detoxification of substances as purification, and processed mercury as pure mercury. However, when speaking Tibetan, they used several technical terms, explained in the following paragraphs. Related processing practices will be discussed in Chapter 6; here I unpack and define the technical terms.

The composite Tibetan term *düljong ('dul sbyong)* combines the meaning of taming, or *dülwa,* with purifying, or *jongwa (sbyong ba*, also *dag pa byed pa)*. *Düljong* is a fundamental practice in Sowa Rigpa pharmacology, or *menjor,*[50] in which poisons are tamed and harmful components transformed or eliminated through skillful detoxification practices collectively called "taking out the poison," or *dukdön*, in order to develop the medicinal effect of a compound (see Tidwell and Nettles 2019).

We need to understand that in Sowa Rigpa, purifying refers to the idea of transforming a harmful substance, or *duk*, into something beneficial, or *men*, that has the capacity to be metabolized or properly digested by the body; this digestive process is known as *juwa ('ju ba)*. In the *Four Treatises,* such digestion is defined as the separation of nutritional essences (*dwangs ma*, which then create blood, flesh, and so forth) and waste products (e.g. urine, feces). The intake of too much *duk*, either in the form of

49 Tidwell and Nettles (2019) point out that in Buddhist philosophy and also in Sowa Rigpa the tiniest piece that makes up matter *(rdzas)* is called *dültren (rdul phran)*. They clarify that "the concept of 'purity' in Tibetan *menjor* [medicine compounding] is not linked to a single-type particle and relates closer to activities of the elemental dynamics," by which they mean the complex interrelationships between the five elements (water, fire, earth, wind, and space) and the absence of capacity to do harm. This is an important difference from a Western conception of purity that defines it as a single type of atom or element (see, for example, Schwabl 2013).

50 With the term pharmacology, I refer to *menjor rikpa (sman sbyor rig pa)*, a large field of Sowa Rigpa knowledge comprising the study of *materia medica* (pharmacognosy) as well as the compounding of medicine, or *menjor*, in which *dukdön* and *düljong* are included. In this book, I largely use *menjor* when referring to these complex techniques.

improperly processed substances in medicines or unsuitable foods, is considered harmful to the body, and over time leads to illness. This necessitates the pre-processing of substances and is evident from complex Sowa Rigpa *menjor* techniques that prescribe *dukdön* and *düljong* processing for all kinds of herbal, mineral, metal, and precious substances before compounding them into formulas.

In Tibetan we find the same terms for taming and purifying substances also applied to the mind; for example, taming the mind is known as *sem dülwa (sems 'dul ba)* and mind training is called *lojong (blo sbyong)*. This shared use of verb forms emphasizes correlating ideas in Tibetan mind–body practices (Garrett 2009; Tidwell and Nettles 2019). These mind–body correlates are also evident in how mental states are deeply interlinked with the balance and imbalance of the three physiological principles, called *nyépa (nyes pa)*,[51] which are the defining paradigms determining the causation of illness in Sowa Rigpa. These principles are understood to be affected by untamed negative emotions as much as by different amounts of indigestible *duk* in foods and other substances.

In Sanskrit alchemical literature, the purification of mercury is—often mistakenly—called *śodhana*, a term that is used for the processing steps that aim at ridding mercury of impurities and unwanted characteristics.[52] The overall term for these processing steps in Sanskrit alchemical literature is *saṃskāra* (White 1996, 266–269).[53] The translation of *śodhana* as purifying is problematic; Dagmar Wujastyk (2013) suggests "perfecting" as the more appropriate translation. This translation issue also echoed my discussions with the Ayurvedic physician Balendu Prakash in Dehradun. Prakash argued:

> Actually, mercury is not purified but amalgamated with more and more substances in the process. So it actually becomes more and more impure. *Śodhana* is not about purifying but about processing. These things get lost in translation.[54]

When translated literally, English equivalents of Tibetan medical terms are often incorrect. They frequently derive from colloquial Tibetan and are polysemous. For example, the term *juwa*, which means to digest, can also acquire the more technical meanings of to melt or to dissolve in *menjor*

51 The three *nyépa*—the term has often erroneously been translated as "humor"—are the basic principles of Sowa Rigpa physiology that are imbedded into the larger cosmology of the five elements. The three *nyépa* are *lung* (*rlung,* predominated by the element wind), *tripa* (*mkhris pa,* predominated by the element fire), and *béken* (*bad kan,* predominated by the elements earth and water). For introductory summaries on the *nyépa* see, for example, Lobsang Tsultrim Tsona and Tenzin Dakpa (2001) and Hofer (2014).

52 Dagmar Wujastyk, personal communication, Vienna, June 2019.

53 Note that in Sanskrit medical literature *saṃskāra* has a different meaning and describes the rites of passage for humans, such as birth, marriage, etc. Dagmar Wujastyk, personal communication, Vienna, June 2019.

54 Vaidya Balendu Prakash, personal communication, Dehradun, September 18, 2013.

or alchemy (Fenner 1979, 120). Thus we need to broaden the contexts in which to explore the medical meanings of detoxification, and what is considered toxic or pure, and why. I use the terms processing, detoxifying, or purifying in the ways in which Tibetan medical practitioners used these terms themselves in our conversations. Broadly and chemically speaking, purified or detoxified mercury in most Indian and Tibetan traditions is a more or less stable material, amalgamated with other metals and bound to other minerals or elements—in most cases sulfur. However, within the Tibetan, Indian, and other medical traditions (Unani, Persian, Chinese, etc.), these meanings are more complex.[55]

In these medical systems, mercury processing is described variously as killing, cooking, dyeing, subduing, drying, or resurrecting, to mention a few of the technical terms that appear in two edited journal issues on mercury in traditional medicines.[56] For example, the Tibetan medical practitioner Sonam Dolma (2013, 114–115) chooses the term purifying as her translation of the Tibetan term *dülwa*, which she defines as "to overpower, or to eliminate the harmful effects of a substance, thereby subduing the negativity of the substance and generating and reinforcing its positive side." The term purification can easily be misunderstood here. A reader with a science background and no prior knowledge of Asian medicine might think that purified mercury as spoken of here means 100% pure mercury—a pure metal free of alloys or adulterants. That is not the case. The concept of pure mercury from a chemical perspective is based on the assessment of a single type of atom (see Schwabl 2013), which was developed as a model in the early nineteenth century (Rosenfeld 1971). As discussed further below, this definition is currently the sole basis for toxicity laws surrounding mercury. For now, let us remember that the atomic model of Hg has little to do with the Indian and Tibetan ideas of processed or tamed mercury, which is also considered pure by its English-speaking practitioners.

When Tibetan physicians talk about pure mercury, they are referring to a stable mercury compound formed with pre-processed sulfur—which in the case of *tsotel* is a complex organometallic mercury sulfide compound with eight metals, eight minerals, and many other ingredients used during processing or mixed into it (see Chapter 6). Considering the atomic model, processed mercury is probably a better and less misleading term in English than pure mercury. Refined mercury (in German: *veredelt*) is also an apt term since it denotes an increase in value and preciousness through processing. The young generation of Tibetan physicians I met in

55 See, for example, White (1996, 269–273) for a discussion of purification in Siddha alchemy.

56 These journal issues are proceedings of two academic events on mercury. In Berlin, I organized the symposium titled "Mercury – Elixir of Life or Poison?" in 2012, with a focus on mercury in Ayurveda and Sowa Rigpa (see the special issue edited by Gerke 2013a). Dagmar Wujastyk organized the workshop in Zurich in 2013, which focused on "Mercury in Medicine: Fluid Economies of Knowledge and Trade" and included historical perspectives from China, Burma, and Graeco-Arabic or Islamic medical traditions (see the special issue edited by Wujastyk 2015a).

India are not oblivious of chemistry and typically think about mercury in terms of an element before they enter their Sowa Rigpa studies. They are mostly not familiar with the complex Buddhist teachings on small particles and matter, which might serve as a useful parallel to understand atoms and elements (Tidwell and Nettles 2019). Quite unlike their senior teachers (some of whom do not speak English), they received a basic science training, are familiar with chemistry, and understand idioms such as the "half-life of mercury." As my examples in Chapter 7 will show, this often leads to culturally-specific forms of translations of toxicity and concepts of safety where science is employed in multiple directions—a process that has already been observed in several Tibetan medical contexts (Adams, Schrempf, and Craig 2011a; Kloos 2011, 2015).

To avoid any major misunderstandings or assumptions when discussing mercury processing from Sowa Rigpa perspectives, I will explain some of the key Tibetan terms in more detail in the following section. Acknowledging that these might not be terms correlating to relevant terminology from chemistry, I will use the term processing or refining to refer to various complex acts of mercury transformation, be they pharmacological, (al)chemical, ritual, or mechanical in nature. These are activities and techniques—such as mixing, triturating, washing, or cooking mercury with various substances—that Tibetan physicians engage in when actively processing it. It is beyond the scope and objective of this book to analyze what happens chemically when Tibetan physicians make *tsotel*, although I will later refer to some of the few existing scientific studies of *tsotel* and precious pills and document what Tibetans physicians think about scientific approaches of chemically analyzing *tsotel.*

"WELL-ACCOMPLISHED" MERCURY

What Tibetan physicians call pure, processed, refined, or detoxified mercury, in the Tibetan language is called well-accomplished or perfected mercury, or *ngülchu drup (dngul chu grub)*.[57] This so-called accomplishment is achieved through certain procedures often dubbed alchemical in English. In Tibetan, the technical term for making *tsotel* is *ngülchu tsodru chenmo*, which is usually translated as "Great Mercury Processing" or "Great Mercury Refinement." The term contains the Tibetan words *tso (btso)*, which means to cook, refine, or distill, and *tru (bkru)*, which means to wash. These refer to procedures of washing liquid mercury with reactive substances or water and boiling it with various additives inside a caldron. The practice is also called *ngülchu drupa (dngul chu grub pa)*, which translates to accomplishing or perfecting mercury.[58] This *menjor* accomplishment is complex. Not

57 We find this term, for example, in the title of the early Tibetan canonical work *Treatise on Perfecting Mercury (Dngul chu grub pa'i bstan bcos)*, in Sanskrit *Rasasiddhiśāstra*. See Bhalipa et al. (1994–2008a); see also Chapter 3.

58 *Drup* can mean refining a substance through processing, but in a Buddhist context it also refers to ritual accomplishment, as in *druptap (sgrub thabs*, Sanskrit:

only do the poisons of mercury have to be transformed in order for the refined compound *tsotel* to be safe for use in other medicines, the ritual procedures that are part of *tsodru chenmo* also have to be carried out successfully.

In Tibetan, the term for ritual is *choga (cho ga)*, which also means method, knowledge, procedure, or technique; briefly, it refers to something that needs to be done to accomplish something. A *menjor* procedure is often simply called *choga*, even without any Buddhist rituals attached to it. However, the practice of triturating substances while reciting mantras, for example, is also part and parcel of *choga*, and it is difficult and—to my mind—unnecessary to distinguish clearly between ritual and medical procedure in a *menjor* setting (Gerke 2016a).

The processing of mercury involves both *drup* and *choga*—accomplishment and procedure, respectively. While making *tsotel*, mercury undergoes the longest and most complicated procedure in Tibetan *menjor* practice, which can take several months. As we will come to understand from the Tibetan physicians I interviewed, the longer the procedure (involving many steps of processing), the safer the final result. In Tibetan medicine, *choga* is human effort and skill put into the transformation of substances in time and space. The approach is similar to the understanding of accomplishments in Buddhist mind practices, which require a certain amount of effort by the practitioner to engage in regular and often time-consuming repetitive daily practices over many years to achieve forms of *drup*. Taming the mind and mental negativities, like taming a wild horse, takes time, effort, and skill. Likewise, taming a poison takes a lot of effort and skill, as expressed by Tenzin Thaye in the opening quote to the introduction. Even though there are short versions of *choga* for mercury, such as cold taming known as *kardül* or *drangdül* and hot taming or *tsadül*, the best *choga*, i.e. making *tsotel*, has the most complex and longest duration, involving many steps of processing. Based on this (and other aspects that will be explained later), Tibetan physicians trust its potency and safety.

MERCURY, THE ELEMENT—*NGÜLCHU* THE AGENT

To understand the Tibetan terminology used in the processing of mercury, we need to temporarily bracket out our chemically determined perception of mercury as an element (Hg), and instead look at mercury as a living substance. Because it is volatile and moves quickly, mercury has a versatile character: it changes form, devours other substances, and penetrates everything it encounters. It appears to be "alive," an attribute given to metals in Indian alchemy. Mercury is considered an active agent. From Tibetan and Indian alchemical perspectives, mercury is alive and thus *does* things,

sādhana). See Garrett (2009, 209) for these close relationships between medicine and ritual in the context of "accomplished medicines," known as *mendrup (sman sgrub)*.

often expressed in active language (see below). Thus, the role of the practitioner is to tame its aliveness into a stable, i.e. immobile, compound.

David Gordon White in *The Alchemical Body* tells the story of how the medieval alchemists of India held a worldview in which sexual fluids were seen as homologous to metals (White 1996, 5). It is easy to comprehend how liquid shiny silvery mercury was seen as homologous to the god Śiva's semen. According to White, "the sexual essence of the Absolute" is present in the mineral world. Mercury is all-absorbing (it can "eat" other metals) "as Śiva, who at the end of cyclic time, implodes the entire universe into his yogic body, thereby transforming existence into essence" (1996, 6). Thus, processing mercury is all about controlling the volatile activity of the metal. Mercury has to be transformed and made less mobile and more stable so it cannot evaporate when heated. When it is "fixed," it can be manipulated and eventually controlled and tamed, in other words the poison has become an elixir.[59] This, in brief, is the main tantric objective of taming mercury into a potent medicine.

Various Tibetan textual sources use specific vocabulary to describe the behavior of mercury. To understand its liveliness, let us look at its behavior described in the Indic alchemical and tantric texts that made it into the Tibetan Buddhist canon. On its way to accomplishment or perfection mercury eats *(za ba)* and pierces or penetrates *('bugs byed* or *'bigs par byed)*[60] other metals and substances (Simioli 2013, 50, 53). Note that mercury here is treated as the agent that can act upon other substances, the objects.

In the following quote from the *Kālacakratantra*, an important Indian Buddhist tantric text from the eleventh century, mercury is described as having the ability to penetrate metal and eat what pierces the body, i.e. destroy disease. Additional substances must be boiled with mercury in order to take care of those parts that could not be pierced by mercury. Such substances take an active role in the "accomplishment" of mercury:

> Mercury is of two types: that which accomplishes and that which does not accomplish; that which pierces and that which does not pierce. It accomplishes when it pierces metal, moreover, eating that [which] pierces the body also. What mercury does not pierce will be transformed by that which is boiled with that mercury. The process of piercing metal and its complete piercing, having expelled the defects of the metal, destroys all disease (*Kālacakratantra*, Chapter 5, verse 204, translation by Fenner 1979, 155).[61]

59 See White (1996, 266–269) for a detailed description of mercury processing through eighteen techniques called *saṃskāras*. Accordingly, the first set of eight detoxify mercury enough to be used internally as medicine. The second set of eight further prepare mercury to transform the alchemist's own body into "alchemical gold."

60 In a fifteenth-century Tibetan medical text, "Piercing-One" is an epithet for mercury (Gyatso 1991, 40).

61 The original quote reads (Fenner 1979, 218/5–13): *ro ni grub dang grub pa ma yin rnam pa gnyis su 'dir 'gyur 'bugs byed dang 'bugs byed min/ grub pa lcags ni 'bugs par byed te slar yang de ni zos pas lus kyang 'bugs par byed pa'o/ gang zhig 'bugs byed min*

Other terms we come across in early descriptions of mercury processing techniques are the words killing *(bsad pa)* and devouring, or *zajé (za byed)*. In the early canonical Tibetan medical texts that were translated from the Sanskrit, the process of calcining metals into a fine ash or oxide is referred to as killing (Simioli 2013, 53; in Sanskrit *māraṇa*, see White 1996, 267).[62] These texts list varying numbers of metals and minerals. Specifically, while perfecting mercury, "eight devouring minerals," called *zajé kham gyé (za byed khams brgyad)* or briefly *kham gyé*, devour the poisons of mercury, and the "eight binding metals," known as *ching jé chak gyé ('ching byed lcags brgyad)* or briefly *chak gyé*,[63] bind them. Strictly speaking, not all of the *kham gyé* are minerals, but most Tibetan physicians call them minerals when they speak English, and I will refer to them as such (see Chapter 6 for their varying identifications).

These examples demonstrate the nature of the specific terminology used in Tibetan texts to describe the processing of mercury. It is important to be sensitive to the fact that English renderings of processing and detoxification should be understood in this book as broad English labels used to refer to very specific procedures that aim at manipulating the *qualities* of substances, not necessarily the substance itself. As Fenner explained: "To the alchemist, the process was seen as a matter of manipulating qualities. The differences between gold and other metals were not seen in terms of substance so much as color, malleability, and so on" (Fenner 1979, 67). This focus on the characteristics and properties of substances that are transformed during processing rather than on the substance itself is a critical point, which is also highlighted in recent studies on *tsotel* (see Tidwell and Nettles 2019).

Similarly, when it comes to the understanding of *nüpa* in Tibetan medical contexts, the term does not necessarily refer to the substance as such, but more often to its qualities (Ploberger 2015). In the Tibetan language, complex notions of potency are articulated under the umbrella term *nüpa*, which is frequently translated into English as potency, referring to a substance's capacity to have an effect. *Nüpa* appears as a central and unifying concept of potency, around which other terms and classifications are established. It can appear as a clearly defined technical term with precise characteristics but might carry multivalent meanings in other contexts.

Sowa Rigpa practitioners frequently talk about the potency of substances *(rdzas kyi nus pa)* as one of the three key pillars of *menjor*, along with the potency of mantras *(sngags kyi nus pa)*, referring to consecration,

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pa'i dngul chu ro de bskol ba dang ni bsgyur ba gyur pa dag gis kyang / lcags ni 'bugs shing rjes su 'bugs te mtha' dag nad 'phrog rul pa'i lcags ni rnam par spangs nas so//.

62 The "killing" or calcination of metals, turning them into ash, is first found in one Sanskrit medical text of the ninth century, and also in early alchemical texts from about the tenth century onwards, but dating these early texts is problematic and it is debated whether this terminology of mercury first appears in medical or alchemical texts (Dagmar Wujastyk, personal communication, Vienna 2016). See also Dagmar Wujastyk (2013, 18) and Dominik Wujastyk (1984).

63 These are copper *(zangs)*, gold *(gser)*, silver *(dngul)*, iron *(lcags)*, bronze *('khar ba)*, brass *(ra gan)*, tin *(gsha' dkar)*, and lead *(zha nye)*.

and the potency of dependent arising *(rten 'brel gyi nus pa)*, referring to the enhancement of *nüpa* through processing substances at auspicious times (Gerke 2019b; for the basic activities of these different modalities in Sowa Rigpa *menjor*, see Tidwell and Nettles 2019).

A relevant example from the *tsodru chenmo* practice is that the most sacred and auspicious day of manufacture is the day when the most significant changes in color and texture occur while triturating pre-processed mercury with pre-processed sulfur. Recitation of mantras and performing of rituals accompany this process (Chapter 6). The visible transformation of the whitish substance that turns into a blackish powder is so impressive that it is called confrontation or "meeting the enemy," in Tibetan *dratré (dgra sprad)*, alluding to a powerful, transformative encounter (Dawa Ridrak 2003, 424/28). The phrase "meeting the enemy" is impressive also because of its visible proof of the successful taming of mercury and the accomplishment of its potency.

The above examples should serve to clarify my approach. While not questioning the potential danger of poisonous substances in medicines, if we want to go beyond a chemical gaze we need to analyze the terms Tibetan physicians themselves use and study the medical sensibilities and specific enskilment that inform their practices and perceptions of potency.

IN THE WORLD OF ESSENCES AND ELIXIRS: *RASĀYANA* AND *CHÜLEN*

Tibetans recognized early on that mercury is a poison. Therefore, the arising question is why mercury was used in medicines at all.[64] To understand this in the Tibetan context, we need to further explore a few key technical terms and themes surrounding this notion of a poison becoming an elixir, which is encapsulated in the taming narrative and origin myth of poisons, explored at the beginning of this chapter. Here, I will briefly discuss the body of knowledge surrounding essences and elixirs and how they are embedded in the wider corpus of longevity, alchemy, and rejuvenation practices in Sanskrit and Tibetan medical texts.[65] Contemporary Tibetan physicians' interpretations of terms often differ significantly from what is in their texts. Walter (1980, 10–11) reminds us that to call a drug an elixir might just mean that it is a potent drug and not that it is alchemical in nature. All the technical terms surrounding the alchemy-elixir-rejuvenation complex require context-specific definitions for us to make sense of their very wide applications. How can we understand the position of mercury in this multifaceted field?

64 Medical historian Andrew Cunningham explores the same question about using mercury as medicine in Europe (2018b).

65 Since the mercury practices I studied for this project are largely of Indic origins, I do not consider Chinese mercury practices in this book. It is also beyond the scope of this work to develop comparative approaches with the history of Chinese mercury practices. See Needham, Ping-Yu, and Gwei-Djen (1976) on the use of cinnabar in medicine in China.

The Sanskrit term *rasāyana* is often translated as rejuvenation or alchemy; however, some scholars think that the meaning of alchemy as a discipline attributed to the term *rasāyana* (which refers more to a set of practices) is a much later development.[66] *Rasāyana* is, however, by and large considered the principal Sanskrit term referring to the material aspects of alchemical processes (Samuel 2010), and also refers to rejuvenating drugs or tonics (Wujastyk 2015d), as well as the final stages in alchemical operations in which the elixir is imbibed by the practitioner.[67] *Rasāyana* is also one of the famous eight branches (Tib. *yan lag brgyad*, Skt. *aṣṭāṅga*) of the fundamental framework of medical classification in both Indian and Tibetan traditions. Two of these eight branches deal with important aspects of vitality—the branch of healing the aged focuses on rejuvenation while the branch of restoring virility targets fertility (see Gerke 2012 [2013], 332–333).

Besides describing the composition of elixirs and tonics, *rasāyana* in most Indian alchemical traditions also refers to the transmutation of metals into gold (Walter 1979, 319); and while *rasa* is one of the synonyms of mercury, it can mean many other things as well, such as the sap or juice of plants. Already in early Sanskrit medical texts, the divergences of approaches, ingredients, and *rasāyana* practices "are so great that any single definition of *rasāyana* is put into question" (Wujastyk 2014, 170).[68] Early Indian Ayurvedic compendia of the first to third century CE allude to a substance called *rasa* that could have been mercury (Wujastyk 2013, 17). We can be more certain that the first formula used for ingesting mercury is found in the Ayurvedic compendium of the seventh century CE, the *Aṣṭāṅgahṛdayasaṃhitā* (see Chapter 4), which prescribes mercury (here called *pārada*) "as an ingredient of a 'rejuvenating tonic' *(rasāyana)*" (Wujastyk 2013, 18).

The Tibetan translation of *rasāyana* as "the coming forth by itself *[āyana]* of the fluid essence *[rasa]*" (compare with White 1996, 73) is *chülen (bcud len)*, which means imbibing the essence or *chü (bcud)*. *Chülen* is also translated as essence extraction, referring to its manufacturing. Walter (1980, 66, note 4) emphasizes that in Tibetan the term *chülen* is consistently used "when referring to metallic, non-metallic, and yogic alchemy, as well as in its Ayurvedic sense of 'tonic.'" The body of Tibetan *chülen* practices is enormous and also heterogeneous. Many Tibetan Buddhist masters wrote *chülen* recipes for a variety of therapeutic effects, ranging from dietary techniques to survive in harsh retreat environments on little food to meditative rejuvenating agents and medicines. There are hundreds of *chülen* recipes without demarcated classifications. Of the seventy-three *chülen* texts which were recently analyzed by Oliphant (2016), only four list mercury as an ingredient for longevity-enhancing *chülen*.

66 Dagmar Wujastyk, personal communication, Vienna, March 2016.
67 Dagmar Wujastyk, personal communication, Vienna, June 2019.
68 See Wujastyk, Newcombe, and Barois (2019) for a comprehensive introduction on the various definitions of *rasāyana* and its link to longevity practices in Sanskrit medical and alchemical works.

The term *chülen* has frequently been translated as elixir (Emmerick 1990, 89), the elixir of rejuvenation (Parfionovitch, Dorje, and Meyer 1992, 119), and as alchemy (Lai 2013, 229). The labels rejuvenation and alchemy have a rather esoteric connotation, and rejuvenation is a popular term in contemporary product descriptions of Tibetan *chülen* that are marketed as supplements.[69] Some *chülen* are indeed elixirs and are mentioned in the *Four Treatises* in the form of pills, liquids, decoctions, extracts, or liquors, but not all of the manufacturing techniques could be called alchemical in the sense of substances undergoing a transformation, or involving base metals. A *chülen* can also be an essence extracted from outer elements and Buddha fields by means of visualization (Gerke 2012 [2013], 350–353). *Chülen* practices are divided into inner and outer practices (Samuel 2010; Lai 2013). In the *Kālacakratantra*, they are presented as internal *chülen (nang gi bcud len)*, which involves tantric practices aimed at longevity and enlightenment within a complex cosmology, and external *chülen (phyi'i bcud len)*, dealing with the preparation of elixirs and gold making *(gser gyur)* (Lai 2013, 230).

Thus the *Kālacakratantra* points to two important relationships Tibetan physicians typically associate with mercury: first, the fundamental interrelationship of mercury with Indian Buddhism and second, with the complex themes of longevity and immortality. Overall, the *Kālacakratantra* favors internal meditative alchemical practices and considers external substance-dependent practices that rely on actual materials as mundane (White 1996, 71; Fenner 1979, 80, 183–184; see also Samuel 2010). The *tsodru chenmo* technique discussed in this book—although showing some parallels to the mercury-related verses of Chapter 5 of the *Kālacakratantra*—has not been introduced to me as originating from it. Contemporary Tibetan physicians told me that the complex *tsotel* practice goes back to the enigmatic figure of Orgyenpa, who, although trained in the *Kālacakratantra,* introduced more complex mercury processing techniques to Tibet from his journey to the Swat Valley (see Chapter 4).

The terms for alchemist in classical Tibetan do not contain the word *chülen* but speak of a wide variety of activities an alchemist would be involved in, such as processing mercury, creating wealth, transforming gold, and enhancing immortality.[70] As far as I know, none of the terms for alchemist are used today for Tibetan physicians producing medicines containing mercury, and none of the Sowa Rigpa experts making *tsotel* would call himself an alchemist. A Sowa Rigpa medical practitioner who is specialized in making medicines is called a medicine compounder or

69 See, for example, a supplement developed by the Men-Tsee-Khang in Dharamsala, called Elixir of Rejuvenation *(rgas pa gso ba bcud len chen mo)*, which translates as "the great essence extraction healing the aged" (Gerke 2012b, 212–214).

70 Tibetan dictionary terms for alchemist are, for example: "the mercury person" *(dngul chu pa)*, "one able to create wealth" *(nor bsgyur mkhan)*, which is the Tibetan translation of the Sanskrit *dhātuvāda* in the *Mahāvutpatti* (quoted from Walter 1980, 66); "a practitioner of the art of transforming materials into gold" *(gser 'gyur gyi rtsi sgrub mkhan)*; and "someone who attained the nectar of immortality" *('chi med kyi bdud rtsi bsgrub mkhan)* (Kazi Dawasamdup 1919, 31).

menjorpa (sman sbyor pa) and the pharmacy is called house of medicine compounding or *menjorkhang (sman sbyor khang)*. However, the English term alchemist is frequently used by scholars when referring to Tibetan practices involving the transformation of metals, which is perhaps due to the historical roots of the term alchemy (e.g. the Greek *khēmia* or *khēmeia*, referring to the art of transmuting metals) and related meanings in the European languages. I prefer to avoid the overloaded term alchemy, especially in discussions of Tibetan mercury practices; however, I use alchemy in the Indian context, referring to works of early iatrochemistry, and alchemist when referring to its practitioners. Note that a trained Sowa Rigpa physician typically compounds *and* prescribes medicines; in India, there is no specialized degree in Sowa Rigpa *menjor*. Only recent institutionalization has led to a separation of medicine making and clinical practice (Pordié and Blaikie 2014), but this separation has not yet translated into separate institutionalized degree courses on making medicines.

This chapter began with the origin myth of taming poisons into elixirs and outlined Tibetan indigenous understandings of what that means in relation to mercury processing in Sowa Rigpa. There is no doubt that mercury has been considered highly toxic (and potent) across Asia. However, the toxicity of mercury also has global and political sides to it, which have influenced ideas of its risks and dangers and how it should be controlled, phased out, and regulated.

Today, modern science significantly shapes our understanding of toxicity and safety. Current approaches to toxicity in Asian medicines too easily preclude indigenous perceptions of poisons, universalizing Western understandings of toxicity. Government policies are based on mercury's elemental structure, often without distinguishing between its chemical bonds and their varying toxicity. The issues that are at stake in the discussion of mercury in Asian medicines often center on the politics of mercury toxicity. On what basis is mercury measured, defined as toxic, and legally negotiated? Who decides what is toxic? Below, I give some examples of how mercury's chemical toxicity—in itself a cultural story—informs the UNEP ban and pharmaceutical regulations in the European Union. How does it impact studies of toxicity in Asian medicines, and what does this tell us about the politics of toxicity? The following sections provide important background information for my broader socio-historical analysis of themes of taming, which I introduce in Chapter 3 through the anthropological lens of the pharmaceutical nexus.

The politics of mercury toxicity

This book follows the story of mercury—a highly toxic metal (in most of its forms)—not just in the world of Tibetan medicine but in relation to the politics of toxicity, global regulations, and the larger issues of safety that are considered global public health concerns today. The recent, legally

binding, global UNEP ban on mercury—which aims to shut down mercury mines and reduce the use of elemental mercury (Hg) as a global pollutant—has raised new questions regarding the safety of the therapeutic use of processed mercury (largely as forms of mercury sulfide) in Asian medicines.[71] It also raises questions on the ways in which such legislation is introduced to Asia, often ignoring the medical epistemologies of Asian medical traditions, several of which are actively practiced in India and are officially recognized under the Ministry of AYUSH (Ayurveda, Yoga and Naturopathy, Unani, Siddha, Sowa Rigpa, and Homeopathy). The UNEP mercury ban is in itself a testimony to the cultural story of a specific depiction of mercury's chemistry receiving a global hegemonic status. Before outlining the parameters of the UNEP mercury ban, I shall first briefly summarize how the chemical forms of mercury have influenced debates on mercury's safety in Asian medicines. The metrics followed in these studies are discussed in the last section of this chapter.

THE CHEMICAL GAZE: MERCURY AS AN ELEMENT

The natural science of chemistry considers mercury as an element with high density (13.534 grams per cubic centimeter). Mercury is liquid at room temperature and highly toxic for most organisms due to its considerable vapor pressure. Its toxicity varies greatly, depending on its organic (i.e. linked to carbon atoms, e.g. methylmercury in fish, ethylmercury in preservatives) and inorganic forms (i.e. without carbon atoms, e.g. mercury vapor, mercurous chloride (calomel), dental amalgam, cinnabar), summarized in Appendix A. Because of its high toxicity in most of its forms, serious attempts have been made during the last decades to stop mercury emission, particularly from various industries (e.g. cement, coal).

Mercury has a fascinating history revealing a rich tapestry of varying therapeutic applications and changing perceptions of safety (Cunningham 2018a; Goldwater 1972). Despite its health risks being at least partially known since ancient times, the applications of mercury (compounds) are surprisingly numerous. Its use has ranged from the extraction of gold, the felting of hats ("mad hatter"), the making of thermometers, electric light bulbs, and switches, to the treatment of syphilis. The medical use of mercury was widespread in European medicine for almost 500 years—from the late 1490s until the late 1950s (Cunningham 2018b, 173).

Anyone reading on mercury toxicity might be surprised by its complexity.[72] Not only does the heavy metal have different half-lives in various human tissues—varying from three days to decades (Kim, Kabir, and Jahan 2016, 382)—the body's absorption of mercury is also highly variable

71 For related publications and reports see UNEP (2019).

72 Different forms of mercury and their toxicity have been documented in numerous studies. See Bernhoft (2012) for a recent summary of mercury's forms of toxicity and treatment.

and depends on its different chemical forms, each of which causes a different public health concern (Clarkson and Magos 2006; see Appendix A for a summary). Mercury poisoning can also be hidden; high levels of mercury in the blood and/or urine do not necessarily give a clear indication of the distribution of mercury in the body. For example, someone can have severe mercury toxicity with low levels of Hg in blood and urine (Kim, Kabir, and Jahan 2016). Symptoms of mercury poisoning can be manifold, and because they can affect all parts of the body, they are difficult to diagnose (e.g. through neuro-cognitive tests, Hg levels in urine, blood, and hair) and are generally treated with chelating agents (Bernhoft 2012). Even though mercury toxicity is well studied, the debates concerning the toxicity of mercury amalgam used for teeth fillings demonstrate how scientists themselves have held contradicting views on mercury safety for decades and how economics and the power of health insurance companies—who for the most part only pay for the less expensive mercury fillings—plays a role in the politics of toxicity.[73]

To follow the debates concerning mercury toxicity in Asian medicines, it is important to understand that different mercury compounds with varying solubility and stability/reactivity have vastly different absorption levels in the body, varying from less than 0.01 to 95% (Clarkson and Magos 2006, 613; Liu et al. 2008, 813). The organic dimethylmercury, first synthesized in the mid-1850s, is absorbed up to 80% when breathed, and when ingested is intestinally absorbed at around 95%, of which around 90% is excreted through feces and less than 10% through urine (Ye et al. 2016). When crossing the blood–brain barrier it can cause significant symptoms of acute toxicity, such as dyspnea, nausea, and vomiting, while long-term exposure can lead to tremors, psychological disturbances, salivation, fatigue, and insomnia (Clarkson and Magos 2006, 613, 619), as well as diarrhea, blurred vision, tremors, paralysis, and memory loss (Kim, Kabir, and Jahan 2016). Forms of inorganic mercury do not cross the blood-brain barrier but can accumulate in the kidneys (Ye et al. 2016). Long-term effects of low but chronic Hg exposure might contribute to common diseases that are not easily associated with mercury, such as sleeping disorders, hearing loss, mood problems, or high blood pressure (Kim, Kabir, and Jahan 2016, 381–382). Eating contaminated fish can cause methylmercury toxicity—known since the 1950s because of Minamata disease[74] (Clarkson and Magos 2006, 625–628, 631). Drinking liquid mercury as a laxative—an eighteenth-century European therapy for constipation—is relatively harmless, while eating one gram of mercuric chloride (known as corrosive sublimate) can be fatal (Clarkson and Magos 2006, 612, 616).

73 For a summary of the amalgam debates see, for example, Bates (2006).

74 Minamata is the name of a city and bay in Japan that was heavily poisoned with methylmercury from industrial waste in 1956, leading to almost 2,000 deaths from Minamata disease, caused by consuming contaminated fish.

It is worth noting that the chemical form of mercury that is least absorbed by the body—mercury sulfide (cinnabar)—is the one used in most Asian mercury-containing medicines.[75] Due to its very low solubility, less than 0.2% of mercury sulfide is absorbed through the intestinal tract into the body, and thus large amounts would have to be ingested to cause toxicity symptoms, mainly in the kidneys (Liu et al. 2008). Cinnabar is typically not converted into the more toxic methylmercury by human gut bacteria (Zhou et al. 2011). It is important to note that Sowa Rigpa experts do not use cinnabar in unprocessed conditions (see Tidwell and Nettles 2019; Yeshi et al. 2018).

In Asia, physicians and pharmacy staff involved in mercury processing, when transforming liquid metallic mercury into the less toxic mercury sulfide, are often exposed to toxic mercury fumes, and sometimes experience symptoms when precautions are not taken. Temporary blurred vision is a common side effect of occupational mercury exposure (Cavalleri and Gobba 1998), which several Tibetan physicians I interviewed who had processed mercury experienced (Chapter 6).[76]

THE GLOBAL MERCURY BAN

The UNEP mercury ban is the world's first globalized effort to phase out mercury from industry. Here I introduce the ban, its main objectives, and how it might affect Asian medical traditions, even though traditional medicine is not mentioned anywhere in the treaty. I also document some of the reactions to the ban among Ayurvedic and Tibetan practitioners in India.

The ban was initiated by Switzerland and Norway and was adopted by the Governing Council of the United Nations Environment Programme in 2009. On January 19, 2013, UNEP passed the text of the legally binding treaty called the Minamata Convention on Mercury, aimed at preventing emissions of the neurotoxic heavy metal worldwide.[77] The European Union and ninety-one countries signed the document in October 2013 in Japan.[78] India signed the treaty in October 2014 and has until 2020 to implement it. The research conducted for this project thus largely fell into the period leading up to and during India's signing of the treaty.

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75 For example, the two forms of mercury sulfide compounds mentioned in Indian *rasāyana* texts are *kajjalī,* which is black in color and metacinnabar (β-HgS), and *rasasindūra*, which is red cinnabar (α-HgS) (Bhatt 2013). See Tidwell and Nettles (2019) for further explanations on the types of cinnabar in *tsotel* and how *tsotel* samples could be analyzed without chemically degrading the substance in the process.

76 Constricted visual fields and loss of vision have been reported after exposure to (di)methylmercury (Clarkson and Magos 2006, 630, 632) and temporary loss of color vision after exposure to mercury fumes (Cavalleri and Gobba 1998).

77 See Hortoneda (2013) on "Minamata Convention Agreed by Nations."

78 For a full coverage of this conference, see IISD (2013).

Looking through the long reports from the four years of negotiations (2009–2013), the use of mercury in traditional medicines rarely features. A request to exempt "traditional religious use" was made by one delegation during the second meeting in Japan (UNEP 2011a, 39). In the third report, only one country "expressed concern for the listing of traditional medicines" (UNEP 2011b, 30). The fourth report stated that "two representatives highlighted the need for exemptions for mercury-containing products, such as cinnabar, for use in traditional medicines" (UNEP 2012, 10–11). Unfortunately, the report does not mention which countries these representatives came from. In the fifth and final session in 2013, it was eventually decided to exclude from the treaty "products used in traditional or religious practices" along with "vaccines containing thiomersal as preservatives" (UNEP 2013, 61). One should note that the term "traditional or religious practices" does not explicitly include medicine, though traditional could be interpreted as including traditional medical practice.[79]

According to these UNEP session reports, the use of mercury in traditional practices is a minor issue when it comes to the overall concern about mercury as a heavy-metal pollutant through mining, coal combustion, cement production, industrial waste, and mercury-containing products such as light bulbs, thermometers, blood pressure devices, skin-lightening soaps and creams, and dental amalgam fillings. Nevertheless, Ayurvedic practitioners in India have realized that the UNEP mercury ban could affect their metal ash *(bhasma)* practices[80] if mercury mines were shuttered and trade curtailed. The point was raised in the Indian media by Dr. Anand Chaudhary, head of the Department of Ayurvedic Pharmaceutics (Rasa Shastra & Bhaishajya Kalpana) at Banaras Hindu University (BHU), which specializes in mercury and other Ayurvedic metallic preparations. Dr. Chaudhary (and others, e.g. Baghel 2013) argued for an exemption explicitly for the use of mercury in Ayurveda, and not just as part of the loosely defined "traditional or religious practices."[81] He wrote to the Indian prime minister requesting specific exemptions for the use of mercury in Ayurveda.[82] To date, a response is still awaited. Tibetan practitioners in India have not lobbied for an exclusion so far. When talking about this with Tibetan physicians in Dharamsala, I noticed a sense of powerlessness because of their feelings of political marginalization as refugees and considering the much larger size of the Ayurvedic pharmaceutical industry.

79 See UNEP (2008) on "Cultural Uses of Mercury." For the full text of the Minamata Convention, see UNEP (2017).

80 These metal ashes are made from mercury, lead, and other metals (Chaudhary 2011; Galib et al. 2011). On recent debates on *bhasma* toxicity see Banerjee (2013) and Nagarajan et al. (2014).

81 See Chandra (2013), TNN (2014a), and Dagmar Wujastyk (2015b, 820).

82 Dr. Anand Chaudhary, personal communication, BHU, Varanasi, March 14, 2015. See also TNN (2014b).

THE ATOMIC MODEL

The European Union—like most countries—bases the analysis of metal contaminants in traditional medicines, drugs, or food on the atomic model (Schwabl 2013). This is founded on a certain interpretation of risk from contaminants and the ability to measure them with literally 99.9999% accuracy, which is then considered the hegemonic status quo in a given legal and regulatory context. The interpretation of risk follows the risk-benefit model that regulates the safety of medicines internationally. Only if the benefit outweighs the risk can a drug be allowed to enter the market (Wiesner 2014). EU regulations rely on pragmatic forms of implementation and a simplified science: is Hg present or not? (Schwabl 2013). Legally it does not matter which chemical bond Hg appears in and whether it is more or less toxic. Any form of Hg in a traditional drug from Asia entering the EU is not tolerated by EU laws. This is a good example of one of the pitfalls of using quantitative measurable data or metrics to measure and evaluate global health problems (Adams 2016). Adams points out that "metrics enable certain kinds of medical practices while impeding others. They generate forms of knowledge and certainty about some things even while effacing others" (Adams 2016, 225). While it is definitely useful to have a global measure to account quantitatively for mercury toxicity, the pragmatic focus on measuring Hg effaces opportunities for a more detailed assessment of the different mercury compounds (e.g. mercury sulfide) that have hugely varying levels of toxicity. This would be roughly analogous to only testing for and banning another highly dangerous element in its chemically pure form: sodium. Sodium is highly reactive, readily catches fire, and can explode on contact with atmospheric moisture, yet when combined with chlorine—another dangerous element in itself—the resulting sodium chloride is found in every kitchen as common table salt.

This limiting focus on Hg and the lack of attention to the various chemical compounds of mercury is a crucial point when assessing the toxicity of Asian medicines containing processed cinnabar. Below I will introduce a few studies to point out the pitfalls of this limitation and discuss what is at stake for Asian medicines when the methodologies used to measure Hg toxicity do not take into account the bioavailability of the different chemical forms of mercury. I will also introduce a few studies that have taken a different approach.

One case is the widely-cited—and critiqued (e.g. Banerjee 2013; Gerke 2015c; Sébastia 2015)—study on mercury in Ayurvedic formulas sold online in the US (Saper et al. 2004, 2008). Contemporary Ayurvedic *rasaśāstra* or rejuvenating supplements frequently contain higher levels of heavy metals than other supplements. The Saper study found they contained the largest amount of metals among the surveyed supplements with 40%, while 20.7% of the samples were found to have potentially toxic levels of lead, arsenic, or mercury (2008, 918). However, one major shortcoming of Saper's

study is that the investigators did not differentiate between the types and chemical species of heavy metals used. In the case of mercury and arsenic, not taking into account their vastly different levels of absorption leads to questionable results and biased conclusions. What is often overlooked in such studies is that the amount of mercury detected in the products is not equal to the amount of mercury absorbed and eventually accumulated by the body. Depending on the nature of mercury compounds, they will differ in solubility and reactivity, and will consequently have varying levels of toxicity.

The focus of most studies on mercury in Asian medicines to date (with a few exceptions noted below) has been on the element Hg, irrespective of its bioavailability. Here lies the crux of the dilemma for its use in Asian medicines. The authors of the Saper study themselves acknowledge that the "specific physical form or chemical species of the metals" used in *rasaśāstra* were not taken into account (Saper et al. 2008, 922), a significant methodological lapse when it comes to mercury and the vastly different levels of toxicity of its chemical compounds. They reason that "the physicochemical form of metals in rasa shastra medicines and their bioavailability have not been fully characterized or reported" (2008, 922). Studies on the toxicity of *tsotel* reveal similar shortcomings (Sallon et al. 2006, 2017). Obviously, economic factors contribute to such lapses—it is considerably more expensive to test the various chemical compounds of mercury in substances and human tissues than to simply check for Hg. Simplified and pragmatic approaches to defining and detecting mercury toxicity by merely measuring the concentration of Hg, while more economic and practical, are also an expression of the metrics and politics of mercury toxicity that has begun affecting medical systems in South Asia. Sébastia (2015) discusses this politics of toxicity and how the study by Saper et al. (2004) and others impacted the reinforcement of Good Manufacturing Practices (GMP) by AYUSH in 2005. The consequence has been a reduced production of mercury-containing medicines in small-scale Siddha medicine manufacturing units in South India (Sébastia 2015, 937–938). It remains to be seen how the implementation of the UNEP mercury ban and any possible negotiations for exemptions for AYUSH medical systems will further affect these and other Asian medical practices.

More nuanced studies addressing the chemical state of elements have been conducted, largely on Traditional Chinese Medicine (TCM) in the PRC. Wu et al. (2011, 839), for example, showed that "different chemical forms of arsenic and mercury have different toxic potentials" and that "both cinnabar and realgar [arsenic sulfide] are much less toxic than well-known mercurial[s] and arsenicals." The PRC is also leading in the chemical analysis of *tsotel*, having a vested interest in the pharmaceutical business of precious pills (Saxer 2013).

In 2007, the micro-structure and chemical composition of a *tsotel* sample from Qinghai Province, PRC, was analyzed for its elements as well as chemical composition, which showed mercury as mercury sulfide crystals

that are insoluble in water, and in the form of solid micro-particles (Yan, Ma, and Zhu 2007). According to this study, a sample of *tsotel* from Qinghai was mainly composed of Hg, C, S, and O, as well as trace amounts of Si, Mg, Fe, Al, Ca, Se, K, Cu and Ni, in addition to other elements.

A detailed study analyzed four samples of *tsotel* from Tibet, Qinghai, Gansu, and Sichuan and found *tsotel* to be "mainly an inorganic mixture of HgS [mercury sulfide], sulfur, and graphite, forming nanoparticles" with trace amounts of "other elements, including Mg, Al, Si, K, Ca, Fe, Cu, Zn, Rb, Sn, and Pb" (Zhao et al. 2013, 2–3).[83] This study also found organic substances from the plant and animal materials added during the processing, and concluded that "the system was too complicated to analyze the organic substances in detail" (2013, 3). This is understandable considering that quite a number of plants, minerals, and animal substances are used during processing. They do not count as the ingredients of *tsotel* but are used to boil and triturate mercury, pre-process the eight metals and minerals, and to some extent, they would end up in the final compound.

The first toxicity study that was carried out at the Men-Tsee-Khang in Dharamsala was incomplete but revealed that their sample of *tsotel* "demonstrated the presence of mercury 44.7%, calcium 1%, sulfur 42.5%, silver 0.4%, iron 1.5% and copper 0.5% [= 90,6%]. Most mercury was in the form of mercuric sulfide (HgS) with smaller amounts as mercuric sulfite ($HgSO_3$) and mercuric sulfate ($HgSO_4$)" (Sallon et al. 2006, 409). While these two studies paid more attention to the identification of different Hg compounds, they still lack accuracy because of the complexity of the multi-component substances used in making *tsotel* and the lack of scientific methods to determine exact compound compositions such as the form and phase of HgS molecules. Tidwell and Nettles (2019, 140) mention several recent studies on *tsotel* that used "additional techniques, including 2-D powder X-ray diffraction and others that do not chemically degrade the substance." These studies found that "*tsotel* is primarily mercuric sulfide (HgS) nanocrystals, with excess sulfur and small amounts of carbon and other elements. No signal for single element mercury was found by the non-destructive analysis (Zhao et al. 2013; Yan 2007; Li et al. 2016)."

Each study used different analytical techniques and *tsotel* samples, and thus results differ. They are also difficult to compare because of the lack of standardized manufacturing methods across Tibetan pharmacies. The composition of *tsotel* varies considerably between different pharmacies (Zhao et al. 2013). With the lack of standardized production, each batch of *tsotel* in each pharmacy would have to be checked individually. Moreover, the amount of Hg varies within individual precious pills (Aschoff and Tashigang 1997, 133–135; Sallon et al. 2017), and the composition of raw materials used in precious pills sold under the same name by different factories differ significantly and are not standardized (Schwabl A. 2001).

83 Energy dispersive x-ray analysis (EDX) of nine *tsotel* samples showed that they contain "Hg, S, O, Fe, Al, Cu, and other elements" (Li et al. 2016, 1).

The studies introduced above show that the issues at stake in mercury toxicity studies of Asian medicines largely center around developing fine-tuned methodologies to measure mercury's bioavailability[84] versus only the elemental Hg content of a compound to clearly judge the levels of its toxicity. Studies on the nanoparticles size of *tsotel* (e.g. Li et al. 2016; Zhao et al. 2013) might help to better understand its pathways in the body and its potential efficacy. However, the lack of standardization across pharmacies and countries that produce *tsotel* as well as the use of multiple substances during processing will make it very difficult to scientifically evaluate all of its ingredients. Except Tidwell and Nettles (2019),[85] current studies do not address Sowa Rigpa parameters used in the processing of poisonous substances or raise questions of how making a "rough" substance "smooth" could translate into a chemical process and an appropriate scientific research methodology. Such cross-cultural translations of research methodologies are challenging and would require researchers on both sides to receive special training. I will give some examples of such transcultural processes between Western and Tibetan researchers based on ethnographic observations during the second *tsotel* study in Dharamsala in Chapter 7, where I look at how Sowa Rigpa ideas of taming translate into Tibetan approaches to science.

None of the existing scientific studies on *tsotel* mentioned above has analyzed its complex processing technique, *tsodru chenmo*, step-by-step. It would require a team of scientists, significant finances, and extensive cooperation with Tibetan *menjor* specialists. Views regarding scientific approaches towards studying *tsotel* greatly varied among my interlocutors in India. The current Men-Tsee-Khang director, Tashi Tsering Phuri, told me in 2012 that he would welcome an analysis of the final product *tsotel*, but not a step-by-step analysis of the process.[86] Some Tibetan physicians, including the previous Men-Tsee-Khang director, Dr. Tsewang Tamdin, would welcome a chemical analysis after each step of the processing (MTK 2011a, 6); others I spoke with support an analysis of the final product for scientists "to verify that we know how to purify mercury," leaving it up to science to prove them right. These opinions reflect very different views on what science can and should accomplish for Tibetan medicine (Adams, Schrempf, and Craig 2011a; see Chapter 7). Moreover, issues of secret knowledge transmission and safeguarding intellectual property rights (Pordié 2008; Pordié and Gaudillière 2014) need to be respected here.

84 See more recent studies by Bolan et al. (2017) and Jayawardene et al. (2010) on bioavailability of heavy metals in traditional medicines. Such studies provide a more specific risk-assessment of medicines that contain mercury and other heavy metals in their varied chemical forms, whether designed on purpose or through environmental contamination.

85 These authors address some of the challenges involved in developing a pharmaceutical research approach based on Sowa Rigpa medical theory, defining some of the key terminology of related pharmacology and *menjor* concepts.

86 Tashi Tsering Phuri, personal communication, Dharamsala, September 29, 2012.

Considered together, it does not increase the likelihood of detailed *tsotel* studies being conducted any time soon.

In summary, mercury toxicity studies—Hg nuanced or not—all relate to measurements of concentration based on the concept that matter consists of discrete entities, atoms, or molecules, as generally accepted in biomedical science. Most of these studies are additionally impacted by issues surrounding production, standardization, contamination, occupational safety, and ownership of knowledge. We still lack concepts (and funds) to scientifically investigate and characterize complex pharmacological techniques such as *tsodru chenmo*, which ideally would include Tibetan epistemologies of taming poisonous substances and methods that do not chemically degrade *tsotel* before analyzing it (see Tidwell and Nettles 2019, for suggestions). One of this book's major objectives is, for the first time, to explore the various epistemologies that inform and underlie Tibetan mercury processing techniques, create a better socio-historical understanding of these practices, and highlight what is at stake in their survival.

The following chapters concentrate on the theme of taming and how this plays out in the social dynamics of those processing mercury into *tsotel.* I explore the historical and contemporary knowledge transmission of this practice, its encounter with global safety and toxicity debates, and what this tells us about the cultural translation of toxicity.

Chapter 3

The Pharmaceutical Nexus of Mercury Practices

This chapter investigates how poisons become powerful agents not only in the making of rejuvenating "precious" medicines, but also how they were used to purify and control social and physical environments. As we shall see, actual events of taming mercury and the manufacturing of the complex mercury sulfide compound *tsotel* have been embedded in the well-known Tibetan dynamics of socio-religious and economic support—called *chöyön (mchod yon)*—since the thirteenth century. Later in the book, we will see that *chöyön* dynamics still impact the ways in which science is employed today by Sowa Rigpa practitioners and their institutions in exile in India to prove the safety of *tsotel* (Chapter 7).

In what follows, I explore how complex socio-historical, cosmological, political, economic, and medico-religious dynamics of *tsotel* can be better understood from the anthropological perspective of the pharmaceutical nexus, which to date has been largely applied to biomedical drugs. My analysis here builds on and modifies the theoretical approach developed and applied by anthropologists to global pharmaceuticals (Petryna, Lakoff, and Kleinman 2006; Seeberg 2012; van der Geest 2006).

In the introduction to their edited volume on global pharmaceuticals, Petryna and Kleinman (2006, 20–21) define the pharmaceutical nexus as capturing "a broad set of political and social transitions that fall under and to some extent happen through the globalization of pharmaceuticals." They focus on the biomedical pharmaceutical industry and the multiple stages a drug goes through from processing to being sold and consumed, as well as the interconnections between state, market, and regulations in a globalized world. They argue that this "is a multiscaled movement with political, economical, and ethical dimensions. Together these dimensions constitute a pharmaceutical nexus" (Petryna and Kleinman 2006, 20).

They approach the pharmaceutical nexus in three ways (2006, 20–22):

(1) As an empirical object, by which they mean basically the pharmaceutical industry, but also its expansion and inclusion of core actors such as "states and populations, governmental and non-governmental

Published in: Gerke, Barbara, 2021. *Taming the Poisonous. Mercury, Toxicity, and Safety in Tibetan Medical Practice.* Heidelberg Studies on Transculturality 7. Heidelberg: Heidelberg University Publishing. DOI: https://doi.org/10.17885/heiup.746

actors, medical professions and patient groups, persons and subjectivity" (2006, 21).

(2) As a problem, in that the nexus appears differently to different stakeholders: for example, drug developers face problems of being curtailed by regulations, manufacturers have to negotiate resources and prices, policy makers weigh national and international interests, and patient groups are concerned with access to affordable and safe drugs.

(3) As a method of inquiry, which refers to the authors applying the pharmaceutical nexus as a tool to rethink "Big Pharma," including ethnographic microanalysis to reflect on the industry's ethical practices and its politics that impact health and the global (un)equal distribution of drugs.

Jens Seeberg applied the concept of pharmaceutical nexus to the biomedical pharmaceutical industry in India with an emphasis on the local—what he calls the molecular level—as well as by including "the state as a necessary actor in the nexus" (Seeberg 2012, 183). In his case, the state acts mainly to regulate and control the poor quality of healthcare services that reveal a pattern of under-diagnosis and over-prescription of drugs. Seeberg's emphasis on the state is an important element of the pharmaceutical nexus, but his focus is mainly on state control. Using the examples of historical and contemporary *tsotel* events, I will instead show how the state and other government entities can also play other roles in pharmaceutical production.

The pharmaceutical nexus was developed by anthropologists as a concept for the analysis of biomedical drugs in the contemporary global world, in order to deal with the enormous complexity social scientists face studying pharmaceuticals today. I hold that when using it in an Asian medical context, such as for the historically rich tradition of Sowa Rigpa, some adaptations and modifications are necessary. My application of this framework to Sowa Rigpa raises several questions, such as whether the pharmaceutical nexus is still useful when applied to earlier historical periods, during which the role of the state and its approach to medical practices were considerably different. As we shall see, during the Cultural Revolution the *tsotel* practice was carried out once in a Chinese labor camp, revealing a mix of state suppression and support. Moreover, the social networks and political relationships surrounding mercury practices in Tibet's history were of a particular character (explained below), which were also to some extent re-established in exile in India.

In addition, does the framework hold when looking at the "political, economic, and ethical dimension" of such diverse drugs as *tsotel*-containing precious pills compared to antiretroviral drugs, antidepressants, or antibiotics? Notably, *tsotel* in itself is not a pharmaceutical drug but an

organometallic, mercury sulfide-containing compound that is added to several other complex formulas, mainly a variety of precious pills. *Tsotel* is never administered alone, but considered beneficial when included in other formulas, since it is meant to enhance the potency of other compounds. Making *tsotel* is also not an isolated event; it has wider impacts on the surrounding community. Tibetan understandings of taming enlarge the significance of processing mercury beyond pharmaceutical settings. Taming mercury also entails the translation of economic and political prestige into medical practice. In Tibet, for instance, taming a poison also meant taming political enemies and harmonizing political relations. Here the pharmaceutical nexus involves not only physicians but also entire communities and their political leaders. Moreover, the community is part of a *tsotel* event, even though mercury is refined in an enclosed setting. The community shares its success and blessings not only in the form of medicine; the process of taming itself is also believed to foster a more beneficial and peaceful environment and bring forth good crops. Thus, the pharmaceutical nexus of taming mercury also has ecological, environmental, social and religious factors. All these aspects should be considered when creating a broad framework to develop an anthropological and socio-historical understanding of this pharmaceutical practice.

Recently, Stephan Kloos introduced the "pharmaceutical assemblage" as a heuristic tool to study the Sowa Rigpa industry in order to generate the "bigger picture" of "the terrain created by ingredients, medicines, knowledge, people, the market, culture, politics, science, or intellectual property rights together" (Kloos 2017a, 714). He suggests that a sustained focus and deeper study of the pharmaceuticalization of Asian medicines would then allow us to apply the same analytic framework as for biomedicines and as part of the pharmaceutical nexus. As I suggest below, the pharmaceutical nexus first requires some modifications to become a suitable analytic framework for complex Asian medicines, which have a long-standing history.

Initially, I employed the notion of "the social lives of medicines" (Whyte, van der Geest, and Hardon 2002) to approach the multifaceted elements that make up the social biography of *tsotel* (Gerke 2013b) because it ends up in many different medicines and plays a variety of spiritual, economic, therapeutic, and political roles. This notion provided a helpful preliminary overview of the multiple dimensions involved in its production, commodification, and regulations. On reflection, while suitable for individual Sowa Rigpa drugs,[87] I found the approach of uncovering biographies of medicines (building on Appadurai 1986; Kopytoff 1986; and van der Geest et al. 1996) too limiting to thoroughly analyze the complex impact of taming on societies, religion, politics, ecologies, gender, and medicines. To follow

87 This approach worked well in Sienna Craig's biography of the Tibetan birth pill Zhije 11 (Craig 2012, 215–252), which presents the multifaceted realities that surround one medicine in transition from a simple Tibetan prescription drug to a trial drug, validated by biomedicine.

tsotel and its use in precious pills through the typical biographical order of the "life-cycle" of drugs, i.e. "from production, marketing, and prescription, to distribution, purchasing, consumption, and finally their efficacy," as laid out by van der Geest et al. (1996, 153) would miss out on the more complex aspects of taming and its broader effects. Moreover, the focus of this book is not on the consumption or efficacy of *tsotel*-containing medicines, but on the underlying ideas of taming mercury that inform perceptions of its toxicity and safety.

I consider the pharmaceutical nexus a useful analytical tool since my overarching theme of taming is found in each of the three approaches laid out by Petryna and Kleinman above (2006). Moreover, I add two approaches to make the concept more applicable to Asian medicines and their historical elements. Thus my five approaches to the nexus that are explored in this book are:

(1) The pharmaceutical nexus **as an empirical object** (the industry and beyond): I show how taming as a key Sowa Rigpa *menjor* principle of handling mercury as a poison impacts all core actors involved in *tsotel* events: the professionals processing *tsotel*, the surrounding community and ecology, and the dynamic support system involving religious and political figures.

(2) **As a problem:** Using mercury in traditional medicine poses a range of problems that are perceived differently by different stakeholders: the physicians processing it, scientists analyzing its Hg content, consumers buying or taking precious pills, those making or demanding Tibetan medicines without mercury, or the women excluded from taming it. This second aspect of the nexus concerns the problems of safety, how evidence of safety is created and how taming mercury is perceived, handled, questioned, translated, negotiated, and presented to the public and at conferences, how Sowa Rigpa institutions and physicians negotiate the scientific approach of detecting mercury atoms, and how they collaborate with scientists to prove *tsotel*'s safety, and so forth.

(3) **As a method of ethnographic inquiry:** Exploring the entire nexus across this book will make us rethink the role of global toxicity regulations for Asian medicines and question what is at stake in the cultural translation of toxicity and identifying who gets "tamed" by whom. It will also make us re-think the ways in which the pharmaceutical nexus of a traditional Asian practice is marked by both religious and medical empiricism, where religion is not a domain distinct from medical knowledge but actually informs it (see Chapter 4), and what this tells us about the nature of a pharmaceutical product. Based on the results, in the conclusion I will also raise questions about the future of traditional mercury practices in India.

(4) **As a process over time:** So far, the pharmaceutical nexus has only been applied to contemporary biomedical drugs. As far as we know, complex mercury processing techniques, such as *tsodru chenmo*, came to Tibet in the thirteenth century. To understand Tibetan mercury practices over time I also raise questions such as, how can we approach historical *tsotel* events as part of the nexus? How did events and texts impact drug production and availability of precious pills and the knowledge transmission of taming mercury over time? Even though, through historical sources, we have more fragmentary access to the nexus of a drug in the past than in the ethnographic present, I expand the pharmaceutical nexus as an analytic tool to include historical elements (texts, events, and lineage transmissions) of a traditional pharmaceutical practice from particular historical periods. Moreover, early tantric paradigms of taming have affected notions of gender and secrecy over time; this has translated into specific ways of transmitting medical knowledge (Chapters 4 and 5). I hold that such historical aspects and developments should be considered a part of the pharmaceutical nexus because they impacted medical knowledge transmission and still greatly affect the ways medicines are made today in different Sowa Rigpa institutes.

(5) **As a self-reflexive process:** Van der Geest critiqued the lack of self-reflexivity of anthropologists, who "fail to see themselves in the nexus of pharmaceuticals" (2006, 313). His critique mainly addresses those anthropologists who write about the nexus but do not "contribute to the actual improvement of distribution and use of pharmaceuticals" (van der Geest 2006, 313). This assumes the anthropologist has passed judgment about the medicines' benefits, which leads us to slippery ground when dealing with substances considered toxic when unprocessed, and medicines that so far have not been tested for their efficacy.[88] While I wholeheartedly agree that we owe something back to our informants, reciprocity can take many forms, as I mentioned in the introduction. Here, as part of an expanded pharmaceutical nexus I include the self-reflective element of an embodied sense of toxicity.

Any anthropologist has to be honest about how she is affected by her own poison culture (Arnold 2016; Buell 1998) and how it can be embodied in her reactions when confronting toxic substances in the field. I experienced this when ethnographically observing the distillation of mercury from cinnabar (Introduction), mercury spills in the Old Delhi bazaar (Chapter 2), and

88 Sarah Sallon made it clear in her two conference presentations (2012, 2016) that her two studies on *tsotel* researched whether mercury-containing Tibetan medicines are safe, not whether they are efficacious.

the roasting of cinnabar for pill coating (Chapter 6). Note that all of these relate to mercury vapor exposure during trade and simple forms of processing and not to *tsotel*, which is a rather stable mercury sulfide ash. It is necessary to be aware of the positionality of one's own embodied sense of toxicity as part of the larger nexus in which toxic substances are processed, since it affects the cultural translation between anthropologists and the people they work with.

Taken all together, analyzing the data through the lens of this expanded pharmaceutical nexus, I aim to show that this anthropological approach helps to provide a deeper understanding of traditional pharmaceutical practices and their manufactured medicines over time. I begin by analyzing the complex social dynamics of support that have been in place in Tibetan communities for a long time to sustain the expensive and complex manufacturing of *tsotel*. What did the pharmaceutical nexus of making *tsotel* look like during those centuries when the Tibetan government, powerful monasteries, rich donors, and political figures all played a part in its manufacture? How has this nexus changed with the establishment of more institutionalized pharmacies in the Tibetan diaspora in India? The contemporary examples presented here are based on oral narratives—often of relatively small *tsotel* events—and speak of the continuation of *tsodru chenmo* among different medical communities that are not necessarily mentioned in medical histories published by Tibetan medical authors in the PRC or in India.[89] These events demonstrate impressive continuity and significant adaptability on the part of the actors involved in the changing political circumstances of mercury taming practices both in Tibet and, post 1959, in exile.

Dynamics of support

The pharmaceutical nexus of *tsotel* practices when approached as an empirical object reveals a complex set of social relationships specific to the Tibetan dynamics of socio-religious and economic support, called *chöyön*, often translated as priest-patron or preceptor-donor relationship. *Chöyön* describes a relational dynamic between one party who is worthy of patronage, or *chöné* (*mchod gnas*, e.g. lamas and monasteries, or a *tsotel* event), and a patron or donor called *yöndak* (*yon bdag*, e.g. a local or foreign ruler), who gains merit, *sönam (bsod nams)*, through sponsorship.

The *chöyön* relationship has been described at length by many Tibetologists in the context of political alliances between Buddhist masters and (largely Mongolian, Manchu, and Chinese) political powers, where

89 For the PRC, these accounts largely mention key institutional *tsotel* events, partly listed in Czaja (2013, 96), and also in Lappendum Lozang Lodrö (2006, 241 / 2–248 / 11) and Sönam Bakdrö (2006, 48 / 1–57 / 21). Published *tsotel* records in India refer to Men-Tsee-Khang events (Choelothar 2000, 106 / 10; Dawa Ridrak 2003, 411 / 14–412 / 17).

armed protection, titles, and annual salaries were gifted in exchange for Buddhist teachings, ritual protection, and empowerments (e.g. Cüppers 2004; DeVoe 1983; Goldstein 1989; Jagou 2009; Ruegg 2013; van Schaik 2011; Schwieger 2015). This relationship network has been in place in Tibet since the thirteenth century. Stacey van Vleet (2016, 106) argues that during the seventeenth century, the Fifth Dalai Lama utilized this network to establish "an integrated Buddhist governance," also through his patronage of medical institutions.

Even today, the *chöyön* dynamics are at the core of interactions between Tibetan refugees, the Central Tibetan Administration (CTA) in Dharamsala, and Western donors (Kauffmann 2015). They also inform the symbiotic relationship between neuroscience and Tibetan Buddhism (Lott 2016). *Tsodru chenmo* events across history show that *chöyön* relationships have shaped the pharmaceutical nexus of *tsotel* and precious pill practices for a very long time (roughly since the thirteenth century). I argue that having been manufactured and gifted along the lines of *chöyön*, *tsotel* and precious pills have gained political, economic, and spiritual potency; at the same time, the falling away of *chöyön* support in more recent times has contributed to the loss of *tsotel* practice among the institutionally trained amchi in exile.

Precious pills hold a special position in Tibetan medical history, and in the historical accounts we find hints that the dissemination of this specialized knowledge for their manufacture—which included the knowledge on making *tsotel*—was surrounded by secrecy and involved political networks, elite financial support, and even sectarian struggle. Precious pills hold what Kloos calls political efficacy (Kloos 2012), in that they were used as gifts for high-ranking officials and wealthy patrons, who often sponsored the expensive, labor-intensive, and time-consuming manufacturing process within the *chöyön* dynamics. The Ganden Podrang Government, headed by the Dalai Lama in Lhasa, sponsored the making of *tsotel* and precious pills several times beginning with its establishment in the seventeenth century and promoted *tsotel* manufacturing into the early twentieth century.

In some regions of Tibet, *tsodru chenmo* came close to extinction several times when one or more of the *chöyön* actors were lost to sudden death, war, or socio-political conflict. In some instances, printed manuals helped to recover such losses. During the making of *tsotel* at the Powo Tramo labor camp in 1977, Tibetan physicians relied heavily on an important eighteenth century manual that had survived the Cultural Revolution in eastern Tibet. *Tsotel* texts thus also form an important part of the pharmaceutical nexus since they help ensure the continuity of the practice.

Each of the different manifestations of *chöyön* needs to be analyzed in its own local and historical context (Ruegg 2013, 225). Overall, my examples show that Tibetan physicians tapped into existing *chöyön* dynamics to attract support for the complex and expensive *tsodru chenmo* process to manufacture *tsotel* that would have been difficult for them to manage alone. I interpret the combined efforts of all actors involved in

chöyön-supported *tsotel* events also as attempts to partake in the larger benefits of taming practices, gaining merit, benefitting from the blessings, medicines, or political or ecological taming powers ascribed to successful mercury processing. Moreover, *chöyön* networks significantly impacted the ways *tsotel* and precious pills were seen and used as medicines, ritual substances, or valuable gifts to establish political alliances. *Chöyön* networks thus also influenced ideas of the pills' benefits.

The following two sections present two examples that highlight how conflicting state support in different historical periods affected *tsotel* production. First, I take the example of how the *tsodru chenmo* practice was established in Lhasa under the Dalai Lamas (summarized in Table 1, p. 96–98). This highlights some of the political aspects involved in taming mercury in the past and how precarious the continuity of its knowledge transmission could be if a *tsotel* event failed to manifest. This focus on Lhasa is an example and should not draw attention away from important mercury practices in eastern Tibet (Chapter 4) or small-scale mercury processing in smaller monastic and lay settings (see Hofer 2018, 74–76). Second, the making of *tsotel* in a Chinese labor camp during the Cultural Revolution explores a very difficult time in the history of Sowa Rigpa with varying forms of governmental support and suppression.

The Dalai Lamas and mercury practices

The Dalai Lamas, an important institution of reincarnated spiritual and religious leaders of Tibet, had been based in Lhasa since 1642. Several of them were short-lived (Mullin 2001), which contributed to the challenges involved in establishing a complicated medical practice that required governmental and spiritual patronage. Twice the early deaths of Dalai Lamas curtailed the manufacturing of *tsotel*. Until the seventeenth century the Gelukpa, the branch of Tibetan Buddhism associated with the Dalai Lamas, "had no significant medical school of their own [...] that could compete with the Kagyüpa medical traditions," (Czaja 2013, 86) which had been firmly established in eastern Tibet (Kham).[90]

It was in the midst of a political struggle at the time of the Fifth Dalai Lama, Ngawang Lobsang Gyatso (1617–1682), that the practice of making *tsotel* and precious pills was introduced to Lhasa. This resulted in what we can see as an example of how Sowa Rigpa practice played out within the power struggles between Buddhist schools. Czaja (2013, 83–86) details the story of how the Gelukpa were keen to receive the *tsodru chenmo* transmission from the Drigung Kagyü school of Tibetan Buddhism in order to establish their own tradition of processing mercury and producing precious pills

90 See Stacey van Vleet's doctoral thesis (2015) for details on the medical schools in Tibet before and after the Fifth Dalai Lama and their alliances to different Buddhist schools.

in Lhasa. Precious pills were not only taken as medicines, but also worn as amulets. Their strong religious emphasis and acclaimed spiritual protection, especially from (at times politically motivated) poisoning, proved to be a valuable asset for the Dalai Lama's Ganden Podrang Government.

The Fifth Dalai Lama and his regent, Dési Sangyé Gyatso, established various medical schools after 1643 (see Sangyé Gyatso 2010, 326). The most important one is known as Chakpori, named after the Iron Hill it was built on in Lhasa in 1696. These monastic medical schools "incidentally ensured that elite medical practice was an exclusively male preserve" (McKay 2007, 32–33). Medicine was one of the many areas in which a more centralized, institutionalized, and Buddhist-oriented government established its influence (Schaeffer 2003a; van Vleet 2015, 2016), but it was also a domain of debate and contestation (Gyatso 2015; McGrath 2017a, b). The Fifth Dalai Lama reformed the production of precious pills with an emphasis on the Zur medical lineage *(zur lugs)* (van Vleet 2015, 72, 151–157).

The first *tsotel* event under the Fifth Dalai Lama took place in 1669 (Dawa Ridrak 2003, 409 / 10; Sönam Bakdrö 2006, 46 / 7–10). Thereafter, the chief physician, Darmo Menrampa Lobsang Chödrak (1638–1710), who was trained by Drigung physicians and in the Zur medical tradition,[91] guided the making of *tsotel* in 1678, four years before the Great Fifth passed away.[92] Janet Gyatso (2015, 118) reports that the Fifth Dalai Lama, in an effort to locate and revive rare medical traditions, searched extensively for texts on mercury processing, and eventually located them at Nyanang in southern Tibet.[93] In 1678, Darmo Menrampa and his assistants made precious pills with precious stones the Dalai Lama had received as gifts while in Beijing in 1652; they also used jewels that had been gifted by Mongolian rulers (Czaja 2013, 84; Sangyé Gyatso 2010, 327).[94]

The two *tsotel* events of 1669 and 1678 also fall into the period of a renewed and intensified intellectual exchange between Tibetan and Indian scholars (1654–1681); according to the Fifth Dalai Lama's autobiography, approximately forty Indian scholars visited the court during that time, a few of whom stayed several years in Lhasa (Schaeffer 2011, 293). Some of them helped in *materia medica* identification, brought medical substances from the Kathmandu valley, and wrote medical treatises (2011,

91 See van Vleet (2015, 154–156) on Darmo Menrampa recording precious pill recipes of the Zur medical tradition in his own works.

92 His death was concealed for fourteen years by his regent, who ruled until he was murdered in 1705.

93 Sangyé Gyatso (2010, 328) mentions that texts on mercury processing from the Orgyenpa tradition were passed down to Namkha Lha from Nyanang and studied by Darmo Menrampa.

94 According to Sangyé Gyatso's *Medical History (Gso rig sman gyi khog 'bugs)*, they prepared "Rinchen Drangjor, Rinchen Tsajor, Tarima [pills, …] and others" *(grang sbyor/ tsha sbyor/ rta ri ma/* […] *sogs*; Sangyé Gyatso 1994, 370 / 15–18). See also Ngawang Lobsang Gyatso (1991, 155 / 20–156 / 2). Dawa Ridrak lists Rinchen Tsodru Chenmo, Rinchen Drangjor Rilnak Chenmo, Rinchen Tsajor, and others, made in 1678 (2003, 409 / 19–23). See part three of the Glossary for the names of precious pills and other formulas containing processed mercury.

296). Although not explicitly mentioned, through these channels the court might have received some of the ingredients necessary for making *tsotel* and precious pills. For example, in 1677, the Brahman Devānanda gifted yellow orpiment to the Fifth Dalai Lama (2011, 294). This is a form of arsenic *(ba bla)*, one of the "eight elements" and an important substance to bind mercury. Sangyé Gyatso himself writes that ingredients for making precious pills had to be procured from across Tibet's borders:

> Therefore, because gem pills were not being manufactured correctly, the Great Fifth decided to perform a great act of giving in order to guard and protect the lives of living beings. He put a great deal of effort into collecting medicines from many other sources in search of those ingredients not found in his own storerooms. Moreover, when he visited the country of Tangkün, people came to him like iron filings to a magnet to make offerings. Queen Dorjé Rapten Ma came from upper Mongolia, and Emperor Chung Wang also brought offerings. These offerings included many rare gems, holy relics of our Teacher [...], a handful of golden myrobalan, clockwise-coiled white conches, milk from a white lioness, whiskers taken from a live tigress, diamonds, beryl of various colors, amber, quartz, pearls, and other inconceivable vajra jewels of men, gods, and nāgas [serpent spirits]. All these he gave up without any sense of loss, as if they were stones on the ground, thereby seeding a wonderful and virtuous tradition that resulted in the large-scale production of many varieties of gem pills (Sangyé Gyatso 2010, 327, translation by Kilty; see also Ngawang Lobsang Gyatso 1991, 155/10–20).

From Sangyé Gyatso's description and the list of ingredients, it becomes clear that these substances were not part of the general *materia medica* that physicians could easily procure by themselves; it required the support of the state and/or wealthy donors. Stacey van Vleet (2015, 157) argues that by using these expensive substances in precious pills, the "Fifth Dalai Lama performed a grand gesture of literally redistributing wealth through a health-giving edible (or wearable) pill." Importantly, existing *chöyön* relationships (including with the Mongols) were greatly strengthened by the Dalai Lama's newly established state medical system (van Vleet 2015, 23), which in effect also strengthened the pharmaceutical nexus of mercury practices.

However, not all political rulers of Tibet who attempted to make precious pills were successful in procuring precious substances through their networks. For example, the "kings of Gyantsé (Rgyal rtse), allegedly failed in this because they had to rely on the water in which precious stones had been soaked rather than using the precious stones themselves" (Czaja 2013, 85).

After the time of the Great Fifth, the Dalai Lamas tried to continue manufacturing precious pills in Lhasa, with varied success, often interrupted

by political strife and warfare, such as the occupation of central Tibet by the Dzungar Mongols in the early eighteenth century. In 1754, the Seventh Dalai Lama made plans for manufacturing precious pills at Chakpori Medical College, which failed due to his early death (Czaja 2013, 88). In 1783, during the reign of the Eighth Dalai Lama, Jampel Gyatso (1758–1804) 400 ounces of mercury were refined after three years of preparation (2013, 89).[95] The event took place at Lhalu gardens, behind the Potala, involving his personal physician as well as several physicians and monks from Chakpori Medical College.[96] We can assume that after this, the tradition was discontinued in Lhasa until the mid-late nineteenth century, when the Twelfth Dalai Lama—the fourth in a row of short-lived Dalai Lamas—had to turn to specialists from eastern Tibet, where mercury practices still flourished. In 1875, he ordered the governor of Nyakrong, Pünrapa Tsering Penden, to bring physicians from Kham to Lhasa to make *tsotel* on a large scale. These eastern Tibetan physicians had just successfully made *tsotel* in 1872 under the guidance of Kongtrül Yönten Gyatso. However, the plan fell through when the Twelfth Dalai Lama suddenly passed away (Czaja 2013, 94).

This historical period demonstrates that a medical practice that depends not only on trained physicians but also on government support and the spiritual guidance of esteemed Buddhist teachers could easily deteriorate when one of these support systems faltered. Between the Eighth and the Thirteenth Dalai Lama, a century passed without a documented government-supported *tsotel* event taking place in Lhasa. The "state" (Seeberg 2012)—in Lhasa, the Dalai Lama and his Ganden Podrang Government and in eastern Tibet, influential governors—clearly functioned as an important player in the pharmaceutical nexus by supplying the expensive ingredients, financing the event, and inviting expert physicians.

Upholding the *tsodru chenmo* tradition also had political purposes. In 1872, governor Pünrapa supported the making of *tsotel* in eastern Tibet and used it for "enhancing his status and to present himself as a benevolent leader, as he was disputed and involved in unabating power struggles" (Czaja 2013, 93–94). *Tsotel* production is thus also an event with political and cosmic significance, impacting political alliances and creating a tamed—or more peaceful—environment. A similar, more contemporary example is making *tsotel* in Lhokha, in 1991 (Gerke 2013b, 131–132; Jamyang Lhündrup, n.d.). Dr. Yeshe Gelek, who participated in this event and who was teaching at the Men-Tsee-Khang in Dharamsala when we met in 2012, explained: "There is a belief that if you do the Great Mercury Purification successfully, it brings good crops and auspiciousness for the entire area. In Lhokha the local people prepared a feast afterwards and made offerings. That year they had a very good crop. People were very happy." [97]

95 Czaja uses ounce as a rough equivalent to *sang (srang)*, a Tibetan unit of weight.
96 Sönam Bakdrö (2006, 56/18) places this event in 1795, the wood-hare year of the thirteenth Tibetan *rabjung (rab byung)*. The names of the physicians taking part in the event and the pills made are listed in Czaja (2013, 89).
97 Interview, Dharamsala, October 30, 2012.

Table 1: Documented *tsotel* events under the Dalai Lamas in Lhasa (1669–1921)

Dalai Lama	**Year**	**Place**	**Precious Pills made**	**Notes**
Fifth Dalai Lama Ngawang Lobsang Gyatso (1617–1682)	1669	Below the Potala	?	Requested by Pöntsang Namkha Lha (Dawa Ridrak 2003, 409/11; Sönam Bakdrö 2006, 46/8).
Fifth Dalai Lama Ngawang Lobsang Gyatso (1617–1682)	1678	Lubug Lingka Grove near the Chakpori Hill	Rinchen Drangjor, Rinchen Tsajor, Tarima pills, and others (Sangyé Gyatso 1994, 370/15–18).	Chief physician was Darmo Menrampa Lobsang Chödrak (1638–1710). Jewels that were gifted to the Dalai Lama during his trip to China in 1652 were used to make the precious pills (Czaja 2013, 84).
Seventh Dalai Lama Kelzang Gyatso (1708–1757)	1754	Chakpori Medical College	none	Preparations were made but processing failed, probably due to the early death of the Seventh Dalai Lama (Czaja 2013, 88).
Eighth Dalai Lama Jampel Gyatso (1758–1804)	1783 (Czaja 2013, 89) 1795 (Sönam Bakdrö 2006, 56/18)	Lhalu gardens behind the Potala	Rinchen Drangjor, Rinchen Tsajor, Tarima, 'Powerful Pills called Stupas of Crystal,' Dugjom Wangril, and Dugjom Mangjor (Czaja 2013, 89)	Guided by the Dalai Lama's personal physician Lamenpa Jamyang Zhenpen. The religious and administrative aspects of the event were supervised by Tri Nominhan and the Ganden Tripa Ngawang Tsültrim. 400 ounces of mercury were processed. Preparations took three years (Czaja 2013, 89).

Table 1 *(continued)*

Dalai Lama	**Year**	**Place**	**Precious Pills made**	**Notes**
Twelfth Dalai Lama Trinlé Gyatso (1856–1875)	1875	–	none	The governor of Nyakrong was asked to bring physicians from Kham to Lhasa to make *tsotel*. The plan fell through when the Twelfth Dalai Lama passed away (Czaja 2013, 94, quoting Jamgön Kongtrul Lodrö Thayé 2003, 178–179).
Thirteenth Dalai Lama, Tupten Gyatso (1876–1933)	1893	Norbulingkha Palace and Zhapten Lhakhang shrine room	?	770 ounces of mercury were processed; mercury was provided by the government of the Thirteenth Dalai Lama and Demo Rinpoche Ngawang Lobsang Trinlé Rapgyé (1855–1899) (Czaja 2013, 94).
Thirteenth Dalai Lama, Tupten Gyatso (1876–1933)	1919	Lhasa	Rinchen Mangjor Chenmo, Wangril 25, Rinchen Tsodru Dashel, Drangjor Rilnak Chenmo, and others (Dawa Ridrak 2003, 410/21–22; Sönam Bakdrö 2006, 47/13–15).	Guided by Trékhang Jampa Tupwang, the personal physician of the Thirteenth Dalai Lama. Khyenrap Norbu was present.

Table 1 *(continued)*

Dalai Lama	Year	Place	Precious Pills made	Notes
Thirteenth Dalai Lama, Tupten Gyatso (1876–1933)	1921	Norbulingkha Palace	?	Guided by Trékhang Jampa Tupwang. Khyenrap Norbu, Tsultrim Gyeltsen from Chakpori, Nangrongshar Rikdzin Lhündrup Penjor, and others, took part. An explosion of pots took place (Jampa Trinlé 2000, 434/2–15).

TSOTEL EVENTS UNDER THE THIRTEENTH DALAI LAMA

Since the *tsotel* practice was introduced to Lhasa during the time of the Great Fifth Dalai Lama, all subsequent *tsotel* events were also strategic political tools for linking subsequent Dalai Lamas back to the power and authority of the Great Fifth.[98] Only during the last decade of the nineteenth century was this link successfully re-established by the Thirteenth Dalai Lama, Tupten Gyatso (1876–1933), who was a skilled leader, administrator, and—inspired by what he saw during his travels—an innovator, including in the area of public health (McKay 2007; van Vleet 2015). He made significant progress in the establishment of precious pill manufacturing in Lhasa and oversaw three *tsotel* events within twenty-eight years (see Table 1).

In 1893, after substantial renovations of the Chakpori Medical College, he commissioned the processing of 770 ounces of mercury, which were provided in part by the central government, and partly by the Demo regent, who ruled while the Dalai Lama was young. The physician Orgyen Tendzin Gyatso (b. nineteenth century) was invited from Tsurpu Monastery, the seat of the Karmapas, north of Lhasa, to guide the processing.[99] The event took place at the Dalai Lama's summer residence, the Norbulingkha Palace, and the accompanying rituals were performed in a nearby temple (Czaja 2013, 94). The precious pills they made with the *tsotel* were not only medicines but also royal gifts. A wall-painting in the Thirteenth Dalai

98 It is, for example, explicitly stated in the biography of the Eighth Dalai Lama that the *tsotel* event "should be seen in the tradition initiated by the Fifth Dalai Lama" (Czaja 2013, 89).

99 Dawa Ridrak (2003, 410/9–19). This is probably Lamenpa Orgyen Tendzin Gyatso, who also authored two texts on mercury (Orgyen Tendzin Gyatso 1986a, b), but Jampa Trinlé's biography of him does not mention any *tsotel* event (Jampa Trinlé 2000, 410–413). Orgyen Tendzin was later exiled to Bhutan.

Lama's shrine room apparently depicts him offering precious pills to the Chinese emperor when visiting him in 1908 (Aschoff and Tashigang 2009, 7–8). I could not verify this, but if true, this offering can be understood in the context of the negotiations between the Dalai Lama and the Qing emperor in Beijing in 1908, which became necessary with Qing aggression on the rise in eastern Tibet.

Tibet declared independence in 1911–1912 and instituted its own paper currency, postal services, and national flag. The post-independence years saw a strengthening of the field of medicine. In 1919, both the Thirteenth Dalai Lama and Trékhang Jampa Tupwang (ca. 1863–1922), his most senior personal physician and a monk of aristocratic background, oversaw the making of *tsotel* in Lhasa. The lineage and technical skills were passed on to several physicians, including Khyenrap Norbu (1883–1962),[100] who in 1916 became the founding director of the Mentsikhang in Lhasa, the first secular medical institute in Tibet (Dawa Ridrak 2003, 411/23; Sönam Bakdrö 2006, 47/15).[101] At the time, several kinds of precious pills were manufactured: Rinchen Mangjor Chenmo, Wangril 25, Rinchen Tsodru Dashel, Drangjor Rilnak Chenmo, and others (Dawa Ridrak 2003, 410/21–22; Sönam Bakdrö 2006, 47/13–15).

In 1921, Trékhang Jampa Tupwang made *tsotel* again at the Norbulingkha Palace (Dawa Ridrak 2003, 410/24–26). Apparently, the Dalai Lama co-financed the event through the state treasury office (Jampa Trinlé 1991, 420/4–16; 2000, 434/2–15). Despite an explosion during the sealed-vessel incineration of metals, the Dalai Lama continued to support the manufacturing. Jampa Trinlé writes about the event:

> One day, when they were preparing gold ash, they were unable to correctly seal the clay container. There was an explosion, and the clay jug was scattered into the sky and [pieces] fell in the middle of the Norling [performance] stage. The Thirteenth Dalai Lama said they should experiment again, and asked for more gold, etc., from the state treasury office to provide materials for doing it again, and thus he gave them confidence. Nangrongshar Gen Rikdzin Lhündrup told me about all this.[102]

100 See Tashi Tsering (2015) on recent biographical notes on Lamenpa Khyenrap Norbu. Lamenpa is the honorific title for the personal physicians of the Dalai Lamas.

101 In this book I use the spelling Men-Tsee-Khang for the Tibetan medical institute in Dharamsala and Mentsikhang for Lhasa.

102 Translated from Jampa Trinlé (2000, 434/8–14): *de dus nyin gcig gser thal bzo dus rdza dam kha yag po bkag ma thub pa'i rkyen gyis 'bar gas byung ste rdza dam nam mkhar 'thor ba dang / nor gling sding cha'i dkyil la babs pa'i gnas tshul byung rung / rgyal ba sku phreng bcu gsum pas bka' rtsad gnang ste yang bskyar tshod lta byed dgos pa dang / gser sogs rtse phyag las khungs nas sprod rgyu'i bka' khyab byas chog ces dbugs dbyung mdzad pa'i skor nyag rong shar rgan rig 'dzin lhun grub lags nas kho bor gsungs byung*. Thanks to Theresia Hofer for pointing me to this reference and sharing an earlier draft translation of the section.

ELITE MEDICINES

Following the large government-sponsored *tsotel* event of 1921 in Lhasa, Lamenpa Khyenrap Norbu, along with his private student Künga Püntsok and others, apparently made *tsotel* for a wealthy aristocrat monk of the Changra House in the Ramoché area of Lhasa, who "needed *ngülchu tsodru chenmo*."[103] Unfortunately no sources or details are given, but—if accurate—this brief excerpt tells us that in 1920s Lhasa, rich individuals were in the position of requesting Tibetan physicians to make *tsotel* for them, something that has been described in earlier and later decades as well. Precious pills were clearly an elite medicine in Tibet, accessible largely to the rich and influential monasteries and the aristocracy.[104]

That precious and other blessed pills were abundant at the residences of wealthy Tibetan families in Lhasa is evident from a rare personal account by Tubten Khétsun (2008, 80–81).[105] The nephew of a senior Tibetan government official, he was imprisoned during the 1959 uprising in Lhasa and sentenced to forced labor. In his autobiography, he describes his experience with precious pills, which highlights the value that was attached to such pills and the extraordinary conditions Khétsun and his friend went through to preserve some of these pills in mid-twentieth-century Lhasa. In summary, Khétsun and his friend Jampa were ordered to empty the house of the Shatra, a long-standing wealthy landowning family in Lhasa, where they found large amounts of precious and other blessed pills. Jampa explained to Khétsun:

> Those are pills blessed by Tromo Geshe Rinpoche[106] and precious pills made in the time of the Thirteenth Dalai Lama, which we could scarcely have gotten hold of as free men, and now as prisoners, whatever mortal dangers we may face, or if we die before being released, there is no one to put a precious pill in our mouths at the moment of death[107] (Khétsun 2008, 80).

Khétsun decided to secretly swallow three of the precious pills since he could not hide them successfully in prison. He had a strong physical reaction and lay ill with vomiting and diarrhea for a few days at Téring prison, but recovered. Khétsun recalled:

> However, not only did I come to no harm, in the long run I came to believe that those pills had strengthened my body a good deal. As

103 This is only mentioned by Dawa Ridrak (2003, 411 / 3).
104 There might have been small-scale events in rural areas with the support of smaller monasteries that provided affordable precious pills to locals, but I have not yet found any documentation on this predating the 1950s.
105 Thanks to Jeremy Russell for pointing me to this story.
106 He probably refers here to the consecrated pills of Domo Geshe Rinpoche Ngawang Kalsang (1866–1936), the teacher of Anagarika Govinda (1898–1985).
107 He refers to the common practice among Tibetans to place a blessed pill into the mouth of a dying person.

> I have already said, the diet and especially the containers we had to use for food affected most people's health very seriously, but during my four years in prison I managed with whatever [food] I was given, whether hot or cold, wet or dry, old or new, and underwent conditions of great deprivation without becoming seriously ill, except for the occasional cold (Khétsun 2008, 81).

Even though we do not know exactly which type of pills Tubten Khétsun actually took,[108] his description illustrates that ordinary Tibetans had difficulty acquiring precious pills, while higher officials—such as his own uncle or the aristocratic Shatra family—appeared to maintain a stock for emergencies, including the moment of approaching death. The value people attached to these pills expanded their perceived preciousness far beyond their therapeutic use for severe diseases.

TSOTEL EVENTS AT LHASA MEDICAL INSTITUTIONS, 1920s–1950s

The close succession of the two *tsotel* events of 1919 and 1921 under the Thirteenth Dalai Lama is particularly noteworthy, given the otherwise seemingly sporadic sequence of *tsotel* production in central Tibet. These two events fell within a time in central Tibetan history that was marked by state health reforms and an increasing interest in public healthcare by the Thirteenth Dalai Lama and his personal physician, Lamenpa Trékhang Jampa Tupwang. The health reforms of 1916–1924 might have played a role in organizing and procuring sponsors and governmental patronage to make *tsotel* and precious pills. During this time, funds flowed from various sources into the development of Sowa Rigpa, its public health program (van Vleet 2010–2011), vaccination, education, and the renovation of the old Chakpori Medical College. Such support declined after 1923–1925, apparently due to internal and personnel conflicts within Chakpori (Tupten Tséring 1986, 179; see also Gerl and Aschoff 2005, 53, 77) and perhaps also because of Trékhang Jampa Tupwang's passing in 1922. Regardless, it caused a rift between the two medical institutions, Chakpori and the Mentsikhang, with Lamenpa Khyenrap Norbu being replaced as head of Chakpori in 1924 (Choelothar 2000, 30/4–8), but remaining in charge of the Mentsikhang (Kloos 2010, 65). The public health program declined, and between 1924 and 1950 the Mentsikhang only received irregular financial support from the government (van Vleet 2010–2011, 371; Janes 1995). According to official accounts, no *tsotel* was prepared at the medical institutions of Lhasa between 1921 and 1953.[109] When I asked contemporary phy-

108 Since he describes the pills as individually wrapped, they were most probably precious pills.

109 Apparently, in 1933 *tsotel* was made in eastern Tibet under Jamyang Chökyi Lodrö (1893–1959) and Kesip Atsang (Sönam Bakdrö 2006, 57/8–9). There might have been other *tsotel* events in different Tibetan regions that are not recorded in physicians' biographies but are mentioned in other texts.

sicians about the cause of the long hiatus of *tsotel* manufacturing between the 1920s and 1950s, most highlighted financial reasons. Dr. Namgyal Tsering, a leading *menjor* expert trained at the Men-Tsee-Khang in India, explained, "In the 1920s, the Mentsikhang in Lhasa had no provisions for school fees. All medical students needed private sponsors, and there were no government funds. The Mentsikhang simply had no funds to make *tsotel*."[110]

With the loss of government patronage, the *chöyön* structure once again crumbled. Thus, the Mentsikhang faced great difficulties continuing the *tsotel* practice and had to look for new sponsors. The physician instrumental in continuing the lineage was the personal physician of the Fourteenth Dalai Lama, Lamenpa Tenzin Chödrak (1924–2001),[111] who made *tsotel* twice in Tibet before initiating the practice in exile in India.

Making *tsotel* in a Chinese labor camp in 1977

The following example presents another form of state involvement in the pharmaceutical nexus of *tsotel* events. The story is based on two of the existing biographies of the Lhasa-educated Lamenpa Tenzin Chödrak and the eastern Tibetan physician and Buddhist scholar Khempo Troru Tsénam (1926–2004).[112] Both physicians became leading *tsotel* experts in the 1980s and are presented as the authoritative *tsotel* lineage holder in their respective biographies, Troru Tsénam for the PRC and Tenzin Chödrak for India. I analyzed these biographies in greater detail elsewhere (Gerke 2015a), but present a summary of the events here to highlight some of the challenges involved in this *tsotel* event, especially regarding the changing relationship between the state and Sowa Rigpa in the 1970s. In my previous analysis of these biographies, I also draw attention to how biographies can be politicized in an effort to emphasize an authoritative lineage of knowledge transmission. We thus need to keep in mind that these biographies are valuable in that they contain personal memories of past events; however, they are also problematic as a source of evidence since they were written with a certain agenda to establish an authoritative line of knowledge transmission.

The Chinese invasion of Tibet in the 1950s and the subsequent communist reforms and Cultural Revolution (1966–1976) changed the pharmaceutical nexus of Sowa Rigpa practices considerably, with many Tibetan

110 Interview, New York, October 13, 2014.

111 Tenzin Chödrak's biography was written by Sonam Rinchen (2000). Several other sources mention 1922 or 1923 as Tenzin Chödrak's year of birth. 1924, the wood-mouse year of the fifteenth Tibetan *rabjung*, is based on Sonam Rinchen (2000, 39/8).

112 This biography of Troru Tsénam was written by Lappendum Lozang Lodrö (2006). Troru Tsénam's dates here are according to Lappendum Lozang Lodrö (2006, 8/3, 276/11). Holmes (1995, 144) mentions 1928 as his year of birth.

physicians being imprisoned.[113] Lamenpa Tenzin Chödrak made *tsotel* together with Troru Tsénam and others under very difficult conditions in 1977 in a Chinese labor camp, with the support of Chinese government officials and a Tibetan regiment commander *(ru dpon)*.[114] After his graduation from the Lhasa Mentsikhang in 1952, Tenzin Chödrak became the personal physician first of the Dalai Lama's mother and then of the Fourteenth Dalai Lama himself. In 1959, this position led to his imprisonment and "re-education" for roughly two decades.[115]

Back in 1953, Tenzin Chödrak had received the *tsotel* transmission in a traditional *chöyön* setup. His teacher, the Mentsikhang director and personal physician of the Thirteenth Dalai Lama, Lamenpa Khyenrap Norbu, sent him to make *tsotel* in Phagri Richung Potok, a high-altitude settlement southwest of Lhasa, bordering Bhutan and Sikkim. A local lama, Tulku Dozher Tupten Lamzang, had offered to sponsor the event.

At Phagri, Tenzin Chödrak made *tsotel* with Penden Gyeltsen (birth date unknown, died in 1962),[116] who was a fellow student of Chödrak, but senior. The contemporary Tibetan author Sönam Bakdrö (2006, 47/17–21) argues that the Phagri *tsotel* event testifies that the *tsodru chenmo* lineage of the Lhasa Mentsikhang continued uninterrupted through the two students of Lamenpa Khyenrap Norbu—Tenzin Chödrak and Penden Gyeltsen.[117] At the time, Penden Gyeltsen taught medicine near Phagri in a medical school called Richung Potok Riteng Mentsikhang, and had eight medical students.[118] Having such a student workforce might have provided an additional incentive to make *tsotel* in Phagri.[119] Apparently, he was also sponsored by the ruler of Phagri and was able to distribute medicines for free.[120] Later, in exile in Sikkim, Penden Gyeltsen lacked such *chöyön* support because he was not well known and was unable to make *tsotel* again.[121]

The fifteen kilograms of *tsotel* made at Phagri were largely kept by the sponsor Tulku Dozher; Tenzin Chödrak presented two kilograms to his teacher, Lamenpa Khyenrap Norbu, back in Lhasa. It is often the

113 See Hofer (2018) on recent accounts of Sowa Rigpa medical practice in Tibet during this time.
114 Parts of this section appeared previously and in greater detail in another article, which also discusses the *tsotel* seeing transmission of Troru Tsénam and Tenzin Chödrak. See Gerke (2015a).
115 His statement on his imprisonment is available online. See United States. Congress. House. Committee on International Relations. Subcommittee on International Operations and Human Rights (1996).
116 There is one short biography of Penden Gyeltsen, which mentions his making of *tsotel* (Tashi Tenzing 2015, 47/14–15). Thanks to Tashi Tsering Josayma for providing this source.
117 The entire lineage transmission is a bit more complex. On Penden Gyeltsen's *tsotel* seeing transmission and further details on making *tsotel* at Phagri, see Gerke (2015a, 881–884).
118 Döndrup Wanggyel Khangkyil (2008, 34). Thanks to Tashi Tsering Josayma for this reference.
119 Tashi Tsering Josayma, personal communication, Dharamsala, July 9, 2014.
120 Tenzin Thaye, personal communication, McLeod Ganj, December 7, 2012.
121 Tashi Y. Tashigang, interview, Delhi, March 4, 2016.

case that the sponsor receives the largest amount of the *tsotel* produced. After Phagri, Lamenpa Khyenrap Norbu wanted Tenzin Chödrak to teach mercury processing at the Mentsikhang in Lhasa, but with the post-1951 annexation of central Tibet by the Chinese Communist Party, the opportunity did not arise. In 1959, Tenzin Chödrak was imprisoned.

With the drastic political changes of this period, the social support networks of *chöyön* were greatly strained and the pharmaceutical nexus of producing *tsotel* and precious pills was repeatedly refigured, with Sowa Rigpa falling in and out of government support. According to Craig Janes (1995), the attitudes of the newly established PRC governing bodies towards Sowa Rigpa changed several times after the Chinese invasion of Tibet. In central Tibet—from 1951 to 1962—Tibetan medicine was largely ignored, while from 1962 to 1966 it was integrated into the official public health system, even receiving government funds. During the Cultural Revolution (1966–1976) it was delegitimized and attacked by the Red Guards as one of the "Four Olds," and the Mentsikhang's activities were interrupted. The lowest point for Sowa Rigpa at the Mentsikhang was in 1973 (Janes 1995, 20), but things began to change in 1974 when Tibetan medicine was officially taught again in Lhasa (Hofer 2018).

In 1973, Tapkhé Püntsok, who was known as the Great Medicine Provider of the Mentsikhang in Lhasa supervising the stock of raw materials, accomplished the burning of the eight metals and eight elements in Kongpo,[122] in preparation for making *tsotel* a year later in Lhasa (Dawa Ridrak 2003, 411 / 11–13). It is not known who supported this event. He apparently trained Tendzin Namgyel,[123] who escaped to India in 1981 and worked as head of the Pharmacy Department at the Dharamsala Men-Tsee-Khang until his death in 1991 (Kloos 2010, 80, 88). Tendzin Namgyel made *tsotel* in Dharamsala with Lamenpa Tenzin Chödrak in 1982 and 1987 (MTK 2014).

Making *tsotel* at a labor camp in 1977, though historically situated at a time when Sowa Rigpa was in a devastated state, occurred also at the turning point of newly emerging Chinese strategies to use it in culturally compatible ways to serve rural populations.[124] The following encounter between Troru Tsénam and a Chinese official can be interpreted as part of wider efforts by Chinese officials to integrate traditional medicine into rural public health schemes, which began with the barefoot doctor campaign

122 Dr. Namgyal Tsering, former head of the Men-Tsee-Khang Pharmacy Department in Dharamsala, suggested that it was less difficult to burn the metals into ash in Kongpo, where wood was more easily available than in Lhasa. Personal communication, New York, October 13, 2014.

123 Dr. Dawa Ridrak, e-mail communication, May 31, 2014. Dawa Ridrak states that Tendzin Namgyel told him this personally. Other Men-Tsee-Khang physicians described Tendzin Namgyel to me as very experienced in *tsotel* preparations, but his previous training and *tsotel* transmissions were not talked about, perhaps out of respect for Lamenpa Tenzin Chödrak as the Dalai Lama's personal physician and the official lineage holder of the *tsotel* practice.

124 Janes (1995, 20). See also Hofer (2011, 154–156) on the changing status of Tibetan medicine in Ngamring in the early 1970s, and Hofer (2018, chapter 4).

in the early 1970s. Hofer reports that starting in 1974, a Tibetan medicine section was opened in the People's Hospital in Ngamring, training health workers and barefoot doctors to prepare Tibetan medicines, using the newly printed publications on Tibetan *materia medica* that presented Tibetan medicine as something new in revolutionary healthcare and not as part of the "Four Olds" (Hofer 2018, 134–140).

Thus a year later, when a Chinese official approached the young Troru Tsénam—who was undergoing "reforms" at Powo Tramo, one of the main detention facilities east of Lhasa[125]—he was probably looking for aspects of Tibetan medicine that could be implemented more widely in public health care. Their tussle over authority highlights how delicate this enterprise was. In the words of Troru Tsénam's biographer, Lappendum Lozang Lodrö:

> [...] one day in the wood-rabbit year of the sixteenth Tibetan *rabjung,* 1977 [sic., 1975–1976], an official who had arrived from the security office in Lhasa approached him [Troru Tsénam] and asked, "What is most important [and] precious in Tibetan medicine?" He replied immediately that the most important among Tibetan medicines is the Great Mercury Refinement. He said, "If you have *tsotel* from the Great Mercury Refinement, only then is one able to prepare and make all the varieties of precious pills. Therefore, the real precious pill is actually this *[tsotel]*. Without it, just saying 'precious pills' means nothing; that's it." Following that, he [the official] asked, "Can you make this so-called *tsotel*?" Khempo Tsénam replied in a matter-of-fact and confident manner, "If I have both the materials and authority, then certainly I can make it." In response the official immediately shrank back and said, "Oh well, he acts as if he needs authority!" Realizing that the official had misunderstood the meaning of what he had said, Khen Rinpoche [Troru Tsénam] responded, "When I say, 'I need authority,' I don't mean political authority at all. I meant the authority to organize the preparation of medicine. If I don't have the authority to direct the entire manufacturing practice as it should be done, there will be great difficulty in preparing the medicines, and there is even the potential danger that I would not be able to complete the preparation process." The official then understood the situation, and only then said, "OK, from now onwards you can begin arranging the materials to prepare the medicines."[126]

125 The camp is still located in the town of Tramo in Powo, Kham, today administered under Nyingtri prefecture, Kongpo.

126 Translated from Lappendum Lozang Lodrö (2006, 173/1–174/2): *de nas bod rab byung bcu drug pa'i shing yos spyi lo* ཤིང་ཡོས་ *lo'i nyin zhig la/ lha sa'i spyi bde las khungs nas yong ba'i 'gro khrid zhig gis khong la/ bod sman las 'gangs rtsa che shos ni gang red ces dris pa la/ khong gis myur phral bod sman las 'gangs che shos ni dngul chu btso bkru chen mo red/ dngul chu btso bkru chen mo'i btso thal zer ba de yod na/ gzhi nas rin chen ril bu'i rigs thams cad sbyor bzo byed thub pas rin chen ril bu dngos kyang de red/ de med na rin chen ril bu zer ba stong pa rang red ces*

Another reason why Chinese officials began supporting the making of *tsotel* has also been attributed to some Tibetan physicians successfully treating Chinese officials with their medicines. Lamenpa Tenzin Chödrak, who was breaking stones in a labor camp, was asked to set up a small prison clinic after successfully treating some local Chinese leaders. A group of other physicians, which included Troru Tsénam, was working in a small prison clinic at Powo Tramo. One of them, Amchi Tsültrim, was appointed part-time doctor at the clinic after curing a high military officer (Sonam Rinchen 2000, 102).[127] Apart from Chinese support—which was partly motivated by personal therapeutic gain, partly by new party plans for including traditional medicine in public health—the Tibetan regiment commander named Tségyel, who was sympathetic to the prisoners, also played a significant role. In 1974, Tségyel was appointed health director at Powo Tramo, where he built a small prison clinic (2000, 102). They financed this clinic by making medicinal syrup decoctions *(khenda)*, which they traded with the Mentsikhang in Lhasa for other medicines. Together, these doctors felt the need to make precious pills, for which they had to process mercury. They decided to search for old *menjor* texts as well as experienced senior doctors who had survived the Cultural Revolution and remembered how to make *tsotel*.[128] They eventually found a copy of the eighteenth-century *tsodru chenmo* manual written by Degé Drungyig Gurupel, which is based on the oral instructions of Situ Chökyi Jungné (1699/1700–1774) and was later reprinted in India by Tashi Tsering (Degé Drungyig Gurupel 1986). The only experienced doctor they could find was Lamenpa Tenzin Chödrak, who was working at a stone quarry. Tségyel was instrumental in securing permission for him to join the others in Powo.

The two biographies of Tenzin Chödrak and Troru Tsénam portray the event, which took place in the fire-snake year 1977, with different emphases on how the two physicians were personally involved in the supervision of the manufacturing process and how they solved enormous technical challenges, which I describe elsewhere (Gerke 2015a). Nevertheless, the

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zhus/ des kyang khyod kyis btso thal zer ba de sbyor bzo thub bam zhes dris pa'i lan du/ mkhan po tshe rnam gongs nas babs brling dang yid ches brtan po'i sgo nas rgyu cha dang dbang cha gnyis yod na bzo thub nges zhes zhus tshe/ 'go khrid des de ma thag tu rnam 'gyur grang shur shur gyis/ 'o/ kho la dbang cha dgos mdog 'dug zer/ mkhan rin po che nas khong gi bsam don nor song dgongs nas/ nga la dbang cha dgos zer ba de chab srid kyi dbang cha zer ba gtan nas min/ sman sbyor bkod sgrig gi dbang cha zer ba yin/ gal te sbyor las thams cad ga 'dra byed dgos pa'i dbang cha med na/ sman sbyor bzo la dka' khag chen po theg pa dang / tha na sbyor bzo mi thub pa'i nyen kha yod srid kyi red ces zhus/ 'go khrid des gnas tshul ha go rjes/ gzhi nas 'o ya da nas khyod kyis sman bzo rgyu gra sgrig gyis gsungs.

127 I think this Amchi Tsultrim possibly refers to Tsultrim Sangyé (1940–2011), better known as Amchi Gege, who set up the Bonpo medical school near Kathmandu (see last section of this chapter). According to his student, Amchi Nyima Sampel, Amchi Gege was an inmate at Powo Tramo and made *tsotel* with Troru Tsénam. Amchi Nyima Sampel, personal communication, IASTAM conference, South Korea, September 11, 2013.

128 I describe in detail how they found the text and Lamenpa Tenzin Chödrak elsewhere (Gerke 2015a).

dire situation of the *tsotel* practice and its being on the verge of extinction undoubtedly comes through in both narratives. At Powo Tramo they made approximately nineteen kilograms of *tsotel* in about forty-five days (Lappendum Lozang Lodrö 2006, 241/7; Troru Tsénam 2001, 515/8). It is not clear where and how they made precious pills and how they got the precious stones and other rare ingredients, but Sönam Bakdrö reports that Rinchen Drangjor, Rinchen Mangjor, Ratna Sampel, Yunying 25, Jumar 25, Rinchen Wangril 25, and other precious pills were made at Powo Tramo (Sönam Bakdrö 2006, 48/10–11).

Even with the challenging conditions of medicine production in a labor camp, the *tsotel* event had a cosmological significance. Tenzin Chödrak recalls in one of his memoirs:

> The medicines were ready by the time of the harvests, which proved to be excellent, much better even than in preceding years. A Tibetan woman came to inform me of it. I answered with a knowing smile: "The texts say that to obtain a good harvest, you must first purify some mercury. It's even better if you also prepare other metals." The woman left reassured and henceforth they thought of me as a sage and a fine interpreter of supernatural things (Chödrak and van Grasdorff 2000, 259).

In the 1980s, following political relaxations, the conditions for Sowa Rigpa in the PRC changed considerably. Khempo Troru Tsénam thoroughly trained dozens of physicians and established the *tsotel* practice across many pharmacies in Tibet, the details of which are beyond the scope of this book.[129] Lamenpa Tenzin Chödrak came to Dharamsala and taught *tsodru chenmo* at the Men-Tsee-Khang in 1982 (see below).

To highlight two key points from the above historical explorations: first, *tsotel* events demonstrate the fluidity of "the state" as one of the central *chöyön* players of the pharmaceutical nexus. We have seen how state support can change drastically in different political climates and can make a pharmaceutical practice vulnerable in terms of knowledge transmission and manufacturing.

Second, the *tsodru chenmo* practice also operates within a larger field of what Sienna Craig (2012) refers to as "social ecologies," which includes the making of medicines as interactive with the surrounding environment, thus creating multiple synergies of potency. The above example of refining mercury producing good harvests illustrates how social ecologies are integral to the pharmaceutical nexus of *tsotel* events.

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129 Sönam Bakdrö (2006, 57/12–21) reports at least seven *tsotel* events between 1980 and 1996 at various Tibetan pharmacies in the PRC. The actual number is probably higher considering potential small-scale undocumented events. The senior physician Gyayé Lobsang Nyima (b. 1933) at the Qinghai Provincial Tibetan Medical Hospital has made *tsotel* more than thirty times in his lifetime (Tawni Tidwell, personal communication, October 4, 2019).

To continue my investigation of the pharmaceutical nexus of *tsotel* events across time, the next section offers examples from the contemporary exile situation in which Tibetan government bodies have held little power and control over *tsotel* events. While *chöyön* networks have continued to play a role, in these examples, they do so in varying ways.

Making *tsotel* in exile

Chöyön, as a complex support system "ideologically compatible to historical forms" (Klieger 1992, 16), has been flexible enough to survive the "democratic reforms" in the PRC and extreme limitations of resources in exile, notwithstanding the challenges. In the following, I sketch the main *tsotel* events at Tibetan medical institutions and several private clinics in India and Nepal post-1959, demonstrating the *chöyön* relationship between Buddhist monasteries, religious and political leaders, and Tibetan physicians. I also analyze how the exchange of social and financial support that we have seen in the *tsotel* events in Tibet have been altered in India. Notably, *chöyön* relationships have continued to enable some of the small-scale practitioners in exile to process mercury and—as we shall see later—also appear as an important player in interactions between Sowa Rigpa institutions and their professionals with modern science and its representatives (Chapter 7).

Tsotel practices in exile are tied to a changing pharmaceutical nexus of politics, economics, and monopolies that come with the institutionalization of pharmaceutical practice. The alteration of patronage and resources among Tibetan exile communities has had significant consequences for the knowledge transmission of *tsodru chenmo* to the younger generations of physicians. The following sections discuss who made *tsotel* in exile and where, and offer the first ever comprehensive documentation of these events and their players, including historical photographs generously provided by the Men-Tsee-Khang. My analysis of these events also illustrates how both institutionalization and small-scale production play a role in the continuation and survival of traditional medical practices in Asia.

INSTITUTIONALIZATION OF *TSODRU CHENMO* IN INDIA

THE MEN-TSEE-KHANG IN DHARAMSALA

Lamenpa Tenzin Chödrak was instrumental in the revival of the *tsotel* practice at the Men-Tsee-Khang in Dharamsala after his arrival from Tibet in 1980. He immediately resumed his position as personal physician of the Fourteenth Dalai Lama and was appointed chief physician at the Men-Tsee-Khang and member of its governing body (Kloos 2010, 80). In 1981, Tendzin Namgyel arrived from Lhasa, was appointed head of the Men-Tsee-Khang Pharmacy Department, and joined the efforts to make *tsotel*.

Under the harsh refugee circumstances, it was initially very difficult for Tibetans to make *tsotel* and precious pills. Before 1982, they made very few precious pills (Yunying 25, Jumar 25, Rinchen Mangjor Chenmo), all without *tsotel*.[130] According to Dr. Namgyal Tsering, in the 1970s they once used a simpler type of processed mercury called *kardül* to make Rinchen Mangjor Chenmo.[131] Being able to make *tsotel* and precious pills was so significant for the Tibetan community in Dharamsala that the Tibetan government in exile, the Men-Tsee-Khang, and the Fourteenth Dalai Lama himself collaborated to make it happen. The pharmaceutical nexus here was similar to the Dalai Lamas' support for making *tsotel* back in Tibet, albeit in a new territory with different access to resources and within the challenging political climate of exile. The role of the Dalai Lama, his special blessing pills, and precious ingredients provided by him have continuously added to the perceived spiritual efficacy of the precious pills produced by the Men-Tsee-Khang since 1982 (Gerke 2017a).

The first *tsotel* event was so significant that—beginning on April 28, 1982—it was prepared in the guarded compound of the Dalai Lama's residence at Thekchen Chöling. Lamenpa Tenzin Chödrak, Tendzin Namgyel, and Lamenpa Jamyang Tashi (of Tsona) worked as the three senior physicians alongside seven other physicians and eleven assistants. Twenty-one years after its establishment in exile in 1961, the Men-Tsee-Khang for the first time prepared sixty kilograms of *tsotel*. This was a special occasion, the excitement of which was felt all over Dharamsala. Between 1982 and 2014, *tsotel* was made six more times (see Appendix B), with increasing production figures, peaking in 2014 with 138 kilograms made under Dr. Jamyang Tashi, with ten physicians and twenty-seven assistants.[132]

There is little published documentation of the 1982 event. What follows, incorporates that with interviews I conducted with Men-Tsee-Khang physicians. According to Lamenpa Tenzin Chödrak's biographer Epa Sonam Rinchen (Sonam Rinchen 2000, 126/18–127/20), the Dalai Lama gave a special order to the Men-Tsee-Khang to make *tsotel*, but it was extremely difficult to gather all of the ingredients, such as chalcopyrite *(gser rdo)*[133] or marmot fat *(phyi ba'i tshi lu)*. The Men-Tsee-Khang director at the time, Jigme Tsarong, travelled to Ladakh specifically to collect the sour berries of seabuckthorn called *tarbu (star bu)*, needed for processing

130 Dr. Pema Dorjee, personal communication, Chontra, July 14, 2014. Note that Yunying 25 is still made without *tsotel* but has processed cinnabar as an ingredient and Rinchen Mangjor Chenmo now has *tsotel*. Jumar 25 does not contain *tsotel* but cinnabar as an ingredient in the form of *tselkar* in some formularies, for example, in Khyenrap Norbu (2007, 170/10). At the Men-Tsee-Khang in Dharamsala Jumar 25 was also coated with *chokla* (roasted cinnabar) up until the end of 2010, when *chokla* coating of pills was discontinued.

131 Interview, New York, October 13, 2014.

132 Official Men-Tsee-Khang pharmacy record in Tibetan (MTK 2014), provided by Dr. Jamyang Tashi, May 15, 2015. See Appendix B.

133 Identification according to Dr. Tsering Norbu, Materia Medica Department, Men-Tsee-Khang, Interview, Dharamsala, March 22, 2015.

Figure 18: The metal caldron made especially to boil mercury. Lamenpa Tenzin Chödrak (right) sealing the caldron, with Lamenpa Jamyang Tashi (middle) and Dr. Tendzin Namgyel (left), Thekchen Chöling, 1982. Photo: Men-Tsee-Khang (Men-Tsee-Khang 1982 / CC-BY-SA 4.0).

mercury. Moreover, the clay vessels from Ladakh broke during the many hours of burning copper (twelve hours) and gold (fifty hours), and the physicians had to experiment with various types of vessels in which to burn the metals. The pot to boil the mercury was specifically designed and made in Amritsar, and was thought to be "stronger than iron" (see Fig. 18).[134] The same caldron is still used today, but on a gas stove, which makes it easier to regulate the heat (see Fig. 19).

I interviewed three physicians who processed mercury in 1982. Their memoirs demonstrate the social, spiritual, medical, and personal importance of this first *tsotel* event in exile and the significance of the role of the Dalai Lama in it. Dr. Pema Dorjee, who sadly passed away in 2015, remembered the event when we met in 2012:

> An unfortunate accident happened when we were collecting ingredients. People said it was an obstacle, *barché*. I was badly injured, but alive [one monk and one student were killed during the accident]. His Holiness gave me confidence that we could overcome the obstacle and make *tsotel* successfully. It was with his blessings that we could make it well.[135]

134 Dr. Namgyal Tsering, Interview, New York, October 13, 2014.
135 Interview, Dharamsala, February 9, 2012.

Figure 19: Since 1982, the same caldron has been used to boil mercury, and since 1987, a gas stove to better regulate the heat. The shield around it protects the gas flame from air currents. Photo: Men-Tsee-Khang (Men-Tsee-Khang 2011 / CC-BY-SA 4.0).

In 2014, I met Dr. Namgyal Tsering (see Fig. 20) in New York. He made *tsotel* several times (in 1982, 1987, and as the head of the Men-Tsee-Khang Pharmacy Department in 2001). He remembered how the Dalai Lama took interest in the processing which was taking place just behind his residence, in 1982:

> Many times His Holiness came to see us. Sometimes he came to see quietly, hiding, sometimes he came and joked with us. [...] To protect ourselves from the poison, we had to chew meat, and drink *chang* [Tibetan fermented barley beer]. Sometimes His Holiness came and joked with us, saying "now all of you are drunk, not making *tsotel*?" [he laughs].[136]

Dr. Tsewang Tamdin, who was a young graduate doctor at the time working in Delhi (he later became the director of Men-Tsee-Khang and visiting physician to the Fourteenth Dalai Lama), remembered:

> In the beginning, His Holiness came to bless the event, and when he had time, he came sometimes to see how we were doing. He was very interested. This is one of the very important practical things in Tibetan medicine. We say, "If you do not know *tsotel*, you do not know how to make medicine." You learn about all the minerals and

136 Interview, New York, October 13, 2014.

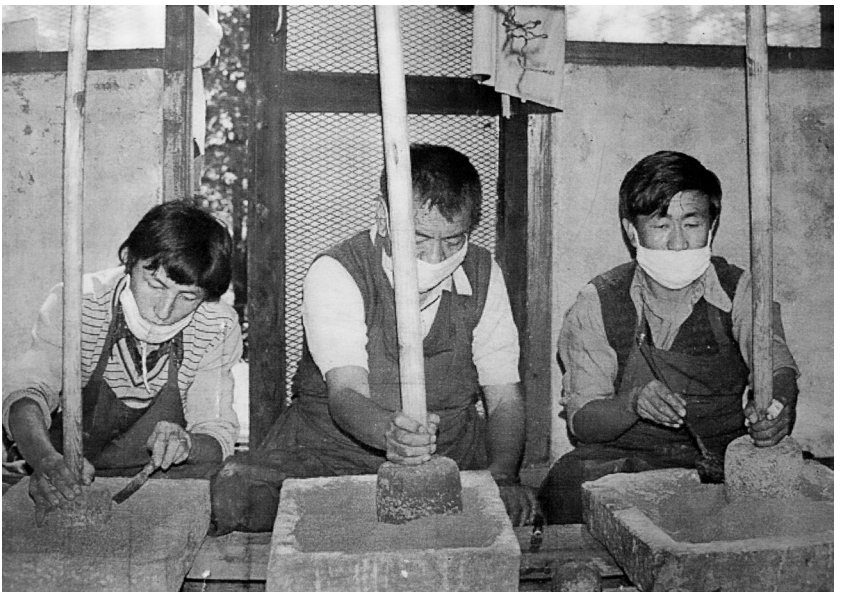

Figure 20: Dr. Namgyal Tsering (left), Dr. Lobsang Chöpel (of Phagri) (middle) and an assistant (right) grinding herbal powders for mercury processing in 1982. Photo: Men-Tsee-Khang (Men-Tsee-Khang 1982 / CC-BY-SA 4.0).

> then know how to use them in other medicines, too. If you know *tsotel* then you know how to make other medicines as well. It is like in the army, if you did the training but you never did the parachute jumping, you are not on the top. Similarly, in Tibet you learn to make the medicine, but if you never learned how to make *tsotel*, you do not know anything.[137]

The Dalai Lama also had a supportive role in financing the *tsotel* event of 1982. Dr. Tsewang Tamdin explained:

> We tried to make it ourselves. Men-Tsee-Khang bought the materials for making *tsotel*. But some of the precious stones came from His Holiness.[138] When people come from Tibet they make offerings to him, even herbs, like ginseng, which he often receives as a tonic. He gives these substances to us. If we need them as medicines, we use them. His Holiness never keeps anything for himself. He helps us with his encouragement. He says making precious pills is useful for humans. He knows the value of *tsotel*. With the *tsotel* of 1982 we

137 Interview, Dharamsala, May 15, 2015.
138 The official Men-Tsee-Khang website states that the office of His Holiness funded the 1982 event. See MTK (2011b).

> could make six types of precious pills. We made an offering of precious pills to him. He takes them regularly.[139]

The Dalai Lama, who is known for his curiosity in science, also showed deep interest in the technicalities of the process. Lamenpa Tenzin Chödrak remembered:

> Since Gyalwang Rinpoche ["Precious King of Victorious Ones," an epithet of the Dalai Lama] has had great interest in Tibetan medicine since his youth, he came to observe the entire mercury refinement process and frequently asked a number of precise questions regarding the burning of gold, silver, copper, iron, and so forth. Moreover, in order to make [Gyalwang Rinpoche] understand, I [Chödrak] also introduced the different stages of burning the gold and silver. [I] explained how the different stages appear, and showed, and frequently clarified, how the substances and [their] potency change by the time the gold, silver, etc., were burned, and so forth. One time, when burning the copper, [we] noticed that the copper had turned into ash, but the cloth that the copper was wrapped in had remained the same. When [we] showed this to the Supreme Gyalwang, he repeatedly said, "The potency of the substance is absolutely amazing." Later, the Supreme Gyalwang discussed this during the cabinet meeting of the Sakya ministers. With Gyalwa Rinpoche's immeasurable compassion and kindness, and together with the great effort of all the senior and the junior doctors, [we were] thus able to accomplish the mercury *tsotel* practice well in a little over two months.[140]

In 1982, it was very auspicious to have the Dalai Lama himself initiate the trituration of mercury with sulfur. This was done in a large stone trough, which to this day is kept at the Men-Tsee-Khang pharmacy, filled with myrobalan fruits and wrapped in special orange-colored silk cloth. Dr. Tenzin Thaye, who currently is one of the visiting physicians of the Fourteenth

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139 Interview, Dharamsala, May 15, 2015.

140 Translated from Sonam Rinchen (2000, 128/14–129/6): *ལ་ rgyal dbang rin po che sku na chung dus bod sman la thugs snang chen po yod stabs thengs 'di'i dngul chu sbyor bzo'i rgyud rim cha tshang la gzigs zhib tu phebs te gser dngul zangs lcags bsregs stangs sogs la thugs zhib kyis bka' 'dri yang yang gnang / gus nas kyang gang gi bzhed dgongs lhun gyis grub ched gser dngul bsregs pa'i rgyud rim ngo sprod zhus par ma zad/ skabs mtshams kyi gnas tshul ji byung dang / gser dngul bsregs sgrub zin mtshams skabs babs rdzas nus 'gyur ba ji byung sogs spyan 'bul yang yang zhus/ thengs shig zangs sreg skabs zangs rnams 'tshig ste thal bar song yang / zangs sgril ba'i ras cha dag sngar rgyun ltar lhag/ 'dug pa ལ་ rgyal dbang mchog la spyan 'bul zhus par de skabs ལ་ rgyal dbang mchog nas rdzas kyi nus par ya mtshan chen po byung zhes yang yang gzungs la phyis su sa skya'i bka' blon lhan rgyas mjal 'dzoms skabs su'ang de skor gsung gleng gnang song / ལ་ rgyal ba rin po che'i tshad med pa'i thugs rje'i bka' drin dang sman pa rgan gzhon rnams kyi 'bad brtson 'og khyon zla ba gnyis lhag gi dus yun nang dngul chu btso thal gyi lag len dag legs grub byung ba red//.*

Figure 21: Dr. Jamyang Tashi, current head of the Men-Tsee-Khang's Pharmacy Department (left), and Dr. Tenzin Thaye, one of the visiting physicians of the Fourteenth Dalai Lama (right), showing the stone trough used by His Holiness in 1982 to initiate the trituration of mercury and sulfur. Dharamsala, May 2015. Photo by author (Gerke 2015 / CC-BY-SA 4.0).

Dalai Lama, and Dr. Jamyang Tashi, current head of the Pharmacy Department, showed me this stone trough in 2015 (see Fig. 21). They explained: "It is important to have a high lama begin the trituration of mercury and sulfur because things can go wrong. We see it as auspicious if it is done by a high Buddhist lama." Dr. Jamyang Tashi kept the trough like a treasure in his office and acknowledged, "We have kept this stone trough from His Holiness since 1982."[141] He received the *tsotel* transmission from Lamenpa Tenzin Chödrak in 1994 and from Dr. Namgyal Tsering in 2001. He then supervised the Men-Tsee-Khang *tsotel* events in 2008, 2011, and 2014, and was publicly honored for these achievements by the Dalai Lama during the Men-Tsee-Khang centenary celebrations in 2016 (Gerke 2017b).

Dr. Tsewang Tamdin later explained the importance of the Dalai Lama triturating these substances: "His Holiness came to bless and even grind the substances for a few minutes. To bless here means that whatever we have prepared, it will be beneficial for the people. Having His Holiness do this

141 Interview, Dharamsala, May 15, 2015.

Figure 22: The young Toding Rinpoche (left), is washing vessels that were used to burn the eight metals with the assistant Trinlé (right) during the mercury processing near the Fourteenth Dalai Lama's residence in 1982. Lamenpa Tenzin Chödrak is standing in the center. Photo: Men-Tsee-Khang (Men-Tsee-Khang 1982 / CC-BY-SA 4.0).

adds purity and authenticity."[142] After 1982, the Men-Tsee-Khang took the spiritual support of other lamas to carry out the required rituals and to triturate mercury and sulfur during the making of *tsotel*. In 2008, this lama was Toding Rinpoche, also known as Tupten Gyeltsen, who was a young monk during the 1982 *tsotel* event (see Fig. 22) and later became a physician at the Men-Tsee-Khang and participated in the *tsotel* events of 1994 and 2008.

Since 1982, the batches of students have become larger, and not every male physician graduating with a *menpa kachupa* degree from the Men-Tsee-Khang receives the opportunity to make *tsotel*. Making *tsotel* is not even part of the medical curriculum of the senior *menrampa (sman rams pa)* degree (Pasang Yonten 1988, 231). Of the approximately fifty physicians who took part in making *tsotel* between 1982 and 2014, to my knowledge none has made *tsotel* outside the Men-Tsee-Khang.

While the Dalai Lamas and their governments played an active role for more than 300 years (between 1669 and 1982) in the organizing and sponsoring of *tsodru chenmo*, the place of the *chöyön* support within the

142 Interview, Dharamsala, May 15, 2015.

pharmaceutical nexus of *tsotel* events has significantly changed since then in terms of power negotiations, financing, and physicians' agency. As a showcase of the institutionalization of Sowa Rigpa (Kloos 2011), the Men-Tsee-Khang in Dharamsala is able to independently train specialists and finance the manufacturing of substantial amounts of *tsotel* (138 kilograms in 2014), and also produce eight different precious pills (MTK 2017c). A certain monopoly and secrecy is maintained by selectively passing on the skills to a few amchi as part of their specialized *menjor* training. This is different at the Sowa Rigpa Department in Sarnath, where making *tsotel* and certain precious pills are included in the Sowa Rigpa curriculum and funded by the university.

MAKING *TSOTEL* AT CIHTS, SARNATH

The Sowa Rigpa Department at the Central Institute of Higher Tibetan Studies (CIHTS), previously CUTS (Central University of Tibetan Studies), is located in Sarnath, which is near Varanasi in the Indian state of Uttar Pradesh. Founded in 1993, it has a teaching faculty with an extensive library, a small hospital, and a pharmacy. It offers a five-year course for the degree of Bachelor of Sowa Rigpa Medicine and Surgery (BSRMS, previously BTMS). The university provides the funds for the practical training of students, which includes making *tsotel*. Even female students are taught most of the process (see Chapter 5).

Kloos (2008, 32) points out one of the most significant institutional characteristics: "CUTS [CIHTS] is under the authority of the Indian Department of Higher Education (rather than the Tibetan exile-government), which means that it is able to operate in complete autonomy from the Men-Tsee-Khang [...] with considerable funding from the Indian government." This means they have their own syllabus, exams, and certificates (although examiners often come from the Men-Tsee-Khang). This considerable independence has also translated into a more open style of knowledge transmission, which some Tibetan physicians see as its hallmark, "compared to the closed and secretive nature of the MTK" (Blaikie 2014, 274).

Gen Rinpoche Rakdo Lobsang Tenzin (also known as Rakdo Rinpoche), who has been teaching at the CIHTS Sowa Rigpa Department since 1993 and became full professor there in 1998, taught *tsodru chenmo* three times between 1998 and 2008, together with Dr. Dorje Damdul, a Men-Tsee-Khang graduate of 1988, who observed part of the *tsotel* process at the Men-Tsee-Khang in 1987 while on a pharmacy internship.[143] At CIHTS, only a small amount of *tsotel* is made. Funded by the university, it is made to train students and to make precious pills in their own pharmacy, and prescribed only in their own clinics.[144]

143 Dorje Damdul, interview, Sarnath, December 21, 2012.

144 Rakdo Rinpoche, interview, Sarnath, December 22, 2012. At CIHTS they make the precious pills Rinchen Dangtso, Rinchen Mukkhyung Gugül, and Rinchen Ratna Gugül. The first was formulated by Khempo Troru Tsénam and the

Rakdo Rinpoche received the *tsotel* transmission directly from Khempo Troru Tsénam in Lhasa around 1983–1984, when Lama Khempo Öser came from Degé in Kham with his female student Do Dasel Wangmo (b. 1928, see Chapter 5). Together with Troru Tsénam and his nephew Sönam Chimé they made about two kilograms of *tsotel* in a vacated residential area of the Lhasa Mentsikhang. This was made possible through traditional *chöyön* networks: Khempo Öser possibly sponsored parts of the event since he took most of the *tsotel* back to Degé, Jampa Trinlé at the Mentsikhang generously provided the equipment and ingredients, and Troru Tsénam passed on the lineage and "seeing transmission."[145]

At CIHTS, Rakdo Rinpoche's incentive is to create independent medical practitioners. But for various reasons we discussed during an interview, none of the graduates has opened his / her own clinic as yet.

RAKDO RINPOCHE: *Students who study at this university should be independent. They can teach, check patients, [and] make medicines themselves. Tibetan medical doctors need this kind of education. Our teachers used to mention this. Tibetan doctors need to know all things so they can do everything themselves.* [...] *All students graduating here learn how to make medicine. Of the thirty-six amchi graduated [by 2012] all can make their own medicines.*

BARBARA GERKE: *Do they do it?*

RAKDO RINPOCHE: *It is like this. Some of the students work in Men-Tsee-Khang clinics, some have their own clinics in Nepal, some went to the United States for further studies and do not practice. Some go to Ladakh and they only teach* [...] *all those things. They did not open their own pharmacy as yet.* [...] *but they could do it. They are very knowledgeable and could open a pharmacy by themselves. No doubt.*

BARBARA GERKE: *But it is not so easy to open a pharmacy these days.*

RAKDO RINPOCHE: *My message is the same, there is no change. If people really study, then they can do it independently.*

BARBARA GERKE: *All your students can make* tsotel*?*

RAKDO RINPOCHE: *They were all taught from scratch how to make it. They have the knowledge and practical experience. The problem is they lack the financial support.*[146]

Regionalism has played a significant role in the transmission of *tsotel* knowledge. Back in Tibet, *tsotel* techniques involved a pharmaceutical and

second and third by Rakdo Rinpoche. E-mail communication Dr. Zamyou Penpa Tsering, CIHTS, October 21, 2017.

145 Rakdo Rinpoche, interview, Sarnath, March 16, 2015. The so-called seeing transmission is one of several ways to transmit knowledge, explained further in Chapter 4.

146 Rakdo Rinpoche, interview, Sarnath, December 24, 2012.

political monopoly (e.g. Gelukpa interests in Lhasa versus Kagyü practices in Kham). This still reverberates to some extent in exile. Rakdo Rinpoche at CIHTS follows an open teaching policy similar to Khempo Troru Tsénam from eastern Tibet. This contrasts with the Men-Tsee-Khang's more conservative approach in Dharamsala, instituted by Lamenpa Tenzin Chödrak, the official *tsotel* lineage holder and the Dalai Lama's personal physician from central Tibet.

While both institutions, CIHTS and the Men-Tsee-Khang, have been able to manufacture *tsotel* without financial support from Tibetan governmental and monastic bodies, receiving the *tsotel* training at either of these two institutions does not mean that physicians would establish this practice after graduation. In fact, to date, none of the students or physicians trained by any of the above institutes has made *tsotel* independently. Some graduates run independent clinics, but do not make *tsotel*. The reasons for this are complex, but my observations are that the absence of *chöyön* relations—while ensuring a certain independence in these institutionalized settings—leaves a void; this lack of support for the new generation of Tibetan physicians graduating from these institutions limits their opportunities to make their own medicines. Rakdo Rinpoche clearly pointed to this lack of support at the end of our interview above. While the commodification of medical practice or a university affiliation seem to be ways of ensuring economic and professional independence from the more traditional Tibetan support systems, they have not provided the complex nexus of support traditionally necessary to make *tsotel* and precious pills.

PRIVATE CLINICS MAKING *TSOTEL*

Sowa Rigpa has been known for its rural and small cottage industry practices across the greater Himalayan regions operating in very different social ecologies (Blaikie 2014; Craig 2012; Hofer 2018). Below, I introduce some physicians who were able to make *tsotel* in small-scale private practice. In contrast to medical institutions, privately working physicians of the older generation have established themselves as active entrepreneurs and / or have drawn from traditional *chöyön* support systems. They have thus been able, to some extent, to make *tsotel* and precious pills.

YESHI DHONDEN MAKING *TSOTEL* IN MCLEOD GANJ

The Tibetan physician Dr. Yeshi Dhonden (1927–2019; see Fig. 23) studied with Lamenpa Khyenrap Norbu in Lhasa. In exile, after working at the Dharamsala Men-Tsee-Khang for eighteen years (1961–1979), he established a private clinic in McLeod Ganj in 1979. During his years at the Men-Tsee-Khang, there were no funds and no ingredients available to make *tsotel*.[147] Running a successful clinic and seeing patients internationally, as

147 Interview, Dharamsala, December 3, 2012.

Figure 23: Dr. Yeshi Dhonden at his residence in McLeod Ganj in 2012, aged eighty-five. Photo by author (Gerke 2012 / CC-BY-SA 4.0).

well as his reputation (he was the personal physician of the Fourteenth Dalai Lama for twenty years) enabled him to finance the processing and manufacturing of several precious pills. In 1985, after working independently for six years, he made *tsotel* in his own pharmacy with a group of around seven, which included Yeshi Dhonden and his chief *menjorpa*, Lobsang Tenzin.

Yeshi Dhonden's nephew, Dr. Kelsang Dhonden—a Men-Tsee-Khang graduate and also taught by his uncle—now runs his own pharmacy. He told me that Yeshi Dhonden made *tsotel* in Lhokha, south of Lhasa, with Penden Gyeltsen and others. Yeshi Dhonden himself remained evasive during a short interview about where exactly he learned how to make *tsotel*, but emphasized that he shared the same lineage, textbooks, and teachers with Tenzin Chödrak. I asked him whether he gave his *tsotel* lineage to some of his students. He answered: "I gave it to many students, but they did not practice it. Many students know the method, but they are not using it. Maybe it is too difficult. It is all written in the text very clearly,

but they are not practicing."[148] Yeshi Dhonden was the first physician to express that the textual descriptions were very clear. Other physicians I spoke with rather rely on their teacher's and personal notes and find the published texts too ambiguous.

Despite his advanced age, in 2012 Yeshi Dhonden was still working as a physician, seeing many patients a day. As he began attending to patients' records and letters with his assistant, I continued the conversation with Lobsang Tenzin, who has worked with Yeshi Dhonden since 1964. He told me that they still use the *tsotel* of 1985 to make their precious pills,[149] which would mean they add *tsotel* only in miniscule amounts. According to Lobsang Tenzin, Yeshi Dhonden has not processed mercury since 1985. He does not make *kardül* or *drangdül* and does not use *chokla* (roasted cinnabar) to coat his pills. This is what Yeshi Dhonden himself told me during a short interview that was very difficult to schedule.[150]

There were also additional sources of *tsotel*. According to Amchi Tashi Y. Tashigang (see next section), at some point Yeshi Dhonden brought some *tsotel* from Lhasa and gave some to Tashigang.[151] He also received some *tsotel* as a gift from the Tibetan aristocratic Trétong family in the 1980s.[152] As mentioned before, aristocrats were part of the *chöyön* network back in Tibet; gifting *tsotel* to a private physician in exile, who is then able to make precious pills, is a highly valued practice in Tibetan society. To donate medicinal substances (usually unprocessed ingredients) rather than money to a physician is called a victorious donation *(rgyal ba'i sbyin)*, and is considered virtuous.

Yeshi Dhonden's situation is a rare example of a private medical practitioner outside the institutional and monastic setting who managed to make *tsotel* within his own establishment or receive it readymade through his *chöyön* networks.

MAKING *TSOTEL* IN DELHI AND KATHMANDU

The medical career of Amchi Tashi Yangpel Tashigang (born 1938) is an example of the geographical territory that Sowa Rigpa physicians often have to bridge to gain access to medical knowledge if they are trained outside institutions.[153] Born in Ladakh into a family of physicians, Amchi Tashigang first received training through his family lineage. Later, he had access to the large corpus of Tibetan medical literature when he worked under Gene

148 Yeshi Dhonden, interview, McLeod Ganj, December 3, 2012.
149 Lobsang Tenzin, interview, McLeod Ganj, December 3, 2012.
150 Yeshi Dhonden, interview, McLeod Ganj, December 3, 2012.
151 Tashi Y. Tashigang, interview, Delhi, March 4, 2016.
152 Chöphel Kalsang, personal communication, McLeod Ganj, December 4, 2013. Tashi Tsering Josayma later told me that Trétong Gyurmé Gyatso (1890–1938) held important positions back in Kham, where he might have had access to *tsotel* that the family later took to India.
153 This account is based on interviews with Amchi Tashigang in Delhi in December 2011, August 2012, and March 2016. For a short account of his life see Pasang Yonten Arya (n.d.).

Figure 24: The author with Amchi Tashi Yangpel Tashigang at his clinic in Delhi, April 2016. Photo: Thomas K. Shor (Shor 2016 / CC-BY-SA 4.0).

Smith's supervision at the Library of Congress in Delhi (1968–1985) before establishing his own clinic and pharmacy in Delhi (see Fig. 24). After 1986 he travelled to Lhasa on many occasions to collect Tibetan medical texts and receive instructions from Jampa Trinlé, the director of the Mentsikhang, as well as Karma Chöpel, who took part in making *tsotel* at Powo Tramo in 1977 (Gerke 2015a, 890).

Amchi Tashigang's *tsotel* training was two-fold. First, Amchi Karma Chöpel gave him private theoretical instruction in Lhasa. Second, he received the practical *tsotel* transmissions from Amchi Kunsang Kunphen (1924–2006) of the Tibetan Nyalam region, who had been trained in *tsotel* manufacturing by the medicine compounder, or *menjorpa*, Topgyel of Lhasa Mentsikhang. Amchi Kunsang Kunphen settled and established his clinic and pharmacy in Kathmandu in 1973 after successfully treating King Tribhuvan of Nepal.[154] He later built the Nyalam Medicine Factory in the Tibet Autonomous Region (TAR), which currently produces the *tsotel* for the precious pills made at Kunphen clinic in Kathmandu.[155] In return, some batches of precious pills are sent to Nyalam, since the factory currently

154 See the official website of the Khunpen clinic on its history (Khunpen 2019).

155 They produce 163 types of medicines, among them eight precious pills: Rinchen Drangjor Chenmo, Ratna Sampel, Mangjor Chenmo, Tsodru Dashel, Yunying 25, Jumar 25, Jumar 70, and Chakril Chenmo, as well as "miracle pills" and *chülen* pills. Florian Ploberger, personal communication, February 1, 2015. See also Khunpen (2018).

does not produce precious pills itself.[156] Sometime around late 1985, Amchi Kunsang Kunphen came to Delhi to make *tsotel* with Amchi Tashigang.[157] They were open to innovation and experimented with machinery to facilitate the grinding and burning processes until they came up with workable results, in the process also experiencing actual explosions of clay pots while burning the eight metals.[158] Amchi Tashigang has gone on to produce precious pills for the European market without *tsotel*. He also produced reformulated mercury-free precious pills for a German migraine study (Aschoff and Tashigang 1997). The precious pills he provides locally to his patients in India, however, sometimes contain *tsotel*.[159]

Amchi Tashigang and Amchi Kunsang are examples of independent physicians who became entrepreneurs, establishing their own clinics and pharmacies, relying on their own networks, finances, and expertise to be able to produce *tsotel* and make precious pills. Amchi Kunsang had royal patronage from the king of Nepal, which helped him to gain recognition in Nepal, but otherwise both amchi seem to have made their medicines outside traditional Tibetan *chöyön* structures.

MAKING *TSOTEL* IN LADAKH

Skilled physicians who are able to finance a *tsotel* event by themselves—such as Yeshi Dhonden, Amchi Tashigang, and Amchi Kunsang—have been exceptions. As a member of an established Tibetan aristocratic family, the Nyingma lama and Tibetan physician Sampel Norbu Trogawa Rinpoche made *tsotel* back in Lhasa, financed by his father.[160] In exile in India, he relied on existing *chöyön* networks; two of his *tsotel* events were sponsored by Buddhist lamas linked to his lineage.

According to Amchi Lobsang Tsultrim (1921–2004?), Trogawa Rinpoche made *tsotel*—"about the size of two high thermos flasks"—in 1954, in a group of nine physicians and attendants at Trogawa House in Lhasa (Stephens and Tsarong 1992, 12). They were taught by Nangrongshar Rikdzin Lhündrup Penjor (1889–1986?), who held the Chakpori lineage and ran a private school and clinic in Lhasa. He was Trogawa Rinpoche's main medical teacher and was present during the 1921 *tsotel* event in Lhasa (Pasang Yonten 1988, 178/3–4).

Trogawa Rinpoche came to India in 1956 and taught at the Men-Tsee-Khang in its early years (1964–1967), where conditions were not favorable to initiate the making of *tsotel*. In 1992 he founded Chagpori Tibetan Medical Institute (CTMI) in Darjeeling, which became a recognized NGO in 1993.

156 Calum Blaikie, email communication March 16, 2016. See also Blaikie and Craig (forthcoming). According to Amchi Tashigang, in the past Amchi Kunsang did make *tsotel* and precious pills both at Nyalam and in Kathmandu (personal communication, Delhi, March 10, 2018).
157 He also once bought *tsotel* from the Mentsikhang in Lhasa. Interview, Delhi, March 4, 2016.
158 Tashi Y. Tashigang, Interview, Delhi, March 4, 2016.
159 Tashi Y. Tashigang, Interview, Delhi, March 4, 2016.
160 Tsewang Trogawa, personal communication, Darjeeling, December 7, 2018.

After Trogawa Rinpoche's demise in 2005, his nephew Teinlay Palsang Trogawa was elected as CTMI director. Teinlay Trogawa's son (b. 2006) was recognized as the reincarnation of Trogawa Rinpoche in 2016.

In 1992, I completed the first year of medical studies at CTMI in Darjeeling. At that time, students were involved in making medicines, but we did not use mercury. In 2001, on invitation of Trogawa Rinpoche, Rakdo Rinpoche from CIHTS taught the making of the shorter mercury processing techniques *kardül* and *drangdül* to CTMI students.[161] Notably, several of the early CTMI graduates have established their own pharmacies in India and Nepal. Tenzin Phelgye, a graduate of the first batch of CTMI who received the *tsotel* lineage from Trogawa Rinpoche in Ladakh in 2002 and currently directs the CTMI pharmacy, has prepared precious pills with *tsotel* that Trogawa Rinpoche made in Ladakh. Sherab Tenzin, also a first batch graduate, established a clinic and pharmacy in Nepal and sometimes bought ready-made *tsotel* from eastern Tibet through connections with a Rinpoche in Nepal.[162]

The case of Trogawa Rinpoche making *tsotel* in Ladakh demonstrates how *chöyön* relationships have supported small-scale *tsotel* events in exile. Beginning in 1992, Trogawa Rinpoche developed strong ties with amchi in the village of Nee, situated upriver from Leh in the remote Changthang Rong region of Ladakh (Fig. 25). The Ladakhi Amchi Nawang Tarchin stayed with Trogawa Rinpoche for many years, eventually graduating from CTMI, and Rinpoche often went to Nee during the summer to make medicines. Ladakhi amchi told me that Ladakh has no living tradition of making *tsotel* and depends on visiting specialists from outside. Trogawa Rinpoche made *tsotel* twice in Nee, in 1994 and 2002. Both events were sponsored by Buddhist lamas, relying on traditional *chöyön* networks. In 1992 and 2004, Trogawa also presided over an extensive *mendrup* ritual[163] to compound and consecrate Dharma nectar medicine, or *dütsi chömen (bdud rtsi chos sman)*, and in 1992 he bestowed the Yutok Heart Essence empowerment, known as Yutok Nyingtik (G.yu thog snying thig) (Gerke 2018b).[164] He is still highly respected in the area (Fig. 26).

In 1994, Trogawa made 1.1 kilograms of *tsotel* in Nee with eight amchi and lamas, all from Ladakh.[165] They prepared the precious pill Tsodru Dashel.

161 Rakdo Rinpoche, interview, Sarnath, March 16, 2015.

162 Sherab Tenzin, personal communication, Kathmandu, November 19, 2011.

163 *Mendrup* rituals are widespread in Tibetan societies. They are performed by amchi to consecrate general Sowa Rigpa formulas, but special *mendrup* medicine is also compounded and consecrated during *mendrup* rituals, usually at monasteries, and distributed to the public. *Mendrup* medicine is attributed with a variety of physical and spiritual benefits. See Cantwell (2015), Garrett (2009), and Sehnalova (2018) for examples.

164 This is a Nyingma spiritual practice for amchi that enables them to consecrate their medicines and perfect themselves as tantric and medical practitioners. See Garrett (2009) and Ehrhard (2007) on its history and van Vleet (2015, 2016) on its importance in different medical and Buddhist schools.

165 The following amchis were present: Amchi Lama Rigzin, Amchi Lama Wangchuk, Kairy Amchi Tsering Paljor, Amchi Katak, Amchi Karma, Amchi Padma Tsetar,

Figure 25: The remote village of Nee, Ladakh, on the upper Indus River, where Trogawa Rinpoche made *tsotel* twice, in 1994 and 2002. Photo: Thomas K. Shor (Shor 2018 / CC-BY-SA 4.0).

Figure 26: A photo of Trogawa Rinpoche at the old temple in Nee, Ladakh. Photo: Thomas K. Shor (Shor 2018 / CC-BY-SA 4.0).

They stayed together in a retreat-like situation and kept their manufacturing a secret. One of the participants told me informally that they made the clay pots themselves (Fig. 27) "with a special clay brought from far away and boiled the mercury in a stone pot rarely found in Ladakh." Trogawa Rinpoche had brought small gold nuggets, and they took them to a goldsmith to make them "as thin as bee wings." The event was sponsored by Amchi Lama Rigzin, head of the monastery in Nee.[166] Trogawa Rinpoche kept some of the *tsotel*, some was offered to the Gyalwang Drukpa Rinpoche,[167] and the Nee Amchi Society received some as well, of which they currently still own 500 grams.[168]

In 2002, Trogawa Rinpoche made around seven kilograms of *tsotel* in Nee.[169] The CTMI graduates Amchi Lhakpa Ngödrup and Amchi Tenzin Phelgye were trained at the event. Following traditional *chöyön* structures, which also link lineages across (re)incarnations of Buddhist masters, the event was sponsored by Dzongsar Jamyang Khyentsé Rinpoche (b. 1961), whose previous incarnation was Trogawa Rinpoche's root guru and spiritual teacher, Dzongsar Khyentsé Chökyi Lodrö (1893–1959). When I interviewed Dzongsar Khyentse Rinpoche about this event, he said, "It was my idea to sponsor *tsodru chenmo*." On my asking why, he responded: "I know, Trogawa Rinpoche is great, and I wanted him to make it, that is the only reason. I know *tsodru chenmo* is really, really special. That is the only reason." Recalling from other events how the sponsoring lama receives most of the *tsotel*, I asked whether he received any. Unsurprisingly, he said, "I got almost all of it.[170] I keep it in Bhutan, in a marble box. I hope it is not rotting."[171] Dzongsar Khyentse had no time to explain the ritual purposes for which he would use the *tsotel*. As a precious substance, *tsotel* can be placed as a *jinlap* (*byin rlabs*, a form of blessing and consecration) inside of Buddhist shrines and statues. It is also added as a "fermenting agent" called *papta (phab rta)* or *papgyün (phabs rgyun)* or an "add-on" substance called *khatsar (kha tshar)*[172] to other blessed substances that are made at monasteries, not pharmacies, such as the popular "accomplished medicines,"

Amchi Nawang Tsering, and Amchi Nawang Tarchin. Amchi Lama Rigzin, personal communication, Nee, August 24, 2018.

166 Teinlay Palsang Trogawa, personal communication, Darjeeling, October 29, 2012.

167 This refers to the Twelfth Gyalwang Drukpa, Jikmé Pema Wangchen (b. 1963), who is the current head of the Drukpa Kagyü lineage of Tibetan Buddhism.

168 Amchi Nawang Tsering, personal communication, Nee, September 21, 2018.

169 Amchi Nawang Tsering, personal communication, Nee, September 21, 2018. Parts of this event were described by Blaikie (2014, 276). The same Ladakhi amchis participated as in 1994, except Amchi Karma and Kairy Amchi Tsering Paljor, who only came for parts of the process. Teinlay Palsang Trogawa was also present. Amchi Lama Rigzin, personal communication, Nee, August 24, 2018.

170 Of the seven kilograms that were prepared, the amchi in Nee received one hundred grams of *tsotel*, which they still preserve. Amchi Nawang Tsering, personal communication, Nee, September 21, 2018.

171 Interview, Bir, April 29, 2015.

172 *Papgyün* refer to small amounts of a compound that are added to future batches as a way of transmitting lineage and potency across many batches of medicines. *Khatsar* can be an (un)processed substance but also a blessed ingredient adding *nüpa* to other compounds (Gerke 2018a).

Figure 27: Some of the earthen clay pots that were especially made for Trogawa Rinpoche's preparation of *tsotel*, such as for burning the eight metals and eight minerals. They are still kept at the Nee Amchi Society (Ogyan Sorig Tsogspa), established in the 1970s. Photo: Thomas K. Shor (Shor 2018 / CC-BY-SA 4.0).

called *mendrup*. In Nee, in 2002, the amchi could not make precious pills, but prepared the formula Dashel Dütsima adding some of the *tsotel* and following Trogawa Rinpoche's secret transmission, which included adding some of his own *khatsar* to the formula. In 2004, some *tsotel* was added as a *khatsar* to the *dütsi chömen*, which Trogawa Rinpoche prepared during a *mendrup* ritual.

With the passing of Trogawa Rinpoche, the Ladakhi amchi lost an experienced medical and spiritual teacher. None of the amchi trained by Trogawa Rinpoche has since been able to make *tsotel*. Funds are easier to get than a trained specialist. One of the Ladakhi amchi, who was a student assistant in 2002, said:

> A sponsor can be found. Collecting all the ingredients is expensive. We can collect the money. But you cannot collect the knowledge. [...] You need a very good teacher and guide who is skilful, confident, and doubtless, who can decide what is the right material.[173]

The manufacturing of *tsotel* described above was a small-scale private affair in a rural village in Ladakh and not connected to the medical school at the Central Institute of Buddhist Studies (CIBS) in Choglamsar, or to any of the other small-scale hereditary lineage pharmacies (Blaikie 2014).

173 Interview, Kathmandu, December 14, 2011.

Similar to the Himalayan region of Lahaul-Spiti and Nepal, Ladakh did not have any monastic or institutional medical schools before the 1990s (Besch 2007; Blaikie 2014). Since the recognition of Sowa Rigpa under AYUSH, they are receiving more government funding, and they now offer a six-year diploma course in Sowa Rigpa (Bhot Buddhist Medical Sciences).[174] However, they do not teach *tsodru chenmo*. According to Blaikie, precious pills have a different status among Ladakhis: "The most well-known types of precious pill are familiar to many Ladakhis, but are nowhere near as popular as they are in Tibetan exile communities across India and in China" (Blaikie 2014, 274). The reasons seem to be varied. From the perspective of the amchi they are largely economic, since rural Ladakhi amchi prefer "to spend what cash they have on raw materials and ordinary medicines" and do not keep precious pills in stock. *Tsotel*-containing precious pills are available only in Leh at the Men-Tsee-Khang branch clinic, and are particularly popular amongst the Tibetan refugee population (2014, 275).[175]

This raises questions for future research of whether, how, and why the making of *tsotel* is such a unique Tibetan cultural practice that has not (yet) been established in other countries or geographical areas where Sowa Rigpa is widely practiced, largely by non-Tibetans, such as Ladakh, Nepal, Bhutan, Buryatia, and Mongolia. The closely-knitted lineage relationships that shape the *chöyön* dynamics in the above examples, along with the individual and selective, secret knowledge transmissions, provide at least parts of the answer.

LOSING, RE-GAINING, AND CONTROLLING *TSOTEL* SKILLS

The previous sections introduced *tsotel* events that received state, institutional, or other forms of traditional *chöyön* support, or in a few cases relied on private entrepreneurship. What happens if such support fails to materialize, if knowledge is not transmitted, and educational settings face too many challenges to facilitate a full transmission? I first take the example of two amchi in Nepal to illustrate how failing *chöyön* networks in exile and challenges of procuring ingredients have contributed to the loss of *tsotel* skills.

I met Amchi Wangchuk Lama, introduced in Chapter 2, during the Kathmandu Sowa Rigpa workshop in 2011. During an interview he told me how he made *tsotel* in 1955 at the Drakkar Taso Monastery in his home region of Kyirong in southwestern Tibet. The teacher and sponsor was the monastery's last acting lama, Kargyü Tendzin Norbu Rinpoche (1899–1959).[176] They made two to three kilograms of *tsotel*, which were kept at the monastery. Since the Rinpoche fell ill it was not possible to

174 The syllabus is published on their website. See CIBS (2018).

175 See also Blaikie (in press) on the popularity of precious pills among the high-altitude Changthang nomads.

176 See Sernesi (2019) on the history of the abbots of this monastery. See van Vleet (2012, 2015) on the medical traditions at Drakkar Taso and one of their abbot's

make *tsotel* a second time.[177] Shortly after, the Chinese invaded the area and Amchi Wangchuk fled to Kathmandu. Now in his seventies, he remembers, "Of all the amchi I made *tsotel* with, I am the only one still alive. It took us twenty-eight days with a group of six or seven amchi. We were able to make two types of precious pills with it."[178]

Amchi Wangchuk has not been able to prepare *tsotel* since he came to Nepal, but feels confident he could make it if the required infrastructure and financial support were there. For a while, he made *kardül* for his formula Ngülchu 18 with mercury traded from Delhi, until mercury became too expensive. He sometimes bought ready-made *tsotel* from other pharmacies, mostly from Tibet. "But the price is high," he complained in 2011, and "since it is an ash you cannot tell if they really put in the expensive gold or not. So I stopped buying it." He still had a stock of 500 grams at his home in Kathmandu, which he showed me one day, and even gifted me a small sample, which I greatly treasure. In 2019, he made several precious pills with *tsotel* from Degé.[179]

In Nepal, most amchi are trained through apprenticeship and are not linked to any of the large medical institutions in India. They still struggle for the Nepal government to recognize Sowa Rigpa (Craig 2007), a cause which Amchi Wangchuk was actively involved in through the Himalayan Amchi Association (Craig 2008). He took part in the Kathmandu workshop, where we also discussed mercury processing (see Blaikie et al. 2015, 190–191). During the workshop, the visiting physicians from Tibet told us that they had the advantage of having received extensive *tsotel* training and the lineage from Khempo Troru Tsénam. The Himalayan amchi requested the four co-organizing anthropologists (Craig, Blaikie, Hofer, and myself) to organize a *tsotel* workshop to be held in Lhasa. Being able to make precious pills themselves would enable them to treat more diseases and improve their financial situation. The idea was so well received that some of the physicians wanted to contribute their own funds to pay for the gold. However, thinking through the management and expense of a three-month workshop in Lhasa made us quickly realize that it was financially impossible. In the end, the idea of a *tsotel* workshop faded behind the more pressing issues of practicing Sowa Rigpa in Nepal. In summer 2015, when the main co-organizing anthropologist at the workshop—Sienna Craig—again visited Nepal, the idea of the *tsotel* workshop with invited experts from Lhasa was still expressed to her as an important program to organize, even in

medical writings, which includes texts on mercury processing and precious pills.

177 Follow-up interview through Jan van der Valk, Kathmandu, September 23, 2019.

178 Interview, Kathmandu, December 17, 2011.

179 He prepared Rinchen Tsodru Dashel, Yunying 25, Rinchen Mangjor Chenmo, Jumar 25, Chakril Chenmo, and Rinchen Da-ö. Note that some of these formulas do not require *tsotel*. Follow-up interview through Jan van der Valk, Kathmandu, September 23, 2019.

Kathmandu.[180] Clearly, the Himalayan amchi in Kathmandu are still actively looking for an authoritative lineage transmission and *chöyön* support (foreign sponsors), as well as specialized teachers from Lhasa, to gain the skills and opportunities to manufacture *tsotel*. In the PRC, new types of *chöyön* support networks have been established, but it is beyond the scope of the book to include them here.[181]

Amchi Tsultrim Sangyé (1940–2011) was the head of a Bonpo medical school in Dhorpatan near Kathmandu, the so-called Bonpo School of the Four Medical Sciences of the Early Tradition (Sngar srol gso rig 'bum bzhi'i slob gra). He was better known as Amchi Gege and had received *tsotel* training in Tibet. His student, Amchi Nyima Sampel (born 1969, Jharkot, Mustang) told me that Amchi Gege's first *tsotel* training was with Troru Tsénam at the Powo Tramo labor camp, where Amchi Gege was an inmate for many years. After settling in Nepal in 1983, he tried for several years to collect the ingredients to make *tsotel*, but did not succeed. He also wanted to send Amchi Nyima Sampel to eastern Tibet to receive the *tsotel* training from Bonpo amchi in Dechen, but Amchi Gege's sudden death in 2011 disrupted these opportunities. Through connections with the Bonpo amchi community in Dechen, Amchi Nyima Sampel received some *tsotel* and precious pills, but has not been able to be trained in *tsotel* production.[182] Amchi Wangchuk Lama and Amchi Nyima Sampel only used the shorter mercury processing methods to make *kardül,* and they knew how to process cinnabar rock into *chokla* to coat some of their pills.

The examples presented above document the changing pharmaceutical nexus of *tsotel* training and manufacturing in exile. They raise questions regarding opportunities of medical knowledge transmission among amchi living in India and Nepal and the continuity of the *tsotel* lineage transmissions. Pordié and Blaikie (2014, 364) observe in their analysis of medical education in Ladakh that knowledge transmission, especially in the newly emerging institutional settings, "suits the preparation of professional physicians, but is inadequate for the training of competent practitioners in terms of pharmacy." Their observations reverberate in the data presented here in that none of the institutionally trained physicians in India or Nepal have been able to make their own *tsotel*, and those who make *tsotel*-containing precious pills rely on *tsotel* from Tibetan manufacturers.

180 Sienna Craig, personal communication, 2015.

181 There would be many examples in the PRC. I documented two: a recent Bonpo *tsotel* manufacturing event in the region of Dechen in eastern Tibet indicates a continuation of *chöyön* structures, somewhat modified to integrate PRC government requirements on the county level, which has also helped amchi to receive more official recognition for their formulas and practices (discussed in Gerke 2013a). In some cases, small-scale *tsotel* manufacturing has contributed to the affordability of precious pills for rural Tibetans. The Tibetan physician Jamyang Lhündrup documented the making of *tsotel* in Lhokha, southern Tibet, in 1991, which cut the price of precious pills by 80% for local patients (Jamyang Lhündrup, n.d., 6/20; this is also discussed in Gerke 2019c).

182 Amchi Nyima Sampel, personal communication, September 11, 2013, IASTAM conference, South Korea.

Medical institutions that are able to make *tsotel* without *chöyön* support have the advantage of keeping the entire amount of *tsotel* to make medicines, and thus control production, price, and knowledge transmission. Currently, the largest production of *tsotel* in India is at the Men-Tsee-Khang in Dharamsala (see Appendix B), which also provides the largest amount of precious pills.[183] While smaller clinics in India and Nepal make precious pills themselves by acquiring *tsotel* through connections in the PRC,[184] this has not empowered those physicians to (re)gain the necessary lineage transmissions, *menjor* skills, and *chöyön* support. Overall, we can observe that while *tsotel* and precious pills have gained political, economic, and spiritual potency, the lack of *chöyön* support has contributed to a decline of the *tsotel* practice in exile outside large institutions. Although the contexts vary, this finding supports what Pordié and Blaikie lay out for Sowa Rigpa in Ladakh (2014), where individual *menjor* skills give way to more institutionalized learning and production of medicines. The pharmaceutical nexus here captures these multiscaled dynamics of a pharmaceutical practice in transition to more institutionalized settings. This also raises questions of how changing transmissions of taming skills correlate to ideas of safety. We shall see in Chapter 6 how the consumption of *tsotel* by the head of the Pharmacy Department after successful processing becomes a public statement of trust in the institutional production of *tsotel*.

In the PRC, precious pills are driving a large-scale Sowa Rigpa pharmaceutical industry, often with a complex ownership of different shareholders and different manifestations of lineages in local and moral economies, the study of which is beyond the scope of this book.[185]

During the last decade, new global actors have entered the pharmaceutical nexus of Sowa Rigpa mercury practices, introducing their concerns about mercury toxicity, which did not feature in the histories told above. The new generation of Tibetan physicians opening their own pharmacies have to decide whether to use mercury in their medicines at all, and if so, how. Most private amchi I spoke with, especially those who send their medicines abroad, want to avoid colliding with toxicity debates and border controls in countries where the use of mercury in medicine is illegal. Chapters 6 and 7 present further examples and an analysis of how different

183 The list of *tsotel* events at the Men-Tsee-Khang in Appendix B shows the increase in frequency and amounts manufactured. Production of *tsotel* more than doubled from sixty kilograms in 1982 to 128 kilograms in 2014. Data on precious pill manufacture at the Men-Tsee-Khang is only partially available online (MTK 2017d). Because demand is higher than production, sales are currently controlled (Gerke 2017a).

184 I have not heard of *tsotel* from the PRC openly for sale in India. Some pharmacies, e.g. the Qinghai Provincial Tibetan Medical Hospital in Xining, strictly regulate their *tsotel* distribution (Tawni Tidwell, personal communication, February 21, 2016).

185 Stephan Kloos, email communication, November 19, 2018. Tawni Tidwell, personal communication, Vienna, February 2019.

notions of safety and toxicity shape, "tame," regulate, and endanger the continuity of *tsotel* practices in the twenty-first century.

The next two chapters explore textually and ethnographically when and how the *tsodru chenmo* practice was introduced to Tibet and how its knowledge was transmitted. How have ideas of gender and secrecy affected related knowledge transmissions and the writing and publication of *tsotel* manuals in the past and today? Chapter 5 focuses specifically on how ideas of taming mercury have influenced perceptions of its safety and how this translates into the exclusion of women from the practice, with some notable exceptions.

Chapter 4

History and Knowledge Transmission

Tsodru chenmo is considered a secret practice going back to an early spiritual transmission to the Tibetan polymath Orgyen Rinchenpel, who brought it to Tibet in the thirteenth century. This chapter explores how ideas of taming and secrecy are embedded in the transmission of knowledge of mercury practices over time. How have these ideas affected the transfer of practical *tsotel* skills? Secrecy has led to specific ways of how Tibetan authors write about *tsotel* practices and how they publish and share texts, and understand its pastness. I explore these issues across the early history of mercury practices and then analyze how knowledge transmission of Sowa Rigpa mercury practices have changed in exile. I embed these aspects of Tibetan medical history in a discussion of where we can place the *tsodru chenmo* practice in the debate on medicine between science and religion (Adams, Schrempf, and Craig 2011b; Gyatso 2015).

Situating mercury practices between science and religion

As my earlier explorations of Sowa Rigpa and biomedical terminology of mercury processing have shown (Chapter 2), translating and understanding technical terms across different epistemologies is complex. Translations between Sowa Rigpa medical epistemologies flow in multiple ways and are rarely straightforward (Adams, Schrempf, and Craig 2011a; Samuel 2006a). In this book I refer to epistemology within its broader meaning of how things are known, one way of which is through the empirical engagement of our senses.[186] Adams, Schrempf, and Craig (2011b, 8) understand "*sowa rigpa* as an epistemology, [that] bears resemblance to Max Weber's portrayal of modern science as 'a vocation'." In their view, *rigpa* (*rig pa*, the Tibetan term for 'science') "implies a different kind of engagement with knowledge than is typical for biomedical or Western forms of science precisely because it simultaneously suggests an experiential notion

186 Here, I follow other scholars who have worked on Sowa Rigpa. See, for example, Garrett (2008, 13–14).

Published in: Gerke, Barbara, 2021. *Taming the Poisonous. Mercury, Toxicity, and Safety in Tibetan Medical Practice.* Heidelberg Studies on Transculturality 7. Heidelberg: Heidelberg University Publishing. DOI: https://doi.org/10.17885/heiup.746

of knowledge, combined with a strong ethics and morality that defines a good healer" (2011b, 8).

In *Taming the Poisonous*, the terms science and religion are used broadly, without clear correlating Tibetan equivalents.[187] Similar to Gyatso's findings, the religious is largely expressed in Buddhist terms, while the scientific stands for an epistemic orientation towards what we could term modern scientific thinking (Gyatso 2015, 5). Buddhism itself is a complex and heterogeneous term, difficult to define. The Buddhism we come across in this book varies significantly between early Indian tantric Buddhist ideas, the forms of state Buddhism of the seventeenth-century Ganden Podrang government, and—for example—how elements of Tibetan Buddhism are employed by Tibetans in exile today. Being aware of these disparities, I try to contextualize Buddhist thought and practice in each case.

The central theme of this book presents the notion of taming as a fundamental principle of Tibetan approaches to poisons, specifically unprocessed mercury. Correspondingly, this raises questions concerning the varied Buddhist influences on Sowa Rigpa medical practices, and requires examination on how medicine and religion overlap in both usage and ideas of mercury. Did Tibetan medical experts implement tantric ideas of taming poisons in empirical ways, or was this part of a deeply religious Buddhist mindset that increasingly pervaded medical thinking in Tibet after the thirteenth century? How did Tibetan physicians mediate between empirical and textual authority in their judgment and application of medical texts on mercury and its safety? Should we view the taming of mercury as solely religious knowledge, devoid of medical empiricism?

Janet Gyatso's recent work, *Being Human in a Buddhist World* (2015), challenges us to revisit the issue of medical empiricism in Sowa Rigpa. Her book is key to the debate on the epistemic shifts towards scientific thinking in Tibet's medical history. She explores these tensions based on textual research, focusing on central Tibet in the seventeenth century, when Sowa Rigpa became state sponsored during the time of the Fifth Dalai Lama. I showed in Chapter 3 how this included the making of *tsotel* and precious pills. Gyatso deploys the categories of science and religion as heuristics (2015, 4) and analyzes how Tibetan medical thought developed its epistemic orientation with a focus on material realism through what she calls a "scientific sensibility" (2015, 5) and a certain "medical mentality" (2005, 16). She highlights that this intellectual development took place in Tibet within the context of state-sponsored Buddhism and esoteric Tantric Buddhism, and outside the intellectual developments of European modern medicine. Her book questions the widespread view of Tibetan medicine being Buddhist to the core.

Her non-religious reading of empiricism in Sowa Rigpa challenges us to think through Tibetan medical knowledge each time we analyze one of the many Sowa Rigpa practices and theories. Her emphasis on what she

187 See Gyatso (2015, 13–16) for an erudite discussion of the problems involved in defining science, religion, and Buddhism in Sowa Rigpa.

refers to as "realistic descriptions" by Tibetan authors—mainly in the fields of anatomy and botany—are examples of how Tibetan physicians in the past developed strategies to consolidate their tantric Buddhist and medical ideas, especially when they contradicted each other. In fact, Gyatso's examples highlight cases where empirical knowledge, such as counting bones or dissecting bodies, contradicted tantric knowledge of subtle channels or authoritative textual statements on anatomic matters that differed from empirical physical evidence, such as the visible channels (arteries, veins, nerves) within the body, or the location of the tip of the heart in men and women. Her conclusion that empirical thought emerged from challenging tantric belief systems, thus demonstrating a Tibetan movement towards material realism in medicine, makes sense in certain contexts but seems limited to examples where such contradictions are obvious.

The data presented in this book will challenge some of Gyatso's assumptions while supporting others. It is true that medical empiricism is at the core of Tibetan understandings of how mercury changes and transforms during the taming process and how physicians are able to detect these changes with their senses. For example, with each step of processing, mercury becomes less mobile and turns black when triturated with sulfur. The visible transformation becomes a direct experience of taming, deeply merging tantric tropes with *menjor* practice.

But it is also true that the pharmacy becomes a ritual space, since the danger of the poisonous and all that can potentially go wrong during mercury taming necessitates elaborate ritual activities to protect those carrying out the taming process from obstacles and make the trituration of mercury more auspicious and successful. These rituals are conducted along with complex *menjor* practices of working and burning metals and other substances that are based on hands-on experience of medical artisanship. In written and oral accounts of *tsotel* events, we hear of experimentations with clay pots and other equipment, instructions on how to avoid explosions, regulate the heat, and so forth. Moreover, individual therapeutic experiences concerning how the resulting *tsotel*-containing precious pills work in medical practice must have contributed to the refinement of formulas and medical skills over time. For example, I show how only those formulas that contain sulfur in combination with mercury survived in medical practice, whereas many ways of taming mercury without sulfur are found in Tibetan medical texts, but are not implemented. This could point to an empirical understanding that mercury sulfide compounds were safer than others.

Overall, I situate the *tsotel* practice and the notion of taming mercury within a medico-religious pharmaceutical nexus marked by both religious and medical empiricism, where religion is not a domain distinct from medical skills and empirical knowledge but actually informs it, while empirical observation of mercury's transformation during processing confirms tantric notions of taming on a substance level.

The overlap of tantric and medical notions of taming is also evident in the wide range of therapeutic benefits attributed to *tsotel*, to which many

authors dedicate special sections in their texts. Many texts assert that the main aim of *tsotel* is to enhance the *nüpa* (potency) of other medicines. As we saw in the previous chapter, making *tsotel* also benefits communities and improves crops, thus helping tame tense political relationships. Here, ideas of efficacy are negotiated at the intersections of religion and science and beyond, including cosmological, ecological, environmental, and political domains. Sienna Craig (2012, 7) rightly argues that "efficacy is produced at the intersections of ritual actions and pharmacology, within distinct social ecologies," pointing to an experiential synthesis of how a substance, compound, or treatment is considered to be effective (Whyte, van der Geest, and Hardon 2002, 36; see also van der Valk 2019).

To analyze all these intersections in Sowa Rigpa requires translation practices that adopt "a culturally Tibetan way of doing science" as suggested by Adams, Schrempf, and Craig (2011b, 23), who prefer the term "morally charged cosmology" to that of "Tibetan Buddhism," pointing to the diversity of religious influence on Tibetan medicine, including Bon, Buddhist, and various folk beliefs. Therefore, they argue that we cannot simply assume "Tibetan medical theory to be purely religious, or purely Buddhist" (2011b, 14), which I agree with and my data attests to. We find some similarities here with the use of the term "Buddhist medicine" in China, which is a "convenient label for discourses about medicine that were introduced to China via Buddhist translations and that were elaborated on in Chinese Buddhist compositions" but are not necessarily "exclusively Buddhist" (Salguero 2014, 20). Likewise, medicine in Tibet was frequently expressed early on in a specific Buddhist literary trope (Garrett 2006; McGrath 2017a), but developed its own specialized knowledge. Specifically, in practice, being an amchi also simply meant working with *materia medica* and making medicines. Sowa Rigpa is also an evidence-based practice linked to materiality—distinguished from Buddhism, something the Fourteenth Dalai Lama keeps emphasizing in public discourse. Nevertheless, while ritual and medical substances might be perceived as distinct and are treated differently by religious and medical specialists, they are not separable as such, and to make a clear distinction between religion and medicine would be artificial. This inseparability is especially evident from the ways in which amchi are trained and knowledge is transmitted (discussed further below; see also Tidwell 2017).

In the section on heterogeneous mercury practices further below, I present examples of mercury-containing formulas for the treatment of venereal disease that were imported from China into eastern Tibet around the eighteenth century.[188] The inclusion of these formulas in medical compendia points to a non-religious attitude of Tibetan author-physicians, who adopted what worked in times of crisis and in order to treat new diseases. This could be interpreted along the lines of Janet Gyatso's argument as signs of medical

188 It is likely that forms of treatment traveled with the spread of the disease, which is known today as syphilis.

innovation in Sowa Rigpa based on transnational empirical evidence, which made some authors even question their authoritative text, the *Four Treatises*.

The making of *tsotel* is a different case and illustrates how scientific sensibilities—to use Gyatso's apt term again—developed in direct contact with a poisonous substance and its visible transformation during processing, while at the same time embedding tantric ideas of taming into ways of understanding and explaining such material transformations. When making *tsotel*, tantric notions of taming go hand in hand with medical skills of processing. Tibetan physicians for the most part see no problem in making a medicine based on principles going back to a tantric myth of taming a demon. It gives the entire event a cosmological significance with both spiritual and material benefits. As we shall see, to this day, the notion of taming is continually applied in Sowa Rigpa *menjor* practices with a large variety of substances, even though it is often expressed in practical terms, such as making a "rough" substance "smooth" (Chapter 6; Gerke 2019b).

Tantric tropes of taming are quite distinct from the ways in which Buddhist elements have been evoked in the recent pharmaceuticalization of Sowa Rigpa, as described by Martin Saxer for the PRC (2013) and Stephan Kloos for India (2012, 2015, 2017a). Kloos discusses how Tibetans in exile have emphasized the link between Buddhism and medicine as part of a re-authentication of their medical and cultural traditions. "Tibetan medicine and Buddhism strongly informed Tibet's cultural and political identity as a powerful civilization, with its systematic destruction by the Chinese striking a serious blow against the Tibetan nation" (Kloos 2015, 124). This entered the narrative of cultural survival in exile and "became the central and defining purpose of Tibetan medicine in exile" (2015, 125). For example, during the process of pharmaceuticalization of Tibetan medicine in India, which began in the 1980s, Tibetan pills arguably became "the material essence of an 'authentic' and at the same time endangered Tibetan culture" through which they were ascribed not only a pharmacological efficacy but also a "political efficacy" in the fight for a "free Tibet" (Kloos 2012, 200). The rich pharmacological repertoire of Tibetan medicines—especially the multi-compound precious pills—have been suitable agents for such an authentication of "Tibetanness," not only in India (Kloos 2012), but also to a varying extent in the PRC (Saxer 2013).

Saxer, in his analysis of the Sowa Rigpa industry in the PRC, points to the paradox of how Buddhism and alchemical ideas of taming have helped to move *tsotel*-containing precious pills into the gray zones of government regulations. Saxer writes,

> One might expect that a substance containing mercury, purified using largely secret, religious and alchemical procedures would be a prime target for the PRC's drug regulations. It is difficult to reconcile with the scientific epistemology on which GMP, the Drugs Administration Law and the *Chinese Pharmacopoeia* claim to rely (Saxer 2013, 73).

By marketing precious pills with an exotic Tibetan quality to a large Chinese clientele, they drive the Sowa Rigpa pharmaceutical industry in the PRC to some extent, making them a valuable commodity.[189] This marketing strategy allows the registration of *tsotel*-containing precious pills as "national heritage drugs," so that their formulas are considered "secret knowledge." Thus, pharmaceutical companies need neither to list all ingredients in their pharmacopeias nor conform to existing mercury regulations for medicines (2013, 73–74). Here, secrecy of traditional knowledge has become a political tool to circumvent existing governmental toxicity regulations for the promotion of an industry.

Saxer also illustrates how Buddhism and the ritual consecration of Tibetan pills becomes a strategy of the industry by evoking "magic" as an ideal technology (2013, 247). Saxer's examples of the "heterogeneity of aesthetics found within the industry" are the rituals performed to consecrate Tibetan pills, the aesthetics of a vegetarian spa center, and the Arura museum in Xining with the world's largest thangka (scroll-painting) on display (2013, 193). His point is that in "the context of industrial production, the ritual automatically acquires an additional layer of meaning, as it endows—or re-enchants—the industry with the aesthetics and power of tantric Buddhism" (2013, 170). Saxer presents this corporate culture as a "moral economy of Tibetanness." He views this "re-enchantment" of Tibetanness as a part of the industry's strategy, in which "authentic Tibetanness" emerges as the key economic factor in a non-localized "moral economy" (2013, 201–229). This entire economy is also embedded in the morality of Buddhism and Tibet's presence within China at large.

These examples of Kloos and Saxer demonstrate how different aspects of Buddhism are used today to promote the Sowa Rigpa pharmaceutical industry. They emphasize the overlap of medicine and religion in the contemporary process of commodification and industrialization. This is distinct from the actual *tsotel* practice, which grew out of centuries of complex knowledge transfers along medical and religious lineages (at times involving competitive, sectarian power struggles), secret tantric teachings, and spiritual empowerments, as well as practical and secret transmissions, all embedded in varying socio-political contexts and a widespread medical need to treat all forms of poisoning and heal serious diseases.

A HISTORICAL GAZE

To tell a history of mercury practices in Tibet, I take a position on "pastness" (Trouillot 1995, 15) that is based on varied sources: texts that medical authors wrote in the past, oral accounts and memories that are either told or withheld, authoritative lineages that continue or are disrupted, and

189 *Tsotel* itself was first patented in 1992 by the Lhasa Mentsikhang; it was also included in the PRC Intangible Cultural Heritage List in 2006 (Saxer 2013, 74).

interpretations of texts that are kept secret or are shared and debated by contemporary Tibetan physicians.

We need to pay attention to "how histories of medicines themselves construct the place of the medical tradition within Tibetan bodies of knowledge and literature" (Garrett 2014, 179). The following explorations of the early transmission of mercury practices into Tibet highlight a religious empiricism deeply linked to tantric ideas of taming; they also highlight the passing on of complex processing techniques of working with poisonous substances. On several occasions mercury practices were introduced from outside Tibet, such as for the treatment of venereal diseases, discussed later in this chapter. This reveals a heterogeneous picture of using mercury in medicines, quite representative of what we know Sowa Rigpa to be: a corpus of varied medical practices introduced over time from vast geographic and geological areas.

Since Sowa Rigpa is classified as one of the ten sciences within Tibetan tradition, many of the medical authors who composed texts on mercury studied and wrote on subjects other than medicine. Often they combined the professional expertise of ordained monastics, Buddhist teachers, and physicians. In their daily lives, they also made their own medicines and closely supervised their students. In their thinking, medicine and religion were not separate domains but merged in forms of *choga*: things that had to be done. As mentioned in Chapter 2, *choga* translates both as a ritual and as a *menjor* procedure. The following example illustrates this.

In the *Four Treatises*, the chapter describing mercury processing for precious "hot" and "cold" compounding (Rinchen Tsajor and Rinchen Drangjor—early versions of two mercury processing methods and also the names of two precious pill formulas) reveals nothing specifically Buddhist at first glance. The "cold" compounding describes nine steps to process mercury and lists nineteen compound remedies, which when mixed with processed mercury "cure all diseases that are difficult to heal."[190] On closer analysis, however, we find commonalities between the nine steps of processing mercury listed in the *Four Treatises*, and a Nyingma treasure revelation or *terma (gter ma)* text, titled the *Vase of Amrita of Immortality ('Chi med bdud rtsi bum pa)*, which has been preserved in the *Precious Treasury of Rediscovered Teachings* (*Rin chen gter mdzod*; Simioli 2016). Carmen Simioli hints at an interesting overlap between mercury processing and "accomplished medicine" or *mendrup* rituals[191] in this *terma* text. She shows how mercurial medicines during certain *mendrup* rituals "absorb the virtues of nine special substances or 'nine heroes' *(dpa' bo dgu)*"—which parallel the nine processing methods of mercury in the *Four Treatises*—"and are

190 Translated from Yutok Yönten Gönpo (1982, 603/16): *dngul chu sbyar bas gso dka'i nad rnams sel/* (cf. MTK 2015, 133). See also Gerke and Ploberger (2017a) for a translation of and an introduction to this chapter and Gerke (2019a) for a discussion of Rinchen Drangjor.

191 Simioli here sees specific Tibetan *mendrup* rituals as crucial to the development of Tibetan iatrochemistry.

imbued with the powers of the demon-subjugator deity *(zil gnon)*, which is embodied by the tantric practitioner / physician" (2016, 413–414). Two of the nine steps described by Simioli refer to internal yoga practices to open and close the channels when taking refined mercury (2016, 408). Simioli suggests that "It could be plausible that the tantric ritual associated to mercury processing was omitted in the medical writing in order to be kept secret and be taught orally" (2016, 409). This would correspond to the nature of specific Sowa Rigpa medical and ritual training, which is often kept secret, and transmitted only orally.

While it is impossible to say which of the two texts predates the other, we are looking at an early, shared history in which mercury taming techniques developed from a deep interrelationship between medical and tantric practices, involving personified substances, visualization practices, and a demon-taming deity. It also demonstrates a shared medico-ritual need to treat poisoning and protect from demonic diseases. Simioli (2016, 414) refers to famous Tibetan physicians of the fourteenth to seventeenth centuries who were influenced by the *Vase of Amrita of Immortality* in their expositions on mercury. Analyzing these texts would make for fascinating textual research to further understand the early interface of empirical medical and tantric spiritual approaches to the use of mercury in Tibet, which seem to reveal forms of religious empiricism quite distinct from what Gyatso describes as an epistemic orientation towards a scientific sensibility (Gyatso 2015, 5).

Sowa Rigpa medical knowledge has been taught in culture-specific ways, which we need to understand to get a better sense of the transmissions involved in passing on the *tsotel* practice across time and changing epistemic orientations.

TRANSMITTING MEDICAL KNOWLEDGE

Tibetan medical knowledge transmissions[192] involve various ideas, such as the accumulation of merit through benefitting others, as well as imbuing medical practice with the power and authority passed along a lineage or *gyü (rgyud)*, from teacher to disciple. The three most widely-known methods of knowledge transmission of both medical and Buddhist teachings are: spiritual empowerments or *wang (dbang)*, given by a highly qualified teacher or lama; oral transmissions or *lung (lung)*, which involves reading the texts that are to be studied out loud; and oral explanations of the "actual practice," called *tri (khrid)*. In the words of a contemporary amchi, who participated in the Kathmandu Sowa Rigpa workshop (see Introduction):

> In our culture, these three things—*wang, lung, tri*—mean that you have been granted permission to practice. If *wang* is not received,

192 An earlier version of this section appeared in Gerke (2015a, 871–872).

> this means you have no authority. And when there is no authority, I don't think we have the power to put our skills into practice.[193]

The Tibetan physicians with whom I spoke and who had made *tsotel* had received the *wang* of the Medicine Buddha and, for the most part, were also given the *wang* to practice the Yutok Nyingtik, which is a cycle of Buddhist and yogic contemplative practices in circulation since the twelfth century and especially developed for the spiritual development of amchi (Garrett 2009).[194] They had also received the *lung* of the *tsotel* manual that the head of the Pharmacy Department would follow. At the Men-Tsee-Khang in Dharamsala this is the *tsotel* manual by Kongtrul Yönten Gyatso (also known as Jamgön Kongtrul Lodrö Thayé, 1813–1899/1900; see below). Moreover, they had been given oral explanations *(tri)* and detailed practical instructions or *laklen (lag len)*[195] by their teachers.

Since making medicines involves hands-on experience—observing through the senses how things are done—the "seeing transmission" or *tongwé gyü (mthong ba'i rgyud)*[196] is another fundamental aspect of medical knowledge transmission and an essential component of passing on complex *menjor* skills such as *tsodru chenmo*. Gen Gojo Wangdu, professor at Tibet University for Tibetan Medicine in Lhasa, commented on this during the Kathmandu Sowa Rigpa workshop:

> You need the practice of seeing transmission, no matter how much we talk, it won't be of much benefit. [...] Even if we give three months lessons, talking through the steps of the practice of the Great Mercury Refinement, there won't be a result without the seeing transmission.[197]

Instructions that are only passed on secretly to selected students are referred to as secret oral instructions or *men ngak (man ngag)*. These are based on the teacher's personal experience and might involve modifications to the textual instructions or practical *menjor* advice. A complete medical knowledge transmission would therefore be complex and involve *wang*, *lung*, *tri*, *laklen,* and *tongwé gyü,* and sometimes a *men ngak*, in the long process of accomplishing a practice. To protect a practice from distortion and abuse many teaching methods have secretive elements to them. The objective is to

193 Recorded during the Sowa Rigpa workshop in Kathmandu, December 6, 2011.
194 See van Vleet (2015, 2016) on how this practice was largely linked to the Zur medical tradition until adapted in the seventeenth century by the Fifth Dalai Lama to unify existing ritual medical practices and develop a systematized Gelukpa medical curriculum.
195 *Laklen* often implies that instructions have been received through participant observation.
196 *Tongwé gyü* is short for "hands-on instruction through seeing transmission" *(mthong ba rgyud pa'i phyag bzhes)*.
197 Translated from a video recording of the Sowa Rigpa workshop in Kathmandu dated December 6, 2011, by Tenzin Demey, Dharamsala.

uphold a comprehensive lineage of a practice across many generations. We can thus understand that whenever a medical institute, a group of doctors, or a monastery made *tsotel*, it was an opportunity to pass on all knowledge transmissions described above—especially the seeing transmission—to the next generation of selected physicians. It is also understandable that not all practices survive such complex methods of knowledge transmission, and that secrecy might also lead to the loss of knowledge.

Overall, ways of teaching Sowa Rigpa intersect the religious and the medical to such an extent that it becomes difficult to make any distinction between different forms of empiricism in the way things are taught, an argument also substantiated by Tidwell (2017). That said, individual amchi choose the level of their involvement in spiritual practice, which varies widely. Sowa Rigpa's relationship with Buddhism has undergone very different historical periods. During the reign of the Fifth Dalai Lama, medicine was presented in a specifically Buddhist fashion (Gyatso 2015; Schaeffer 2003a; van Vleet 2016), while during the Cultural Revolution anything considered Buddhist was stripped from medical practice (Hofer 2018). More recently, in the PRC Sowa Rigpa had to present itself as more "scientific" to survive governmental restrictions (Adams 2002a, b), but there has also been a revival of Sowa Rigpa related Buddhist practice and lineage transmissions (Tidwell, in preparation). Next, going back in time, how did ideas of taming enter Tibetan medical knowledge and how was it passed on?

EARLY CULTURAL TRANSLATIONS OF TAMING

From its beginnings, what we now call Tibetan medicine, or Sowa Rigpa, has been a cross-cultural endeavor of medical knowledge production. Already in the thirteenth century when more elaborate mercury practices reached Tibet, medical authors faced the challenge of articulating and translating their understanding of medical and religious ideas across cultures and borders. Origin myths of poisons and the tantric symbolisms of mercury, along with both elaborate and simple processing techniques, were translated not only from Sanskrit into Tibetan—from Indic into Tibetan contexts—but also from various Hindu, Śaivite, Vedic, and alchemical cosmologies into emerging Tibetan Buddhist cosmologies.

Such acts of translation were complex interactions. Śiva, or Īśvara (Lord), became known in Tibetan as Wangchuk, "the all-powerful one" *(dbang phyug)*. Wangchuk is still associated with the tantric power of mercury, which represents Śiva's semen, and Tibetan physicians today know mercury by many secret synonyms, such as "the drop of Śiva" *(dbang phyug thig le)* (Deumar Tendzin Püntsok 2009, 106/7) or "*daryaken,* the semen of the male tantric deity" *(yab kyi dwangs ma dar ya kan)* (Dawa Ridrak 2003, 425/16–17).[198] Śiva's female consort Parvatī—whose menstrual blood is

198 For more on *daryaken*, see Beckwith (1980), who thinks it is of non-Tibetan origin and allied to the Greek panacea theriac. See also Akasoy and Yoeli-Tlalim

represented by sulfur— appears as "the queen, refined essence of the earth *chülen" (sa bcud kyi dwangs ma mtsun mo)* (2003, 425 / 16).

I already mentioned that the widespread idea of taming mercury or poisons in general shows parallels to Śaivite material and its related Śiva taming myths (e.g. Rudra). However, even though mercurial practices in Tibet still reveal Śaivite elements, when Tibetan physicians mix mercury with sulfur and re-enact the tantric sexual union of Śiva and his female consort Parvatī it does not make them Śaivite practitioners. I argue, however, that Tibetan practitioners deeply absorbed the underlying notion of taming and made it their own because it matched what they saw and experienced in actual medical practice: preprocessed mercury, when tamed with sulfur, becomes immobile and is drastically transformed from a whitish to a blackish compound (see Chapter 6).

Janet Gyatso writes about transcultural processes of transmitting and absorbing foreign medical knowledge into Tibet in an attempt to discover innovations in medical thinking:

> In adopting and adapting Indic and other important medical concepts throughout the *Four Treatises*—and Yutok selected and restated such material judiciously—the Tibetan doctors were making it their own. The knowledge so employed worked for them, and it accorded with what they already knew or suspected about the human body. [...] Although the Fifth Dalai Lama and his court were aware of the value of searching abroad for new information and therapies, Tibetan medical tradition does not systematically distinguish foreign medicine from Tibetan medicine in just those terms. In short, our concern to discover innovation has to do with the conditions under which change occurs, not the cultural or national identity of those shifts as such (Gyatso 2015, 289).

Applying this cautious historical gaze raises the question: under what conditions do particular pharmacological practices become culturally specific? When were mercury-containing formulas from outside Tibet absorbed into Sowa Rigpa medical compendia? Why did some become long-term tested formulas, while others disappeared over time? In summary, what we find woven into Tibetan narratives of medical histories testifies to complex acts of translations in their broadest sense and to how medical knowledge has been transferred and re-enacted over time. As we shall see next, sometimes they point to empirical innovations, while at other times they seem to nestle comfortably within prominent religious ideas.

(2007, 234) on musk and the elixir of *daryaken*. The contemporary Tibetan physician Penpa Tsering (1997) calls *ngülchu tsotel* the "*daryaken* nectar, king of essences" *(bcud rgyal bdud rtsi dar ya kan)*. *Daryaken* also became a popular synonym for a range of potent substances, especially those treating poisoning (see, for example, Simioli 2016, 400). *Daryaken* is further discussed in Chapter 6.

Narratives of mercury transmissions from India to Tibet

Tibetan historical narratives on mercury knowledge transmissions from India to Tibet reveal three reappearing themes: poisoning, Buddhism and its threats, and the importance of lineage.[199]

First, mercury practices are frequently linked to a medical quest for treating poisoning. The search for remedies against poisoning is evident in early Tibetan medical texts,[200] and as one of the eight branches of Sowa Rigpa, the treatment of poisoning holds a prominent position among medical nosology. Precious pills were much sought after because of their ability to treat poisoning (Czaja 2015, 48–49).

Second, the position mercury occupies within Buddhist thought is linked to mercury practices originating in India—the land of accomplished hermits, saints, and Buddha himself. In the following Tibetan narrative, the Indian saint and mercury specialist is introduced as an emanation of Avalokiteśvara, the Buddha of Compassion, which emphasizes compassion as a central moral concern of medical practitioners. Physicians' responses to human beings' suffering in their quest for wellbeing included the search for a panacea against diseases caused by poisons, which would be manifold during upcoming degenerative times, which refer to the third age of Buddhism that is often described as a future period of unrest, suffering, and the decline of Buddhist teachings.

Lamenpa Tenzin Chödrak, who introduced the *tsotel* practice to the Men-Tsee-Khang in India in 1982 (see Chapter 3), spoke of these themes to his biographer Epa Sonam Rinchen:

> During ancient times in India there was a saint called Rikpé Lodrö, an emanation of Avalokiteśvara, who had the clairvoyance that in the future 2,000 different types of poisons would appear [affecting] sentient beings. After knowing that, he travelled miraculously to a southern continent in search [for a remedy] to treat those kinds of poisons. There are many supreme beings of divine emanations like the hermits, the medicine goddesses, and others, who are experts in processing mercury. The greatest among them was a hermit called Zhungkyé, from whom he [Rikpé Lodrö] received the complete teachings on the essence extraction *[chülen]* practice made

199 This is, for example, evident from Tenzin Chödrak's biography, and his version of the history of mercury transmission (Sonam Rinchen 2000, 129/16–131/3).

200 For example, Yoeli-Tlalim (2015, 750–751) discusses the treatment of poisoning with rituals in Tibetan medical Dunhuang manuscripts from the ninth century AD. Garrett (2006, 210, 212) emphasizes the treatment of poisoning in the *Eighteen Additional Practices (Cha lag bco brgyad)* of the twelfth century (Yutok Yönten Gönpo 1999). The *Four Treatises* dedicate three chapters to poisoning and its treatment. In the fifteenth century, Zurkhar Nyamnyi Dorjé (1993, 287–298) places his famous black pill *(ril nag)* mercury formulas in the chapter on treating poisoning in his work *Relics of Countless Oral Instructions (Man ngag bye ba ring bsrel)*.

> with three nectars. After that he returned to India and he passed [the teaching] to Yogi Śavarī Wangchuk. Gradually, it was passed down to the great yogi of Tibet, Orgyen Pel [Orgyen Rinchenpel], who spread it in Tibet.[201]

Third, Tibetan physicians discuss the history of knowledge transmission in terms of authoritative lineages and key texts (e.g. Sönam Bakdrö 2006, 22/10–14/14; Sonam Rinchen 2000, 130/9–131/3). Some of the key figures and texts of Indian and Tibetan mercury lineage transmission are: Vyālipa (Bhalipa in Tibetan), the Indian alchemist who discovered from a woman the missing ingredient needed to refine mercury; Nāgārjuna, a key representative of alchemy in India,[202] whose mercury lineage apparently did not spread widely in Tibet;[203] Vāgbhaṭa, the author of the Ayurvedic compendium *The Essence of Medicine* (Skt. *Aṣṭāṅgahṛdayasaṃhitā*), which was translated into Tibetan[204] and became one of the sources available to Yutok to compile the *Four Treatises* in the twelfth century (Yang Ga 2010, 2014); and the *Kālacakratantra* which includes chapters on the magical powers of mercury.[205] The most important figure for the Tibetan part of the history is Orgyenpa Rinchenpel (1229/30–1309), briefly known as Rinchenpel, who brought Bhalipa's mercury practices to Tibet, translated his works into Tibetan,[206] and is believed to have received his own mercury instructions from the female deity Vajrayoginī. Thus, in the eyes of most Tibetan physicians today he is considered the first lineage holder of the *tsotel* practice, which has survived to this day. His story holds the key to why *tsodru chenmo* is considered superior among all mercury processing practices.

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201 Translated from Sonam Rinchen (2000, 129/16–130/8): *rgya gar du sngon byon spyan ras gzigs kyi sprul pa drang srong rig pa'i blo gros zhes bya ba zhig byon pa de nyid kyis ma 'ongs pa'i sems can la dug rigs mi 'dra ba stong gnyis 'byung ba mngon par mkhyen nas dug rigs de dag sel byed 'tshol bar lho phyogs kyi gling phran zhig tu rdzu 'phrul gyis gshegs pa na / der dngul chu btso bkrur mkhas pa'i drang srong dang sman gyi lha mo sogs sprul pa'i skyes mchog mang po zhugs pa'i gtso bo drang srong gzhung skyes zhes pa las bdud rtsi gsum 'dus pa'i bcud len gyi bdams pa lhag lus med par gsan nas 'phags yul du byon te/ grub thob sha ba ri'i dbang phyug la gsungs pa rim bzhin gangs can gyi grub thob chen po o rgyan dpal gyis bod du spel zhes dang /*.

202 See White (1996, 66–69) on the controversial history of Nāgārjuna.

203 Some of the twenty-two Sanskrit medical works that were translated into Tibetan and included in the Tibetan Buddhist Canon are attributed to a Nāgārjuna (Dash 1976, 9–15), but are not currently used in Tibetan *menjor* practice.

204 Its Tibetan translation was incorporated into the Tibetan Buddhist Canon as *Yan lag brgyad pa'i snying po bsdus pa*. See Vāgbhaṭa et al. (1994–2008).

205 These chapters have been translated and analyzed by Fenner (1979).

206 Among the four Indian alchemical texts that were included in the Tibetan Buddhist Canon in their Tibetan translations, two are attributed to Bhalipa; three of the four are said to have been translated into Tibetan by Orgyenpa (Simioli 2013, 2015).

Orgyen Rinchenpel receives the *tsodru chenmo* practice from Vajrayoginī

The Indian sage and alchemist Mahāsiddha Vyālipa, in Tibetan Bhalipa, is revered by Tibetan physicians as one of the most accomplished Indian masters of mercury formulations. Two of his treatises, the *Treatise on Perfecting Mercury (Dngul chu grub pa'i bstan bcos)* (see Fig. 28) and the *Compendium on the Transmutation into Gold (Gser 'gyur gyi bstan bcos bsdus pa)* are still extant in Tibetan as part of the Tibetan Buddhist Canon, but their Sanskrit originals are lost, and "[i]t is impossible to ascertain if they are a simple translation of the Sanskrit originals or not" (Simioli 2015, 37).[207] They formed the early textual corpus of Indian alchemy that influenced mercury practices in Tibet beginning in the thirteenth century (Simioli 2013, 2015).

This knowledge of mercury processing represents late tantric teachings that survived the Muslim invasion of northern India and were brought to Tibet by the famous Orgyenpa Rinchenpel, a master of the Töd Drukpa Kagyü lineage.[208] The figure of Rinchenpel is of great significance for Tibetans since he not only translated those works into Tibetan but also received transmissions on mercury processing himself from the female tantric deity Vajrayoginī. He was a "great Tibetan yogi, thaumaturge, scholar, alchemist, and traveler" (van der Kuijp 2004, 299), and his life has been described in detail in no less than eleven biographies, which were analyzed by Brenda Li (2011). Gene Smith makes the important point that his works are "partly responsible for the charges that Tibetan tantric teachings are heavily influenced by Kashmiri Saivism," and because his essential practices were received from *ḍākinīs*, "consequently scholars like Kong sprul [Kongtrul Yönten Gyatso] have distinguished this tradition from both the Bka 'rgyud pa [Kagyüpa] practices and the Kālacakra system" (Smith 2001, 46).

Briefly, according to the Tibetan narratives summarized by Brenda Li (2011), Rinchenpel was born in southern Tibet and became a fully ordained monk in his youth at the Bodong E Monastery (founded 1049), west of Shigatse. Among many other subjects, he studied two of the major *Kālacakratantra* traditions (2011, 121). Since he received initiations and precepts for the *Vimalaprabhā,* the famous commentary on the *Kālacakratantra*, he was probably familiar with Indian alchemical ideas of transforming mercury. One of his teachers advised him to go for further study to Nepal as well as to Orgyen (2011, 122). Orgyen, from which he derived his name, is the land of Oḍḍiyāna, located by some scholars in the Upper Swat Valley in present-day northern Pakistan (2011, 126). For

207 Their Sanskrit titles are *Rasasiddhiśāstra* and *Rasaśāstroddhṛti* respectively. See Simioli (2013) for an introductory comparative analysis of both works. For the Tibetan translations see, for example, Bhalipa, Orgyenpa Rinchenpel, and Sri Narendabadra (1994–2008a, b).

208 The Kagyü school is one of the main schools of Tibetan Buddhism. The Töd Drukpa Kagyü school, which was founded by Orgyenpa's teacher, Götsangpa Gönpo Dorjé (1189–1258), is one of its sub-schools.

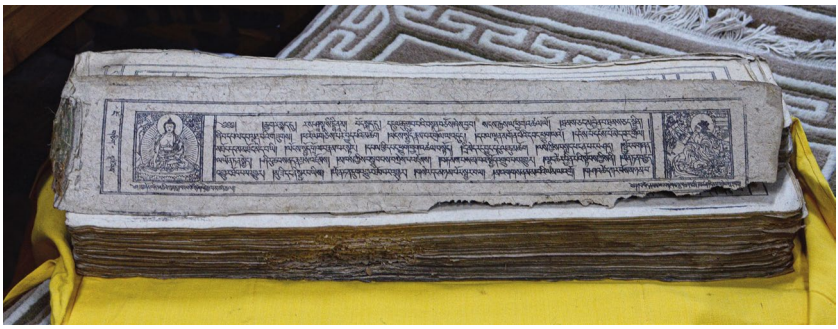

Figure 28: The *Treatise on Perfecting Mercury (Dngul chu grub pa'i bstan bcos)*, from the Shantarakshita Library at the Central Institute of Higher Tibetan Studies in Sarnath, India. Approximately 300 years old, it belongs to a collection that the Fourteenth Dalai Lama brought to India when fleeing Tibet. Note the image of Buddha to the left and what appears to be an Indian sage on the right. Photo: Thomas K. Shor (Shor 2012 / CC-BY-SA 4.0).

Tibetans, this place as a source of medical knowledge was not new. It is mentioned as one of the ten regions of medical systems in eighth- to eleventh-century Tibetan medical literature, testifying to an early exchange of medical knowledge with experts from outside Tibet (Garrett 2006, 218, note 18; Martin 2007, 314, 316).

One of Rinchenpel's biographies mentions that later when he abandoned monkhood and became a wandering yogi, he was tested on his knowledge of the *Kālacakratantra* by a female adept in northwestern India, and he admitted to having forgotten most of what he had studied as a monk. He discarded textual knowledge for the experiential and practical, thus living the full spectrum of Tibetan religious life at the time, which often stretched from monastic Buddhism to tantric siddha techniques following the ideal of the Indian wandering yogi (Samuel 2006b, 46 in Li 2011, 237). However, he did not give up his scholarly work entirely; later in life he commissioned the copying of the *Kālacakratantra* commentaries and published a condensed version of the *Kālacakratantra* while in the Yuan dynasty summer capital of Shangdu (Li 2011, 46, 87). He translated Bhalipa's two texts on mercury processing and composed a trilogy on mercury, known as *Notes on the Trilogy of Mercury* (*Dngul chu skor gsum gyi zin bris*, briefly *Dngul 'bum*; Troru Tsénam 2001, 513 / 8). Orgyenpa Rinchenpel also translated *The Powerful Lord's [Śiva's] Chülen that, Pacifying all Diseases, Promotes Physical Strength (Thams cad kyi dbang phyug gi bcud len nad thams cad 'joms shing lus stobs par byes pa)*, a text on mercury processing, which was attributed in the colophon to Īśvara, an epithet of Śiva (in Tibetan, Wangchuk).[209] Notably, it was these non-Buddhist

209 This text was included in the Tibetan Buddhist Canon. See, for example, Orgyenpa Rinchenpel and Śivadāsa (1982–1985).

Śaivite-related mercury texts by Bhalipa and Īśvara, of which the original Sanskrit versions are lost, that were codified into the "Translated Treatises," or *Tengyur (bstan 'gyur),* of the Tibetan Buddhist Canon during the fourteenth century.[210]

This inclusion demonstrates that some importance was given to mercurial practices at the time. The approach towards these practices might not have been particularly medical or religious, but more artisanship-like, since these texts were classified under the sections titled arts and technologies *(bzo rig)*, which includes texts on alchemy / metallurgy, iconometry, incense making, astrology, and divination in different editions of the *Tengyur* (Simioli 2013, 46). Notably, none of the four Indian tantric texts on mercury included in the *Tengyur* is decisively Buddhist in character (White 1996, 105), which might have influenced the way they were classified.

As the story goes, Orgyenpa's adventurous journey to Oḍḍiyāna lasted several years and covered thousands of kilometers.[211] In Dhumatala, the capital of Oḍḍiyāna and probably referring to the ancient site of Butkara near modern Mingora in today's Pakistan (Czaja 2013, 77), he received teachings from Vajrayoginī. Czaja (2013, 77) writes that somewhere on this journey, Orgyenpa acquired the knowledge of mercury processing, but we lack detailed accounts. The technique of mercury processing attributed to him is known as "The Great Cooking and Washing of Mercury," or *ngülchu tsodru chenmo*, often translated as "Great Mercury Refinement," and nowadays abbreviated as *tsodru chenmo* or *tsotel* practice.

Based on his biographies, we can conclude that Orgyenpa received textual, practical, and spiritual teachings on mercury. However, none of his eleven existing biographies mentions him actually processing mercury on any scale.[212] Only one biography mentions that Orgyenpa told the Mongolian ruler Qubilai Khan (1215–1294) during his visit to Shangdu in around 1293 that he knew how to turn mercury into silver, from which we can infer that he was involved in processing mercury.[213] We do not know the reasons behind this lack of recorded history. One can only speculate that during the time Rinchenpel's main biographies were written, mercury practices might have held a less significant status; it could also be that the practices were considered so secret that they were not put into writing; or that such details were not considered worthy of being included by the biographers.

Orgyenpa was a visionary, and receiving instructions from a female deity was not unusual for him. His teacher, Götsangpa Gönpo Dorjé (1189–1258), engaged in tantric sexual practices with a consort, the *yoginī* Drowa Zangmo, whom he had met in Jalandhar in India in 1217. Götsangpa

210 For details see also Fenner (1979), Simioli (2013), Walter (1980, 8, note 10), and White (1996, 105).
211 His travels have been described in detail by Li (2011), Tucci (1971), van der Kuijp (2004), and Vitali (2012).
212 Li (2011). Brenda Li and Olaf Czaja, e-mail communication, 2012.
213 Sönam Özer (1997, 239). Thanks to Brenda Li for this reference.

also received teachings on scriptures and practices in visions and dreams from Vajrayoginī, including instructions on the *Kālacakratantra* (Li 2011, 127). He must have taught his student in a similar vein. Drowa Zangmo is mentioned as one of four *yoginīs* Rinchenpel met in Oḍḍiyāna, but he apparently had a tense relationship with this powerful woman, who was his teacher's consort and around thirty years Rinchenpel's senior (2011, 130, 134–135).

Orgyenpa is said to have received the *tsodru chenmo* practice in a vision from the "land of the *ḍākinīs*" while encountering Vajrayoginī in Oḍḍiyāna. In the eyes of Tibetan physicians today, the spiritual potency of the practice and its lineage transmission can be traced back to him. Receiving the mercury teachings from this spiritual source also links physicians processing mercury to the land of these *ḍākinīs.* This is still evident from the ways in which Tibetan physicians revere Orgyenpa today. The senior Tibetan physician and teacher, Gen Gojo Wangdu from Lhasa, explained it this way during the Kathmandu Sowa Rigpa workshop:

> If we can master the stainless practice of the Great Mercury Refinement through the lineage of "seeing transmission" [...] it can help us to remove all the diseases and, ultimately, it can help us attain the supreme state of omniscience. As the Mahāsiddha [great yogi] Orgyenpa said, "If we even let a grain of *tsotel* enter our body, it enables us to enter the land of the *ḍākinīs*." So it is very powerful.[214]

What Gen Gojo Wangdu is implying here is that the Great Mercury Refinement practice itself has the potential to transform the practitioner. Tibetan physicians I spoke with in India did not mention these internal spiritual refinements, but attribute special abilities to Orgyenpa and consider him the founder of the *tsotel* practice. Dr. Tenzin Thaye explained it this way:

> Tibetans feel that the process of *tsotel* was perceived through a clear mind; it did not take long times of trial and error and experimentation. They had an all-knowing [mind], what we call *tamché shépa [thams cad shes pa]*. Mental clarity was needed to develop the process and maybe people like Nāgārjuna and Orgyenpa had it.[215]

The previous head of the pharmacy at the Men-Tsee-Khang in Dharamsala, Dr. Namgyal Tsering, during an interview in New York, emphasized the importance of carefully watching a specialist making *tsotel*, which Gen Gojo Wangdu refers to above as seeing transmission. Dr. Namgyal Tsering placed this in a scientific context:

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

215 Interview, McLeod Ganj, July 17, 2014.

> Only the founder of *tsotel*, Orgyenpa, does not need the seeing transmission, but everybody after that needs it. It is very important. If a scientist performs experiments, then he can make *tsotel*. But at that time, there were no experiments.[216]

Dr. Namgyal Tsering points to the possibility of replacing a complicated practice that requires seeing transmission through science, arguing that through trial and error experiments, one could scientifically develop a method of making *tsotel*. Orgyenpa—as the original adept of the practice—was the only one who did not require the seeing transmission. Dr. Namgyal Tsering's response here exemplifies how experiential and spiritually perfected ways of knowing mercury refinement can easily coexist in the minds of contemporary *tsotel* experts.

Most Tibetan physicians I spoke with did not feel the need to experiment with making *tsotel*. Science could potentially verify the success of their technique, but not alter it (see Chapter 7). In their eyes, the *tsotel* practice is perfect, since it originated from what they consider an all-knowing mind, referring to Orgyenpa's special capacity to receive this practice directly from Vajrayoginī. Collectively, this reverence for historic figures and their perfect knowledge adds power and perseverance to passing on a lineage over long periods of time.

Even though Tibetan physicians revere Orgyenpa as the founder of their *tsotel* practice, they do not use his texts or those translated by him in their pharmacies. They rely on nineteenth-century manuals (discussed below), which are easier to understand, as well as notes and oral instructions from their teachers who hold the lineage. Practically speaking, Bhalipa's mercury texts, which Orgyenpa translated into Tibetan, did not reach the prominence that one might expect. The descriptions are often opaque and difficult to understand.[217]

The Tibetan tradition of telling *tsotel*'s early history is a prime example of a spiritually informed medical empiricism. Orgyenpa's story has all the elements that made the *tsotel* practice outstanding in the eyes of Tibetan physicians: It is a spiritual and visionary transmission received from a female deity, and it includes the theme of taming linked to the Rudra taming narrative and Śaivism. It was brought to Tibet by a unique expert who was both a yogic practitioner and had undergone a Tibetan Buddhist monastic training. Orgyenpa had accomplishments across the spectrum of the visionary, experiential, and the scholarly. He was thus capable of making the required cultural, spiritual, and textual translations for this mercury refinement practice to reach the Tibetan world.

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216 Interview, New York, October 13, 2014.

217 According to Simioli (2015, 43), Bhalipa's mercury processing steps show some similarities to the eighteen *saṃskāras* mentioned in Sanskrit alchemical texts. These *saṃskāras* are described in detail by White (1996, 265–294).

But why did the *tsodru chenmo* technique attributed to Orgyenpa develop into the main and most popular processing method used today? I explore some of the reasons in Chapter 6. Next, we follow some of the historical developments of mercury practices in Tibet after Orgyenpa.

Mercury refinement practices in Tibet (fourteenth to nineteenth centuries)

The transmission of mercury refinement practices in Tibet since Orgyenpa Rinchenpel is complex and would require a study of its own. Olaf Czaja (2013) outlines this multifaceted history for the first time. Here, I present a succinct summary of the most outstanding components of the *tsodru chenmo* knowledge transmission, highlighting those most relevant for the next chapters. The examples below show that throughout the history of making *tsotel*, medicine and religion cannot be regarded as two separate domains, nor can they easily be confined to the temple vs. the clinic or pharmacy. Rather, the complex ways of making *tsotel* reveal an intertwined collaboration between medical and Buddhist ritual experts across long historical periods.

Orgyenpa is said to have passed the *tsodru chenmo* technique to the Third Karmapa, Rangjung Dorjé (1284–1339), from whom it was passed on through subsequent throne holders of the Karma Kagyü, the largest sub-school of the Kagyü school of Tibetan Buddhism, and their affiliated physicians. While the contemporary Tibetan author Sönam Bakdrö writes that the Third Karmapa received the mercury knowledge from Orgyenpa himself (Sönam Bakdrö 2006, 31–32). Czaja maintains that there is no clear textual evidence to support this, except that the Third Karmapa included the eight metals (which are essential components in the making of *tsotel*) in his medical glossary.[218]

The Karmapas became famous for their black pills or *rilnak (ril nag)* tradition, which do not contain *tsotel*. The Karmapa's black pills, given to devotees as blessing pills, appear to be quite different from the Precious Black Pill Great Cold Compound (Rinchen Drangjor Rilnak Chenmo), which is the most complex *tsotel*-containing precious pill formula. However, these pills seem to have shared histories, particularly in their use of special consecrated substances such as *jinlap* and *papta*, nectar medicines, and the aforementioned *mendrup*, which I discuss elsewhere (Gerke 2019a).

To give one example here: we know from the autobiography of the Buddhist master and famous physician from eastern Tibet, Kongtrul Yönten Gyatso, that during the New Year ceremony of 1838, the Fourteenth Karmapa, Tekchok Dorjé (1798–1868) prepared black pills. At the

218 Czaja (2013, 78) here refers to the *Treatise on Medicine: An Ocean of Medical Terms (Sman gyi bstan bcos ming rgya mtsho)*, in short *Sman ming rgya mtsho,* by Rangjung Dorjé (2005, 200 / 18).

time, Kongtrul was making several kinds of precious pills, and the physician Karma Tsépel of Pelpung Monastery in eastern Tibet made the *tsotel* for them. The Karmapa's black pills were added as a *papta* to Kongtrul's precious pills, adding a special *jinlap* and empowering Kongtrul's medicines with the Karmapa's lineage.[219] This testifies to a close collaboration between medical and ritual experts in the consecration of *tsotel*-containing precious pills.

By the fourteenth century, the mercury texts that Orgyenpa had translated earlier were codified into the *Tengyur* and appear in a more organized form in medical compendia, such as those of the Drangti School (Drangti Penden Gyeltsen 2005). Orgyenpa's trilogy also appears in a collection by Lhatsün Rinchen Gyatso (2005, 257–304) under the brief title *Trilogy of Instructions on Mercury of the Great Yogi Orgyenpa (Grub chen o rgyan pa'i dngul chu gdams pa'i skor)*.

Zurkhar Nyamnyi Dorjé (1439–1475), the famous representative of the Zur medical tradition,[220] trained in the Kagyü lineage, wrote extensively on mercury and included black pill instructions in his famous *Relics of Countless Oral Instructions* (*Man ngag bye ba ring bsrel*, Zurkhar Nyamnyi Dorjé 1993, 2014). While Nyamnyi Dorjé's treatise contains several texts on *ngülchu* and mentions many formulas that contain processed mercury, his black pill instructions for making the precious pill Rinchen Drangjor have received the most scholarly attention to date.[221] Nyamnyi Dorjé's mercury texts and related practices were spread by his disciples in southeastern Tibet (Czaja 2013, 81). As discussed earlier, during the time of the Fifth Dalai Lama, Kagyü physicians from eastern Tibet transmitted the *tsotel* practice to the Gelukpa school in central Tibet. In Lhasa, physicians affiliated with the main medical institutions—Chakpori (est. 1696) and Mentsikhang (est. 1916)—were trained and passed on the tradition further.

In eastern Tibet (Kham), the Drigung Kagyüpa school carried the practice into the seventeenth century. Drigung Rigzin Chökyi Drakpa (1595–1659)—briefly known as Drigung Chödrak—was a trained physician and the twenty-third throne holder of the Drigung Kagyü, one of the sub-lineages of the Kagyü school of Tibetan Buddhism. He wrote eleven short works on precious pills and mercury processing in his *Drigung Collection of Sowa Rigpa* (*'Bri gung gso rig gces bsdus,* Drigung Chödrak and Könchok Dropen Wangpo

219 This story is partially told in Jamgön Kongtrul's autobiography (Jamgön Kongtrul 2003, 33–34). Thanks to Khempo Chödrak, the nephew of the Sixteenth Karmapa Rangjung Rikpé Dorjé (1924–1981), for explaining these details to me (interview, Delhi, December 5, 2018). I previously published a different interpretation (Gerke 2013b), thinking that *tsotel* was added to the *rilnak* in 1838. It was in fact the other way around.

220 The two main medical traditions that developed in the fifteenth century in Tibet are known as the Northern School or Jang *(byang)* and the Southern School or Zur *(zur)*. See Hofer (2007). On the sectarian rivalry between the Jang and the Zur and their ties to different Tibetan Buddhist traditions, see van Vleet (2016, 275).

221 See Zurkhar Nyamnyi Dorjé (1993, 287/3–297/11) and the English translation of this text by Gyatso (1991). The work was also reprinted in Tibetan by Tashi Tsering (1986, 1–20). For details on this black pill formula see Gerke (2019a).

2007).[222] Representatives of the Rimé movement, foremost Kongtrul Yönten Gyatso, were very active in mercury processing in the eighteenth and nineteenth centuries and wrote several treatises on the topic (Czaja 2013; Tashi Tsering 1986). They wrote the works that remain the textual foundation of today's *tsotel* practice (see the next two sections).

Based on the examples presented here, one can glean the impression that mercury refinement practices were transmitted only through major Tibetan Buddhist schools and the technical skills and formulas were upheld solely by powerful monasteries and their adjunct medical schools and elite physicians. For social, economic, and political reasons, this is largely true of the complex *tsotel* practice, as explained in Chapter 3; but it is also influenced by the fact that those larger events were documented in writing, while smaller events remained often undocumented. However, in Tibet, mercury was used in a variety of medicines, also in smaller medical settings, family traditions, and by travelling medics. The heterogeneity of its varied processing practices is quite intriguing and requires a closer look.

Heterogeneity, lineages, and the question of origins

Tibetan medical works reveal a heterogeneity of mercury practices indicating a wide geographical range of texts and teachers. In fact, we are not dealing with one single tradition of mercury refinement, but a variety of practices from different neighboring regions. For example, the medical texts of the thirteenth to sixteenth centuries analyzed by Czaja show that various mercury processing methods circulated in the Cherjé medical school and in the Drangti medical school at Sakya. These schools mention Indian teachers such as Nāgārjuna, Abhayākara,[223] and the Bengali scholar Vanaratna (1384–1468), who taught how to tame mercury with mantras (Czaja 2013, 79). In the eighteenth century, the famous physician and author Deumar Tendzin Püntsok (2009, 575/17–585/13), briefly called Deumar, lists fifteen methods of taming mercury, attributing three of them to Indian teachers of mercury processing, Jyōtikīrtinātha,[224] Kāmadeva, and Nāgārjuna (2009, 577/18–579/8). We do not know whether Deumar included these three in his list of fifteen methods to acknowledge the Indian representatives of mercury practices, or whether he received any substantial practical transmission himself.

222 These eleven works are listed in Czaja (2013, 81, note 32).

223 According to Simioli (2015, 39, note 20), Abhayākaragupta introduced a method to extract mercury from cinnabar, realgar, magnetite, and the plant *sne'u*. On the sourcing of *ngülchu* and its classification as a cold, inanimate poison in Tibetan medical texts, see Gerke (2016b).

224 An unknown proponent. He could have been an Indian Nāth Siddha (practitioner of *haṭha* yoga), who had exchanges with Tibet (Schaeffer 2003b).

Of course, there is the tempting question of locating the origin of these mercury processing techniques, similar to the quest of uncovering the origin of Hindu alchemy. I define origin here in a broad sense, implying precedents as continuous change without a precise beginning. Bloch reminds us that "the term 'origin' is disturbing because it is ambiguous." It implies a beginning, which invokes a starting point, and "for most historical realities the very notion of a starting point remains singularly elusive" (Bloch 1992, 25). In Tibet, questions of origin are often conflated with those of authority and are shaped by the ways in which origin narratives are presented (McGrath 2017a). Davidson succinctly points out with regard to Tibetan Buddhism, "great antiquity is one of the important values of Tibetan religion, and imputing it into the lives of the saints becomes an essential tool for the affirmation of their sanctity and authority" (Davidson 2005, 49).

When asking questions about the origins *('byung gnas)* of these practices during fieldwork, I often realized that such inquiries into the history of *tsotel* or other mercury practices, and even medical history in general, are of relatively little importance to contemporary physicians, who are concerned with the methods for making *tsotel* and precious pills and their lineage, as well as their therapeutic uses. They are less interested in the details of exactly where they came from. When we spoke about his early education in Tibet, Dr. Tenzin Thaye made me realize how differently history is approached in Tibetan medical education:

> We never really ask these questions on history. Of course we need to know the lineage, but that's enough. We are not taught that way, and it is not so important for us. When I was learning from the senior teachers, I was very young, and I simply did not think of asking these questions because our teachers were so qualified. They taught us like their sons and imparted everything they knew, like pouring all their knowledge into a vessel. In principle, students usually did not ask questions.[225]

For Dr. Tenzin Thaye, knowing the lineage provides the authentication of practice. As it is, historical events are tricky to trace, and a view of history "as a combination of fact and meaning" to quote Carole McGranahan (2002, 113), might help to understand the historiographies of *tsotel* events. Those are shaped by attempts to—often retrospectively—(re)shape, install, and decree certain lineages and authorities of transmission, and be silent about others. To this day, the lineages of their medical traditions are very important to Tibetans, since they bestow a certain authority on today's medical practitioners and their institutions. As is evident from the biographies of Khempo Troru Tsénam and Lamenpa Tenzin Chödrak, the ways in which lineages are linked to authoritative figures and their histories are

225 Interview, Dharamsala, May 6, 2015.

quite different for Tibetan physicians in India compared to those living in the PRC.[226] Since Tibetan historical narratives serve certain purposes, we need to "track the possibility for history as configured by shifts in Tibetan social and political worlds" (McGranahan 2002, 113).

Likewise, Trouillot (1995) reminds us that issues of power are frequently involved in the construction of history. This often comes to the forefront when we ask questions concerning where certain medical practices originate. Authors might be keen to prove certain origins, often for different purposes. Regionalism and political history have often played a role in what is told and what is kept silent in writing the history of mercury, influencing who defines medical knowledge and what counts as authentic.

There are different ideas regarding the historical diffusion of mercury practices, which link up again with the debates on medical empiricism raised by Janet Gyatso (2015). White notes that the use of mercury in Chinese Daoist and Jabiran traditions of Persian alchemy predates those of India and Tibet. He argues that "one is tempted to hypothesize that the fundamentals of Hindu alchemy were carried, along with mercury and cinnabar, from one or both of these foreign sources" (White 2013, 216). This makes sense considering that India does not have mercury mines (see Chapter 2). While the sourcing and trading of cinnabar naturally impacted the movements of knowledge on how to process it, it does not solely account for the existence of shared processing techniques. Based on his in-depth research on Indian mediaeval Siddha alchemy, White holds the position that the similarities between the techniques and apparatus used in Greek, Hindu, Persian, and Chinese systems are

> best explained by the chemical behavior of the reagents themselves, as well as by independent trial and error discoveries made in the techniques of distillation, amalgamation, fixation, and so forth with the allied fields of metallurgy, coinage, perfumery, and the production of distilled spirits (White 2013, 217).

With the increased interest in the PRC to manufacture *tsotel* and precious pills on a larger scale, Chinese authors seem to be searching for specifically Chinese origins of the practice, looking for parallels to the Tibetan material in early medieval Chinese alchemical texts. Zhang and Jinyuan (1999) compare Orgyenpa's method of mercury processing with the techniques and names described in the *Instructions on the Scripture of the Divine Elixirs of the Nine Tripods of the Yellow Emperor (Huangdi Jiuding Shendan Jingjue)*, written between 649 and 684 CE. The authors pursue a line of argument that White cautions us not to follow. A similarity between Tibetan and Chinese mercury processing descriptions of similar material, detoxification methods, and terminology leads Zhang and Jinyuan to hypothesize that

226 I compared and analyzed these biographies with regard to mercury processing in detail elsewhere. See Gerke (2015a). See also Chapter 3.

Chinese terms and manufacturing skills went from China to India and from there to Tibet (Zhang and Jinyuan 1999, 48). While there are undoubtedly similarities—the widespread use of the term "kill" for subduing a poison, or the method of cooking, etc.—there are also many differences. Again, White reminds us that in the Indian context, such similarities are not a case of wholesale borrowing:

> While Chinese (Taoist alchemy) and Persian (the Shi'a Jabirian school) traditions no doubt interacted with tantric alchemy, the Indian material is so specifically Indian—as much in the subcontinental provenance of its *materiae primae* as in its nearly exclusively Hindu religious and metaphysical presuppositions—as to preclude any possibility of this being a matter of wholesale borrowing (White 1996, 54–55).

I would argue that the same holds true for Tibet. While there were certainly multiple influences and transmissions from neighboring countries—which Tibetan authors themselves have acknowledged—medical practitioners in Tibet tested, adopted, and adapted some of these practices over time as integral to Sowa Rigpa or what they understood to be specifically "Buddhist" and transmitted them through their unique medical and religious lineages, attributing authoritative knowledge to these techniques.

Although knowledge of medicine and astrology as practiced in China certainly influenced the development of Sowa Rigpa,[227] from what I have seen, Tibetan mercury processing practices of Chinese origin are conspicuously absent in most Tibetan historiographies on mercury with a few exceptions, explained below.[228] Mercury was clearly traded in the form of cinnabar from China, and—as mentioned earlier—the Tibetan phoneticized version of the Chinese terms for cinnabar, *chu shak* and *dachu*, appear in Tibetan medical texts. Tibetan writings, however, attribute the *tsotel* practice to Tibetan Buddhist lineage holders going back to the Third Karmapa and ultimately to Orgyenpa Rinchenpel. Some processing techniques are assigned to Indian masters. For contemporary Tibetan practitioners in India and the PRC, Orgyenpa remains the authoritative lineage holder of the *tsodru chenmo* technique, which they also consider the safest and most enduring modus operandi.

However, there were some eastern Tibetan medical authors of the eighteenth and nineteenth centuries who relied on Chinese mercury processing techniques to treat certain communicable diseases and poisoning during

227 Chinese influences on Tibetan medicine were summarized by Meyer (1981, 66–71), but have not been studied in depth. For Chinese influence on Tibetan astrology see Dorje (2002). For Chinese origins of early Tibetan medical texts, see Yoeli-Tlalim (2010) and McGrath (2017b).

228 Historical parallels between Chinese and Tibetan mercury processing methods still need to be researched. On Chinese alchemy of mercury, see Needham and Gwei-Djen (1974) and Needham, Ping-Yu, and Gwei-Djen (1976).

the Qing Empire (1644–1912). Tibetanists have argued that "documented cultural exchange between Qing China and Tibet outside the scope of religious teachings was extremely limited" (Tuttle 2005, 28), except in the fields of painting, architecture, and, among the nobility, clothing design and cooking (Tuttle 2005, 28; referring to Petech 1950, 262). I think medicine was an important sphere of exchange, especially between Qing China and Tibet, some of which was also documented, but still requires extensive research.[229]

An outstanding representative of an inclusive approach to medical scholarship and transculturality is the polymath and medical specialist from eastern Tibet, Situ Chökyi Jungné (1699/1700–1774), also known as Situ Paṇchen, who translated Chinese medical texts and studied Chinese medicine with doctors in China, and afterwards practiced an eclectic mix of Tibetan and Chinese medicine (Garrett 2013, 279). Situ Paṇchen and his nephew Karma Ngélek Tendzin included Mongolian, Nepali, Chinese, and Uygur medical treatments in their repertoire and noted that "certain poisons, venereal diseases, and smallpox, are often best treated using Chinese medicine" (Karma Ngélek Tendzin 1973, 8 in Garrett 2013, 285).

The treatment of venereal diseases, in Tibetan called *rekduk* (*reg dug*, meaning poison on touch, or contagion), provides a special case in the study of mercury in Tibet and the exchange of processing techniques with its neighbors, which I analyze in detail elsewhere (Gerke 2015b). This exchange was linked to a widespread infectious disease, which in the twentieth century became known as syphilis, and which was commonly treated with mercurial medicines. In the case of *rekduk*, foreign recipes containing mercury were widely adopted by Tibetan doctors between the seventeenth and early twentieth centuries, reaching not only eastern Tibet but also Lhasa in central Tibet, prior to the British bringing the biomedical antisyphilitic drug Salvarsan to Tibet (McKay 2007). These foreign recipes included fumigants, ointments, pills, and powders which were gathered from travelling practitioners from Mongolia and India, as well as Muslim physicians in Lhasa and other areas across the Himalayas, demonstrating considerable heterogeneity of mercury processing techniques. Processing techniques described by eastern Tibetan physicians included rolling mercury in thin Chinese paper (Lingmen Trashi Bum 2007, 719/18–19) and burning it inside a Chinese porcelain cup; the burning time was measured by burning Chinese incense sticks (Karma Ngélek Tenzin 1973, 533/3–4). Some of these *rekduk* formulas included quite toxic forms of mercury, what we today would chemically identify as red mercury(II) oxide (HgO), which is a red-yellow solid compound that is considered toxic but contains antibacterial properties, still used today externally in skin ointments and in many skin-lightening products.[230]

229 Stacey van Vleet's doctoral thesis (2015) on the importance of Sowa Rigpa for the development of Buddhism outside of Tibet during the Qing dynasty is a step in that direction.

230 The use of inorganic mercury in skin-lightening products is considered hazardous to health. See WHO (2019).

Contemporary Tibetan practitioners I interviewed in India consider these *rekduk* formulas unsafe. When I showed the description of how to process mercury for a *rekduk* formula of red mercury(II) oxide by Kongtrul Yönten Gyatso et al. (2005, 110/7–111/16) (whose text on making *tsotel* is still used by the Men-Tsee-Khang) to the contemporary Men-Tsee-Khang-trained Tibetan physician Ngawang Soepa in Dharamsala, he immediately responded that "this kind of mercury processing is not used anymore" and is "part of history." He also noted that the mercury processing methods for treating *rekduk* were "always different and not so safe" compared to those used for making *tsotel*.[231]

Apparently, Tibetan physicians were more open to adapting foreign treatment methods for new diseases in times of crisis; therefore, their use of mercury in medicines for these diseases should be treated as exceptional. In the case of venereal diseases such as *rekduk*, we can talk of a considerable borrowing of techniques and formulas, since the treatment methods often seemed to have travelled along with the disease and the need to treat it. Thus, the social history of processing mercury for the treatment of *rekduk* looks quite different from the social history of processing mercury for the creation of precious pills.

Their detailed study might also reveal different medical mentalities in dealing with mercury formulas to point back to Gyatso's argument for scientific thought and innovation in Tibetan medicine. Tibetan physicians adopting *rekduk* formulas from neighboring countries reveal a pragmatic and non-religious empirical attitude towards medical knowledge in an attempt to treat a new communicable disease. At the same time, it made them question their own medical texts. Karma Ngélek Tenzin (1973, 8/4–6) criticized the *Four Treatises* as well as the *Instructional Manual (Lhan thabs)* by Sangyé Gyatso (1992) as less useful when it came to the treatment of *rekduk*, for which he clearly preferred the Chinese methods and terms.[232] Perhaps this is an indication that in the eighteenth century, Tibetan physicians did not find existing Tibetan disease categories and methods suitable for handling a larger venereal outbreak and were looking to their neighbors for workable solutions. They were open to medical innovations in adopting new formulas. Some Tibetan physicians, such as Kongtrul Yönten Gyatso, Deumar Tendzin Püntsok, and Lamenpa Khyenrap Norbu, also questioned the different levels of toxicity of *rekduk* formulas—many of which were quite poisonous and led to salivation (a known symptom of mercury toxicity). These physicians recognized the toxicity of these formulas and recommended protective measures.[233]

In sum, we can detect different medical mentalities in the heterogeneity of Sowa Rigpa mercury practices. But they require a nuanced approach

231 Personal communication, Dharamsala, December 6, 2012.

232 For example, Karma Ngélek Tenzin (1973, 533/3–4) describes one such Chinese *rekduk* formula, which involves the burning of mercury with arsenic trioxide, sodium sulfate, and cinnabar in three stages. Translated in Gerke (2015b, 546).

233 I discuss these in detail in Gerke (2015b).

and a case-by-case analysis, which is what Gyatso also points to when she writes "our concern to discover innovation has to do with the conditions under which change occurs, not the cultural or national identity of those shifts as such" (Gyatso 2015, 289).

Notably, these innovations in mercury processing techniques and mercury-containing formulas for treating *rekduk* coming in from China and elsewhere did not alter the *tsotel* practice. Although both used mercury, they followed very different lineages, procedures, and histories. While Situ Paṇchen was quite willing to adopt specific medical practices from China and elsewhere, he followed the teachings of Orgyenpa when it came to making *tsotel* and precious pills, which he manufactured towards the end of his life within a traditional *chöyön* network and the support of the Degé king[234] (Garrett 2013, 279–280; Tashi Tsering 2014). Situ Paṇchen's work on *tsodru chenmo* became the foundational text for today's *tsotel* practice, as did the works of his nephew Gurupel and those by Mipam Namgyel Gyatso (1846–1912), and specifically Kongtrul Yönten Gyatso, whose text is used at the Men-Tsee-Khang.[235] These texts survived the Cultural Revolution and were reprinted in India in the 1980s (Tashi Tsering 1986; see Appendix D). They are important, if still untranslated, documents of the rich medical history summarized above and textually inform today's *tsotel* practices in India.

In pre-1959 Tibet, these texts were rare and typically passed along with the practice to lineage holders, but in India and in the PRC, a range of publications on *ngülchu tsodru chenmo* have appeared since the 1980s, available to anyone interested enough to read them in Tibetan. This raises questions concerning the secrecy of Tibetan knowledge transmissions and the safety of any practices done without the seeing transmission. My interviews below show how such issues have been handled by Tibetan physicians and scholars in India in their attempt to preserve, edit, and (re-)write *tsotel* manuals.

Secrecy and Tibetan publications on mercury formulations

Knowledge transmission in Asian medicine is known for the challenges it faces negotiating between the concealment and the publication of techniques that have often preserved not only knowledge but also the livelihood of family-lineage based enterprises (e.g. Blaikie 2013; Hofer 2011). Balendu Prakash's Ayurvedic family lineage, introduced earlier, based their mercury formulas on a handwritten manual passed down through

234 This was probably the Twelfth Degé King, Lodrö Gyatso (1722–1774), who was trained in and practiced medicine. See Sonam Dorje (2013).

235 This text is titled *Bdud rtsi bcud kyi rgyal po rin chen dngul chu btso bkru chen mo'i sbyor bas grub pa'i bcud len du bsgyur ba'i lag len rnam par gsal ba 'tsho byed mkhas pa'i snying bcud* (Kongtrul Yönten Gyatso 1986). It is part of the collection edited by Tashi Tsering. See text 12 in Appendix D.

generations (Prakash 2013). In sixteenth-century Tibet, the "writing from experience" *(nyams yig)* became a special genre in Tibetan medical literature that valued the individual physician's diagnostic and therapeutic experience in written form; some of them became a "kind of patrimony, a possession to be guarded against competitors" (Gyatso 2004, 86).

In the early 1980s, several manuals on the making of *tsotel* and precious pills were circulated privately by Tibetan doctors in Dharamsala, but none of them were published or available to medical students at large. In this section, I ask the question: Why have some Tibetan physicians and scholars chosen to publish Tibetan texts on *tsodru chenmo*, and why have others kept silent about it? How have mercury practices been influenced by the ways in which knowledge of the processing methods has been transmitted through published works?

The arrival of Lamenpa Tenzin Chödrak in Dharamsala led not only to the first manufacturing of *tsotel* in exile, but also to the first and only published collection of Tibetan mercury formulations in India. This was initiated by Tashi Tsering Josayma (Fig. 29), who, from 1980 to 1998, was the head of the Publication Department at the Library of Tibetan Works and Archives (LTWA) in Dharamsala. He collected twelve Tibetan medical texts on mercury and published them as *Collected Works on Mercury Formulations (Rin chen dngul chu sbyor sde phyogs bsdebs)* through the LTWA (Tashi Tsering 1986, see Appendix D). When we met in Dharamsala in December 2012 for a meal of *momos* (Tibetan meat dumplings) and *thukpa* (noodle soup) at his then favorite restaurant, I asked him what motivated him at that time to collect texts on mercury. Listening to him, I understood the ways in which his own motivation hinged on issues of lost lineages and changes in knowledge transmission. He began with his own family:

> My father's maternal lineage was from a family amchi lineage, of which the last doctor died in 1964 in Manali, India. His name was Gowa Tashi Tsering. I was told the lineage came from Ngari and had been unbroken since the sixteenth century. So I grew up with knowledge of medicine. My father's uncle was also a physician, but I do not know the story because he died in 1962.

Dipping a *momo* into spicy chili sauce, I wondered how it must feel to be part of a family of a lost medical lineage. Tashi Tsering continued,

> When Tenzin Chödrak made *tsotel* in 1982, it reminded me that most pharmacy practices are done in secret, and were passed on from father to son. When the Mentsikhang in Lhasa was established in 1916, they mostly enrolled monks from central Tibetan monasteries; then they were sent back as amchi. Many disrobed and became laymen and sent their children back to the Mentsikhang for training. The same practice continues in exile.

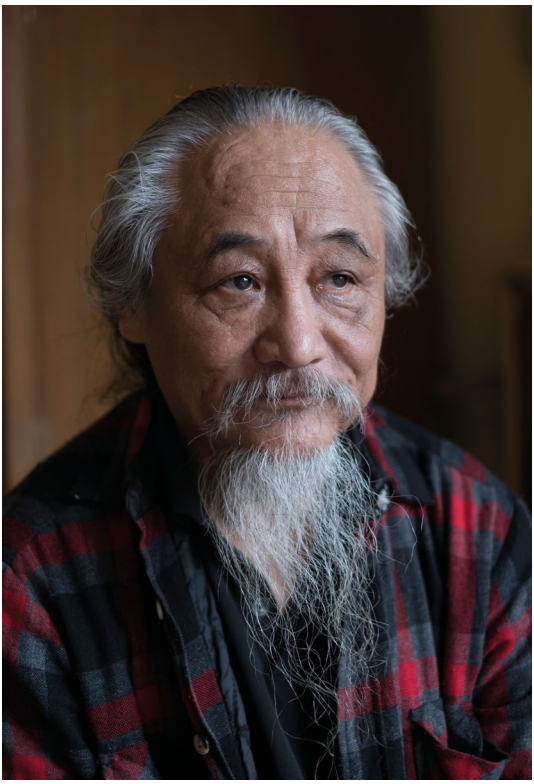

Figure 29: Tashi Tsering Josayma at the Amnye Machen Institute in Dharamsala in 2017. He collected twelve medical texts on mercury and published them as *Collected Works on Mercury Formulations*. Photo: Thomas K. Shor (Shor 2017 / CC-BY-SA 4.0).

He was clearly aware of the changes in Tibetan knowledge transmission. I asked, "How was it when Tenzin Chödrak suddenly arrived in Dharamsala, having the knowledge of making *tsotel*?" Tashi remembered:

> When Tenzin Chödrak came to Dharamsala, we realized how special and sacred it is to make *tsotel*. You need a sponsor; it is super secret and expensive. How can it go on passing just from father to son? In Tibet, because of the government taxation system, the trade remained in one family. [...] In Dharamsala, there were thirty young doctors who did not have family lineages anymore! Now the knowledge has to pass down to anyone who is interested. For that reason you need to publish the texts. Yeshi Dhonden and Tenzin Chödrak were monks; they had the texts—but no sons.

We paused. I knew that neither of these two widely respected physicians published any significant details about mercury practices. Tenzin Chödrak

only left some notes on *tsotel* manufacturing with one of his students at the Men-Tsee-Khang and gave a few historical details in his biographies. They both represented a generation of practitioners that held knowledge secretly. To date, apart from a detailed *tsotel* manufacturing description in Dawa Ridrak's book (2003) explored below, Men-Tsee-Khang-trained physicians have published only one translation of a mercury formulation in English (Gyatso 1991) and two articles in Tibetan—one on *tsotel* (Penpa Tsering 1997) and one on the shorter mercury processing techniques *kardül* and *tsadül* (Namgyal Tsering 1997).

Thinking about the undisclosed skills of the practice, I then wondered aloud, "How did you find the texts and motivate the doctors to give them to you, since they were considered secret?" He laughed, "That was the only problem: to make them share the texts and the knowledge!" Curiously, I asked, "How did you convince them?" He answered,

> At that time, I had not seen the text by Gurupel.[236] I knew it existed from reading the mercury texts by Kongtrul Yönten Gyatso. In 1981, a week after Tenzin Chödrak arrived, I met him. He allowed me to copy some of his texts, but not the *ngülchu* text. In 1984, I met him for the second time. [...] At some point he agreed to let me publish it. The other texts I received from the Late Jamyang Tashi of Tsona,[237] as well as from Lobsang Tashi from Dromo.[238]

I then asked, "Which of the texts was the most interesting to you?" Tashi Tsering was certain of his answer: "Among all the texts I collected, the text written by Orgyen Tendzin [fl. nineteenth century] is the rarest. Even Tenzin Chödrak did not know this text; it was never published before. It was written in Lhasa. It is extremely rare." I remembered Lamenpa Orgyen Tendzin Gyatso from my list of physicians who made *tsotel* in Lhasa in 1893 under the Thirteenth Dalai Lama (see Chapter 3). He wrote two texts, both of which are in the *Collected Works on Mercury Formulations*.[239] Tashi Tsering continued:

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236 This text is based on the oral instructions of Situ Chökyi Jungné and titled *Srid gsum gtsug rgyan si tu chos kyi 'byung gnas kyi zhal lung dngul chu btso chen dang rin chen ril bu'i sbyor sde zla ba bdud rtsi'i thig le ces bya ba bidza ha ram sde dge'i drung yig gu ru 'phel gyi zin bris* (Degé Drungyig Gurupel 1986). See text 11 in Appendix D. Situ Chökyi Jungné himself authored *Dngul chu btso bkru chen mo'i lag len 'chi med bdud rtsi'i bsrubs shing*, an extant but unpublished manuscript on mercury processing (Czaja 2013, 90).

237 Lamenpa Jamyang Tashi of Tsona (1918–1986) studied at the Mentsikhang in Lhasa, became head of the Men-Tsee-Khang pharmacy in Dharamsala in 1963, and the personal physician of the Fourteenth Dalai Lama in 1976. On his life, see the official website of Amchi Lobsang Tsultrim (2019).

238 Amchi Lobsang Tashi worked at the Men-Tsee-Khang in Dharamsala from 1963 until 1971 (Kloos 2010, 68, 74). He later worked at the Kalimpong Men-Tsee-Khang branch clinic for many years and retired in Switzerland.

239 The first is a short description of how to make the precious pill Rinchen Tsodru Dashel *(Rin chen dngul chu btso bkru zla shel ril bu'i sbyor ba drang srong rgyun shes kyi lugs khol du phyungs pa)*; the second is titled *Rin po che'i sbyor ba'i gtso*

> Amchi Lobsang Tashi had a copy, which was written in *khyuk yik* [*khyug yig,* Tibetan cursive writing]. I saw it by chance in his collection. I established some contact through a friend of mine who is from the same village as Lobsang Tashi and requested a copy.

Approaching someone from the same region was the culturally appropriate way to appeal to Tibetans one did not know closely. Tashi spoke further on this, saying "we had to copy it into *u chen* [*dbu can*, Tibetan printed script]. Finally, we got a calligrapher to prepare the final version." I pondered on the rarity of the texts and how exciting it must have been to finally see them in print. "What was the impact of the publication?" I asked, not anticipating his answer. "Absolutely none," he said with a sense of disappointment. "We printed 150 copies and hardly any doctor bought it. It is still available." He then went on to complain about the lack of teaching medical history at the Men-Tsee-Khang. After lunch, Tashi Tsering and I parted, but the next day he invited me to the Amnye Machen Institute to copy more texts on mercury, among them a reprint of an early manuscript from the twelfth century, which he thinks predates Rinchenpel's work.[240]

The *Collected Works on Mercury Formulations* is the only collection of classical Tibetan medical texts on mercury processing that was published in India. One of its texts was also reprinted by Amchi Tashigang in Leh (Degé Drungyig Gurupel 1985). Apart from that, the Tibetan physician Dawa Ridrak is the only contemporary Tibetan physician in India who wrote in detail on mercury practices. Born in Lhokha (southern Tibet) in 1963, he came to India in the 1980s and graduated from the Men-Tsee-Khang in 1991. He worked at the Men-Tsee-Khang pharmacy for ten years and also directed the Herbal Product Research Department. In 2003, Dawa Ridrak published a detailed chapter with photos on the 1994 *tsotel* event in his self-published *menjor* book, which largely contains formulas (2003, 402–451). He was also instrumental in getting the first samples of *tsotel* and precious pills to Sara Sallon for chemical analysis, before the toxicity study became an official Men-Tsee-Khang project.

I interviewed Dr. Dawa Ridrak at his home in New York, where he now lives with his family. Like many physicians who left Men-Tsee-Khang,[241] he has found a new life in the US. We met several times between 2011 and 2014, and I always noticed his innovative ideas on new supplements, as well as his dedication to collecting material for new publications. In 2011, I asked him why he published his account on making *tsotel*. He said:

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bo bdud rtsi bcud rgyal dngul chu btso bkru che mo'i lag len snying por dril ba phan bde'i gter mdzod. See Orgyen Tendzin Gyatso (1986a, b) and texts 9 and 10 in Appendix B.

240 These are two small works on *ngülchu* by the first Drigungpa Jikten Sumgön (1143–1217), found in the *Collected Writings* of Barawa Gyeltsen Pelzang (1310–1391; 1970, vol.12, 512–517).

241 See Kloos (2010) on the issue of frequent resignation of amchis from Men-Tsee-Khang.

> In the past, the masters had very sharp brains. By just seeing they understood everything. These days the brain is not so smart, we still get confused even with writing everything down. So, I took many notes when we made *tsotel* in 1994. I also took photos and collected notes for several years, but I could not publish them for a number of reasons, one being financial. Then, around 2001, there were a lot of controversies about mercury in Europe [he refers to the safety scandals in Finland and Switzerland, see Chapter 7]. Because of that, I felt we had to clarify the scientists' doubts, so I published this. It was my own idea; there was no request made by the Men-Tsee-Khang.[242]

In Dawa Ridrak I saw a young physician who chose to document the *tsotel* practice and offer it for scientific study, preferably in a laboratory. He even collected samples from the different stages of making *tsotel* and wanted to test them in a laboratory to detect any chemical changes that occur between the processing steps. He could not find any support, though the approach of the Men-Tsee-Khang towards such studies has changed over the years with changing directors (see Chapter 2).

I questioned Dawa Ridrak on the secrecy of the practice. As the short title of his book implies, he gave the "key to open a secret door" *(gsang sgo 'byed pa'i lde mig)*. Several physicians I met in Dharamsala have voiced their concerns, believing it should not have been published. This might be linked to tantric ideas that the secrecy of a method might also affect the potency of a substance and comes with a certain responsibility for the author who writes about it. In his analysis of secret medicines in the writings of Sangyé Gyatso, Tony Chui (2019, 16) remarks: "As with other tantric teachings, keeping potentially dangerous tantric substances from the uninitiated was the responsibility of the author." Moreover, tantric substances are known to unfold their potency more fully when handled secretly (2019, 15). Dawa Ridrak knows that this knowledge could potentially be abused, but thinks the benefits are larger:

> Some have the feeling that I opened up what was considered secret. Many doctors won't talk or tell anything about making *tsotel*. But, we should remember, the *Four Treatises* are also secret, it is also a "secret oral instruction" *[gsang ba man ngag]*, and is now published in many languages. Of course, there are many things to check if a person is fit to receive the teachings or not. Since the medical tantras have a connection to tantric rituals, they are considered secret. If someone without proper experience tries to detoxify mercury, it can be very harmful. [...] Many doctors and others liked this book. There was no special recognition from the Men-Tsee-Khang office. But what I wrote is not something new. I collected it from other

242 Interview, New York, July 21, 2011.

> sources. However, one mistake I made in this book is that I did not give my sources in detail. But since I published this, it has become available. For some interested doctors it is helpful, especially for the doctors who practice in the Himalayan belt.[243]

I asked Dawa Ridrak if anyone had tried to make *tsotel* following his book.

> Not that I know of, but it has planted some seed in them on how, for example, the gold is purified. In the past the gold was made thin with a hammer but now it can be done mechanically.

He excitedly opened the book and showed me the photograph of a little machine that makes gold plates as thin as bee wings (Dawa Ridrak 2003, 429), thus revealing his openness to empirical innovation in pragmatic ways.

A few months later, during the Sowa Rigpa workshop in Kathmandu, mentioned before, I saw for myself that his book had become popular among Himalayan amchi. Many of the amchi I spoke with during the workshop used Dawa Ridrak's book for their *menjor* training and practice. None of them, however, had ever made *tsotel* and did not think it was possible to make it based on the book without receiving the seeing transmission. As described above, Tibetan knowledge transmissions are complex, and reading a printed text is only one aspect of learning; it is never sufficient to gain an entire skill, but Tibetan medical history shows that it has been an essential aspect that ensured the continuity of *tsodru chenmo* across centuries.

During the workshop in Kathmandu, the twelve amchi attending from Tibet had all received the *tsotel* transmission from Khempo Troru Tsénam, the famous Tibetan physician and trained scholar from Katok Monastery in eastern Tibet, who was instrumental in spreading the *tsotel* lineage in the PRC after the Cultural Revolution (see Chapter 3). He published a detailed *tsotel* manual (Troru Tsénam 2001, 2012) and his students continue to publish on *tsodru chenmo*, including photographs of the processing steps (e.g. Nyima Tsering 2009; Sönam Bakdrö 2006). Due to the widespread training of *tsotel* manufacturing in the PRC, many pharmacies are able to make precious pills today. A study on the exact knowledge transmission of *tsodru chenmo* in the PRC is still lacking and would require intensive study and fieldwork, which was not part of this project.[244]

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243 Interview, New York, July 21, 2011.

244 See Sönam Bakdrö (2006, 57) and Lappendum Lozang Lodrö (2006, 241/2–245/7) for published details on the making of *tsotel* in Tibetan pharmacies in the PRC. Studying with senior physicians, such as Gyayé Lobsang Nyima at the Qinghai Provincial Tibetan Medical Hospital who has made *tsotel* more than thirty times in his lifetime, would provide opportunities to more deeply understand many aspects of *tsodru chenmo* (Tawni Tidwell, personal communication, October 4, 2019).

As for secrecy, anthropologists have acknowledged that it is part of the everyday negotiation of knowledge in many societies, serving a variety of social purposes (e.g. Piot 1993; Luhrmann 1989; Herdt 2003). The material presented here raises issues of secrecy surrounding the sharing of *tsotel* techniques in published form and through selective training. This secrecy debate hinges on questions of keeping or giving away the details of a *menjor* skill to (un)suitable students.[245] It also hinges on ideas of potency, just mentioned, and issues of safety, since dealing with mercury can be dangerous, and an incomplete knowledge transmission is additionally considered unsafe.

Gen Rinpoche Rakdo Lobsang Tenzin mentioned this in one of our conversation at CIHTS in Sarnath when I asked him whether they were visually documenting their manufacturing of *tsotel*. "So far we haven't," he said with some reluctance. "Someone could write it down and try to make it, but if the resulting *tsotel* did not have good quality—something can easily go wrong—it would not be safe." He then affirmed, "It is not just about secrecy; safety is most important. Some might try to practice, but they do not have the knowledge."[246] While he is keen to teach the *tsotel* technique to all his students, at the same time, he is extremely careful to ensure the safety of his students and the entire procedure.

Publishing manuals of how to make *tsotel* (with or without photos) might override some of these secrecy and safety concerns. As I have shown, in India this has been done with varying motivations. Tashi Tsering Josayma with his *Collection of Mercury Formulations* wanted to support the practice within the changing culture of knowledge transmission among Tibetans in exile and the lack of family lineage training opportunities. The gap, he argued, can be partly filled by printing the classical *tsotel* texts. For Dawa Ridrak, the motivation for publishing a *tsotel* account with photographs was to explain his tradition to Western scientists. He would like his medical knowledge to stand the test of modern chemistry and see Sowa Rigpa contribute to global health.

Today, the debate among Tibetan physicians and their institutions on publishing formulas and pharmacological techniques also hinges on the question of who "owns" the knowledge of *tsotel* pharmaceutical practices.[247] As mentioned earlier, *tsodru chenmo* has remained for the most part a uniquely Tibetan practice. *Tsotel* is largely manufactured along the lines of *chöyön* networks (except at large institutions), and is currently not manufactured by Sowa Rigpa practitioners in Ladakh, Nepal, Bhutan, Buryatia, and Mongolia. Here, ownership becomes not only a question of intellectual property, but also of Tibetan cultural identity. The case of ownership with

245 The *Four Treatises* has a dedicated chapter titled "Entrustment," discussing to whom medical knowledge should be transmitted and to whom it should not. See Gerke and Ploberger (2017b) and MTK (2015, 294–307).

246 Interview, Sarnath, December 24, 2012.

247 Saxer (2013, 74, 147–148) has written about the patenting of precious pills in the PRC; also summarized and discussed in Gerke (2019c, 344–345).

regard to *tsotel* practices is also an issue of gender. To date, with a few exceptions highlighted in Chapter 5, *tsotel* has been manufactured and its lineage transmitted only by male practitioners.

Secrecy and gender are deeply linked to ideas of taming, and the next chapter will explore the main reasons why taming mercury has been a widely gendered practice and how this has been affecting the *tsotel* knowledge transmission and cultural translations of toxicity and safety in contemporary Sowa Rigpa mercury practices.

Chapter 5

Blood and Semen: Women and Mercury

> *Our teachers told us that* ngülchu *resembles the man's semen, [she laughs] and* muzi *[*mu zi*, sulfur] which purifies the* ngülchu *is the women's menstrual blood. So during the purification they use a lot of* muzi *to purify* ngülchu*. If there are women around, it is not effective, it kills the effect of* ngülchu*. Women are menstruating and the menstrual blood is a manifestation of* muzi*. That is why women would hamper the purification of* ngülchu*, and the mercury would overboil (Dr. Dawa Dolma [interview, August 25, 2010]).*

Dr. Dawa Dolma told me about the women's role in mercury processing early on, in an informal conversation we had at her home in McLeod Ganj. She spoke matter-of-factly and accepted what her teachers had taught. She was trained in one of the first batches at the Men-Tsee-Khang in Dharamsala and was the head of their Research and Development Department when Sarah Sallon undertook the first clinical study of mercury in 2002. Dr. Dolma is one of the co-authors of the study (Sallon et al. 2006, discussed in Chapter 7) and was intimately involved with investigating mercury's safety, but never touched mercury or witnessed the making of *tsotel*.

This chapter explores how the evidence of the safety of using processed mercury in Sowa Rigpa medicines and ideas of taming mercury are impacted by gender issues. In Tibetan medical works, authors have deified the female *(tsodru chenmo* is said to originate from the secret knowledge of the *ḍākinīs)*, while at the same time fearing the female will reduce the potency of male vitality embodied in mercury. This has in many cases limited the education of female physicians in *menjor* practices, with the notable exception of the Sowa Rigpa training at the Central Institute of Higher Tibetan Studies (CIHTS) in Sarnath and a few privileged Tibetan female physicians trained outside of institutions.

I analyze how and why the taming of mercury also translates into the taming of women by barring them from touching and processing this silvery liquid. This is based on ideas of the female presence reducing mercury's potency and undermining the safety of a *tsotel* event, thus affecting the final products of *tsotel* and precious pills. But how are the restrictions against women in relation to processing mercury justified, debated, and enforced today? I begin with textual explorations related to the restriction of women processing mercury and summarize the mythological narrative

Published in: Gerke, Barbara, 2021. *Taming the Poisonous. Mercury, Toxicity, and Safety in Tibetan Medical Practice.* Heidelberg Studies on Transculturality 7. Heidelberg: Heidelberg University Publishing. DOI: https://doi.org/10.17885/heiup.746

of the Indian alchemist Bhalipa, who was able to complete the mercury refinement only after a woman provided the missing ingredient—menstrual blood, which is homologous to sulfur.

The missing ingredient

> *For a long time the Indian spiritual master Bhalipa could not accomplish his mercury [refinement] because he lacked one ingredient. Disheartened, the master went elsewhere. There, in his mercury processing house a menstruating woman began bathing. Her substance [menstrual blood] mixed with the mercury, and it began boiling. [Later] Bhalipa returned* [...]*. After he recognized that the mercury refinement had been accomplished, Bhalipa remained. He [then] realized that if he stayed there, he would raise the doubts and suspicion of many, so* [...] *he departed to the south of Mount Meru and resided where no one knew him (From Lamenpa Tenzin Chödrak's biography).*[248]

Here, Lamenpa Tenzin Chödrak addresses a significant link between gender and mercury: the missing ingredient is provided by a menstruating woman. In the story, this fact would have been so unacceptable to the local population that it necessitated the sage's departure to another place where no one knew him. These elements of secrecy and of the gender issues surrounding mercury practices reappear repeatedly in Tibetan medical texts. Women's capacity to cause mercury to (over)boil draws a strong gender distinction into this practice. In most Sowa Rigpa settings women are not allowed to make *tsotel*. This chapter explores why this has been the case and the extent to which it is changing.

In Tibet, processing mercury and making *tsotel* became a specialized, exclusively male skill. It remained one of the areas of Sowa Rigpa that to this day is rarely accessible to women.[249] I often wondered where this attitude came from since in Ayurvedic settings—such as those I investigated in Dehradun and Varanasi—women were allowed to touch and process mercury, while the Men-Tsee-Khang in Dharamsala has excluded women from mercury practices. The contemporary physicians I interviewed argued in

248 Translated from Sonam Rinchen (2000, 130 / 8–16): *'phags yul gyi slob dpon bha li pas dngul chu sgrub pa'i rdzas gcig ma tshang nas yun du ma 'grub pas slob dpon yid chad nas gzhan zhig tu byon tshe/ dngul chu sgrub khang du bud med zla mtshan can gyis khrus byas nas dngul chur rdzas dang 'phrad de grub nas khol bar gyur ba der bha li pa'ng phebs nas* [...] *dngul chu grub par rtogs te de nas bha li pas der bzhugs na re ba'i mi mang gi thugs bsun dwogs nas* [...] *ri rab kyi lho ngo cha zhig tu gshegs te gzhan gang gis kyang mi shes par bzhugs pas/.*

249 See Hofer (2018, 74–75) for exceptions, where women processed mercury with their lamas in Tibet. Other areas where women were disadvantaged in practice might involve bloodletting (Fjeld and Hofer 2010–2011, 185), but likely with regional differences. For example, in Amdo, women are allowed to practice bloodletting (Tawni Tidwell, personal e-mail communication, November 17, 2019).

various ways for and against women touching mercury or being present when mercury is processed. In the course of this chapter, I present some of their views, explore how Tibetan female physicians have reacted to these restrictions, and present the stories of Tibetan female physicians who processed mercury. I also analyze those Tibetan medical texts that seem to influence contemporary views on mercury and gender along with widespread ideas of perceived female impurity and pollution, or *drip (grib)*.

The role of the female in mercury processing in South Asia has been ambivalent to say the least. Indian tantric literature often states that a woman is one of the necessary requirements for the (male) alchemist to complete the transformation of mercury. We also find the female in the enticing role of causing the mercury to boil over (symbolizing the spilling of semen). This kind of ambivalence towards the feminine is quite characteristic of early Buddhist texts in India, which Alan Sponberg (1992) analyzed, largely from the fifth century BCE to the fourth century CE, with some references to the development of Indo-Tibetan Vajrayāna Buddhism. Far from it being "a simple inconsistent ambivalence," he describes this ambivalence as a "rich multivocality" (1992, 4). I found that some of this multivocality towards the female is found in contemporary Tibetan mercury practices and influences the role of female physicians in them.

Janet Gyatso and Hanna Havnevik critically point out that in the study of women in Tibet it is important to avoid falling into gender essentialism and stereotypical assumptions about women in Tibet. They also caution against "exploring the truth of gender stereotypes *ahistorically*," as found, for example, in European and North American Buddhist *ḍākinī* literature (2005, 5–6, emphasis in original). In my analysis of the various voices I documented on women and mercury processing, I want to avoid binary generalizations on the role of the *ḍākinī* in Tibetan Buddhism,[250] and build on Sponberg in an attempt to "separate the voices [and] recognise the specific institutional or intellectual context out of which each voice arose" (1992, 5).

Sponberg points to several factors that allowed for a soteriological gender inclusiveness in Buddhism to appear side by side with social attitudes of androcentrism and misogyny. He highlights that although the Buddha suggested equality for men and women on the path to liberation, this did not necessarily translate into social equality in day-to-day life (1992, 12). Buddhist institutionalization and male-dominated monasticism led to a fear that the feminine would undermine male celibacy. Thus, the institutional androcentrism as well as ascetic misogyny with concerns for pollution and purification was propagated at the same time that Buddhism continued to teach soteriological gender inclusiveness. Sponberg argues that these expressions of discordant attitudes towards the female should

250 Such generalizations have either stressed Jungian perspectives of the *ḍākinī* as "the shadow," or as an idealized focus point of male Tibetan Buddhist practitioners. For a discussion of the evolution of the *ḍākinī*, see Simmer-Brown (2002, 43–80), who argues that there is no single definition of a *ḍākinī*. See also English (2002) on Vajrayoginī.

be seen "as an indication of conflicting interests within the early [Buddhist] community" (1992, 23), and often had pragmatic reasons.

During later centuries, Tibetan Vajrayāna Buddhist texts depicted a more mature form of soteriological androgyny, in which the male and female were more egalitarian (1992, 26–27). In tantric Vajrayāna practices, the female aspect in its empowered form takes the prominent role of the *ḍākinī*, but—according to Sponberg—primarily functions for the benefit of the majority of practitioners, which were male.[251] He argues that the Vajrayāna movement has not necessarily addressed the needs of female practitioners. Sponberg's multivocality of Buddhist attitudes towards women "enables us to see the tradition more accurately for what it is: one stream of many interacting currents in the cumulative history of human religious experience, one that, like all other human institutions, encompasses both noble aspirations and all too human failings" (1992, 28).

Tibetan medical texts expose various approaches to women's roles in the processing of mercury, which seem to resonate with early Indian Buddhism as well as Indian alchemy. The ambivalent status of mercury processing by women in Tibetan history could in part indicate certain conflicts within particular Tibetan medical communities—especially those which were predominantly male and monastic—in their incorporation of mercury practices from Indian alchemical traditions into a monastic setting. We still know too little about the non-monastic family traditions of medical houses of the thirteenth to nineteenth centuries,[252] when the *tsotel* practices were passed down, to come to a generalized conclusion here.

In Chapter 4, we came to know Orgyenpa as a wandering yogi who left behind monastic discipline and also learned from women practitioners and received divine transmissions on mercury from the female deity Vajrayoginī during his wanderings. I highlighted the importance of this divine *ḍākinī* origin narrative for the perceived perfection of the *tsotel* lineage and practice. However, most extant and authoritative Tibetan medical works on *tsodru chenmo* were written by male physicians with strong monastic links, such as the eastern Tibetan physicians Degé Drungyig Gurupel, Kongtrul Yönten Gyatso, and Lamenpa Orgyen Tendzin Gyatso, introduced in Chapter 3 and 4. Contemporary Tibetan *tsotel* manuals are largely based on their works. As we shall see, egalitarian Buddhist approaches towards "male" and "female" substances used to transform mercury do not necessarily translate to women having equal status in Tibetan pharmacies or Sowa Rigpa practice in general.

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251 See also Gyatso (2003, 89, note 1) on scholarship that presents critical discussions of Buddhist misogyny.

252 See McGrath's recent thesis on early Tibetan medical lineages and schools and their standardization in the fourteenth century (2017b) and Hofer (2018) on rural medical houses in Tsang.

Embodied metals in Indian alchemy

Let us begin by unpacking the relationship between metals and the body in Indian alchemy. How were metals thought to be embodied in physical substances—specifically blood and semen? Medieval alchemists of India held a worldview in which sexual fluids were seen as homologous to metals, following a classic aphorism "as in metals so in the body" (White 1996, 5). David Gordon White succinctly summarizes the "corresponding hierarchies"[253] of sexual fluids with metals:

> In a universe that was the ongoing procreation of the phallic god Śiva and his consort the Goddess, a pair whose procreative activity was mirrored in the fluid transactions and transformations of human sexuality, in a universe whose every facet reflected the fundamental complementarity of the male and female principles, the mineral world too had its sexual valences and fluids. In the case of the Goddess, her sexual emission, her seed, took the form of mica,[254] while her uterine or menstrual blood was identified with sulfur. There are a number of reasons for these identifications, not the least of which are chemical: mica and sulfur are important reagents in the purification and activation of the mineral homologue to divine semen. This is mercury, and if there ever was an elective affinity to be found at the interface between chemistry and theology, this is it (White 1996, 5).

White describes how mercury's power to absorb other metals is enhanced through its treatment with "female substances," such as sulfur and mica. The divine sexual enhancement was replicated in the medieval Indian laboratory, where the alchemist relied on female assistants to process metals and practiced Haṭha yoga and sexual tantra (White 1996, 6). Some of these practices and various versions of the related myths found their way to Tibet and were adopted, developed, and applied to medical settings that were also strongly influenced by Buddhism and male monasticism. How did this impact the ways in which taming mercury influenced the role of women in mercury practices on the high plateau?

While it is impossible to trace the history of this development and pin it to a particular tradition, there are numerous Tibetan textual sources from different regions that have something to say about the role of women in mercury processing. Some of these are examined in the course of this chapter and, as we shall see, they determine how Tibetan medical practitioners and their institutions position female physicians during *tsotel* production

253 See White (1996, 191–202) on the corresponding hierarchies between blood and semen.

254 The Ayurvedic practitioner Vaidya Balendu Prakash translated mica to me as "the orgasm of the goddess, which comes rarely and thus mica is used sparingly." Personal communication, Dehradun, September 2013.

today. While it is difficult to understand the stark contrast to the Ayurvedic operations I visited in Dehradun and Varanasi where women were allowed to process mercury, and while I cannot present a definite answer here, I point out certain trajectories that in my view influenced gender orientation in mercury processing in Tibetan settings in India.

Ayurvedic scholars and physicians I discussed the gender issue with referred me to classical Sanskrit medical texts that describe beautiful women as essential prerequisites to processing mercury. These thirteenth- to fourteenth-century Sanskrit texts form part of the canonical works of Indian alchemy (White 1996, 244), but were not translated into Tibetan. Two of them, the *Rasārṇava* and the *Rasaratnasamuccaya*, describe the perfect female assistant to the alchemist as "young, beautiful, raven-haired, doe-eyed, perfectly proportioned, fair of speech and light of laughter, gentle when she kisses and embraces, a lover of dairy products, and a devotee of Śiva" (1996, 197). Note that female participation here does not necessitate gender equality. This is the description of the perfect female assistant according to the *Rasaratnasamuccaya*:

> A lady having curly hairs, who is blackish in colour, who has lotus like eyes, who is beautiful and young, who has easily distinguishable & broad buttocks, who herself is a good omen who is eager for sex from heart, who is politely bend [sic] forward due to heavy & big breasts, who is soft to touch during kissing and embracing, who is softspoken, whose external genitalia is like a leaf of ficus religiosa (Holy fig), & whose menstrual period is in the Kṛṣṇa Pakśa i.e. in the lat[t]er half of a lunar month, is known as Kālini. She is helpful in various experiments of solidifying Mercury as well as rejuvenations. In her absence, any young & beautiful lady who has been fed sulphur with Ghee 10 Gms each in the morning for three weeks becomes as effective as Kālini (*Rasaratnasamuccaya,* chapter 6/33–37 in Dole 2008, 251).[255]

Other passages from Sanskrit alchemical texts describe how the menstrual blood of a woman who has eaten sulfur for twenty-one days was considered "efficacious in the fixation and calcination of mercury" (White 1996, 197). Since sulfur was understood to be the goddess's menstruation fluid, and both of these substances (sulfur and menstrual blood) were considered equal in potency, from this rationale it followed that mercury could also be processed inside a woman's vagina during her menstruation.[256] It is not mentioned how this affected the woman. Alternatively, sulfur's potency could be enhanced by macerating it with menstrual blood (1996, 197).

255 Thanks to Dr. Anand Chaudhary and Dagmar Wujastyk for this quote.
256 Dagmar Wujastyk, personal communication, June 2013. White (1996, 197) also mentions several sources for this practice.

As mentioned earlier, these methods of involving women directly in mercury processing were not translated from Sanskrit into Tibetan. Concepts about the female were introduced to Tibetan medical thought along with the quite ambiguous ideas about gender in Buddhism, straddling the divide between the divine and the polluted. In the context of mercury being both potent and poisonous, this translates into a difficult position for the female: in the image of the *ḍākinī*, she is the divine origin of the *tsodru chenmo* teaching; as sulfur, she is a necessary substance to tame mercury's poisonousness; but as the arousing element, she risks diverting mercury's potency away from the successful trituration with sulfur. This has led to strict rules mentioned in texts that exclude women from processing mercury. However, some Tibetan women defied these gender rules and processed mercury. Some of their stories are explored in the following section.

Tibetan women processing mercury

The following accounts are based on oral histories of three Tibetan women born in the twentieth century who processed mercury to varying extents, alone or with their male monastic teachers. All three of them became well-known physicians. They were all from privileged family backgrounds, which must have played a role in enabling them to access teachings on *tsotel* and defy the widespread rules against women touching or processing mercury.

DO DASEL WANGMO (B. 1928)

When Gen Rinpoche Rakdo Lobsang Tenzin (now the dean of the Sowa Rigpa Department at CIHTS in Sarnath) received the full transmission of *tsodru chenmo* in Lhasa in the early 1980s, probably in 1983/1984, from Khempo Troru Tsénam (see Chapter 3), a woman from eastern Tibet was present, except during the *dratré* step of the processing (when preprocessed mercury is triturated with preprocessed sulfur). Rakdo Rinpoche's own liberal attitude towards women and *tsotel*, which we will hear about later in this chapter, might also stem from his personal experience of having been taught during a *tsotel* event in which a woman was present.

Her name is Jetsunma Do Dasel Wangmo (b. 1928) (Fig. 30).[257] She came with Lama Khempo Öser from Degé to study astrology and receive the *tsodru chenmo* transmission from Khempo Troru Tsénam in Lhasa. Do Dasel Wangmo is the great-granddaughter of Do Khyentse Yeshe Dorje (1800–1866), a famous master of the Nyingma School of Tibetan Buddhism. She was the only surviving child in her family. Her recently translated biography (Schneider 2013) analyzes her Do family lineage; Michalson (2012)

257 Thanks to Theresia Hofer for providing her unpublished notes on Do Dasel Wangmo and a photograph from their last meeting in 2014.

Figure 30: Do Dasel Wangmo, in Chengdu, in 2014, aged eighty-six.
Photo: Theresia Hofer (Theresia Hofer 2014 / CC-BY-SA 4.0).

studied Do Khyentse's lineage of teachings, while Hofer describes her medical career (2015).

Briefly, during the 1930s and 1940s, Dasel Wangmo studied medicine with her mother, the Tibetan physician Do Tsédzin Wangmo (1914–1953) who was trained by a student of Ju Mipam. She suffered considerable violence during the reforms, but after 1969 was allowed to work as a village doctor. Eventually, she became a professor of Tibetan medicine at the Sichuan Tibetan Language School. She is still alive and works as a physician and Buddhist master in Dartsedo in Kham. It was probably her privileged family position that allowed her to travel with her lama to Lhasa and learn how to make *tsotel*. Unfortunately, we do not know whether she prepared *tsotel* after she was trained, or ever made precious pills.

ANI NGAWANG FROM NYÉMO (C. 1930–2006)

Before the Chinese invasion, some women in Ngamring (now TAR) were trained as amchi and practiced medicine. Hofer mentions a nun called Ani Ngawang in Nyémo County (Fig. 31), who was a long-term disciple and student of the eastern Tibetan physician and lama known as Kyémé Rinpoche.

Ani Ngawang rebuilt the Chiu Tekcholing nunnery in Nyémo, where she taught and prepared a *tsotel*-containing eye medication. According to Dawa Norbu, whom Hofer interviewed in Lhasa in 2007, Ani Ngawang trained other nuns and monks in the mercury processing techniques. He referred to the result of these processes as *tsotel* and said it is still produced by her students (Fjeld and Hofer 2010–2011, 186; Hofer 2018, 170).

Figure 31: Ani Ngawang, late in her life at her nunnery in Nyémo. Photo: Ani Payang, presented to Theresia Hofer (Theresia Hofer 2014 / CC-BY-SA 4.0).

The biography of Lamenpa Tenzin Chödrak mentions a nun also called Ani Ngawang, who made *tsotel* with her own lama, Nyimé Dorjé, a teacher from eastern Tibet (Sonam Rinchen 2000, 103 / 3–6), who might be identical with Kyémé Rinpoche.[258] In the 1970s, Ani Ngawang apparently pointed Yeshe Dorjé—who was searching for surviving *tsotel* specialists—to the imprisoned Lamenpa Tenzin Chödrak. This might be the same Ani Ngawang from Nyémo mentioned by Hofer.[259] She might have had information on the whereabouts of Tenzin Chödrak and his medical expertise because she was from Nyémo near Lhasa, Chödrak's birthplace. It is likely that the same Ani Ngawang mentioned by Fjeld and Hofer made *tsotel* in collaboration with her lama, Kyémé Rinpoche. Hofer further reports that students of Ani Ngawang and Kyémé Rinpoche continued making *tsotel* at the Chiu Tekcholing nunnery in Nyémo (Hofer 2018, 75). There is no information whether these women were permitted to attend the *dratré* or whether this activity was performed solely by the lama or his male students.

Based on personal communication with Tupten Püntsok in Beijing in 2007, Fjeld and Hofer (2010–2011, 186) also report that nuns at the Drakkar Rikhö nunnery in Kardzé in Kham prepared *tsotel* and the precious pill Rinchen Tsodru Dashel, locally known as Géma Tsodru Dashel—"The Virtuous Nun's Tsodru Dashel." Tsodru Dashel generally contains *tsotel*. However, the distinct name might point to a variant of the formula.

258 Theresia Hofer, personal communication, July 2014.
259 Theresia Hofer, personal communication, July 2014.

I could not establish the accuracy of these reports and whether they actually refer to Orgyenpa's complex *tsodru chenmo* technique or to one of the shorter processing techniques, described in Chapter 6.

AMA LOBSANG DOLMA KHANGKAR (1935–1989)

> *To make [the precious pill] Ratna Sampel there are so many things we have to observe, we cannot expose it to the sky, cannot show it to cats or dogs. Then I also asked her: "How can you do this as a woman?" She said: "Are women not like men? Life is the same. Do women have no right to life? I have to do this, if I want to treat my patients" (Norbu Chöpel on Ama Lobsang Dolma Khangkar, McLeod Ganj, 2012).*

I was quite surprised when Norbu Chöpel, Ama Lobsang's second husband and the personal attendant to Kyapjé Trijang Rinpoche (1901–1981), told me the story of Ama Lobsang (Fig. 32) processing mercury in her private clinic in McLeod Ganj in the 1980s, reconstructed here based on our interview.

Ama Lobsang was born in Tibet in 1935 as the only child of the Khangkar family of Kyirong in southwestern Tibet, and her father educated her well (in the absence of a male successor).[260] She received teachings on Tibetan language, astrology, Buddhism, and medicine from several renowned physicians and lamas, and worked as a full-fledged physician in the Kyirong region. In 1961, she came to India as a refugee working on road construction. In 1962, her request for admission at the Men-Tsee-Khang was refused on the grounds that female students could not be admitted (Tashi Tsering 2005, 179).[261] In 1970, she opened her own clinic in Dalhousie, and in 1972, she was finally invited by the Men-Tsee-Khang to join as its principal physician with her husband Dozur Tsering Wangyal, who worked at the pharmacy and passed away in 1975. She went abroad several times. Spending long periods abroad led to her suspension from the Men-Tsee-Khang in 1978 (2005, 183). She then opened her private clinic in McLeod Ganj, where she worked and made her own medicines from 1979 until her passing in 1989. Norbu Chöpel ran the pharmaceutical unit. Dekyi Khangkar Memorial Clinic (see Fig. 33) is now directed by one of Ama Lobsang's two daughters, who are both Men-Tsee-Khang-trained Tibetan physicians.

In December 2012, I spoke at length with Norbu Chöpel at his residence in McLeod Ganj. He gave me a warm welcome into his living room, which had a sofa and comfortable seats and was lined with a large altar housing Buddhist statues, offering bowls, flowers, and butter lamps. A monk served us tea and remained in the room during our conversation, regularly refilling our teacups.

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260 This summary of her biography is based on Tashi Tsering's account of her life (2005, 177–188).

261 This admission policy changed in 1969.

Figure 32: Ama Lobsang Dolma Khangkar at her clinic in McLeod Ganj in the 1970s. Photo: Khangkar clinic (Khangkar clinic, 1970s / CC-BY-SA 4.0).

Figure 33: The "White Mansion of Joy" Dekyi Khangkar Memorial Clinic, McLeod Ganj, 2017. Photo: Thomas K. Shor (Shor 2017 / CC-BY-SA 4.0).

I asked him whether he mentions Ama Lobsang's processing of mercury in his book on her (Norbu Chöpel 2008). He explained, "Since I did not take notes on it, I could not write about it. It was in the mid-1980s that she purified mercury once. I do not remember much. She used to do everything herself and did not leave us detailed instructions because she did this only once." Since he assisted her in the pharmacy at the time, he remembered parts of the process:

> The process took about a month. She first added mercury to *gapipo-sum* [*lga pi pho gsum,* ginger, long pepper, and black pepper] into an airtight glass container. In Tibet they used skin bags, but those were not available. We had to shake these containers for many hours. The substances changed in color; they turned black.

Another step in the processing was burning this pre-processed mercury with sulfur in a frying pan. Norbu Chöpel remembered:

> She said it was toxic and dangerous. She had covered her mouth and hands as she was stirring it inside the pan and sent us far away. I perceived the sulfuric smell from afar and my eyes started tearing. The wood fire burned for about an hour to generate the right amount of heat. In an iron pan she first boiled oil, then added the [preprocessed] mercury, and afterwards sulfur.

"Did she use the compound in precious pills?" I asked. He remembered, "When the fire burned down, she took it out; it was a black ash that she used in her precious pills. She made Mangjor Chenmo and Old Turquoise 25 [Yunying 25] many times, and Ratna Sampel only once." Acknowledging the amount of time it took to prepare the ash and the danger of toxicity involved, he said, "She did this only once. After that, she bought *tsotel* from Tibet whenever she got the chance. Once, people came from Phagri, offering her what they said was old *tsotel.*[262] It had a sulfuric smell; we bought it."

Trying to locate the year when Ama Lobsang processed mercury, he said, "It was a year or two after Yeshi Dhonden had made *tsotel*," which was in 1985. "How much did she prepare?" I asked. "Not more than a kilo, maybe around 300 grams," he recalled.

Since Norbu Chöpel could not remember her processing the eight metals and eight elements, an important part of the process of refining *tsotel*, we cannot be sure if what Ama Lobsang made was really *tsotel*.[263] His description of the burning process has elements of the burning method of making *kardül*, which is the first part of the operation to make *tsotel* (see

262 Lamenpa Tenzin Chödrak made *tsotel* in Phagri with Penden Gyeltsen in 1953 (see Chapter 3). Penden Gyeltsen might have made more *tsotel* after 1953 or taught it more widely before he fled to Sikkim.

263 Unfortunately, I could not ask Ama Lobsang's daughters about this.

Chapter 6). Perhaps Norbu Chöpel only saw some aspects of a much longer process. Nevertheless, it is remarkable that Ama Lobsang processed mercury on her own for use in her medicines.

When we spoke about her spiritual life I asked, "Did she consecrate her medicines?" He replied:

> She was not an ordinary woman; she also did many kinds of meditation. Once a week she did the Medicine Buddha *pūjā*, and at least once a month she invited eight monks to the house to do *pūjā*. We kept the medicines and precious pills on the altar. But I don't know if she did any special rituals for the mercury preparations. The bag of *tsotel* was kept on her altar.

Ama Lobsang clearly included her Buddhist practices into her daily life as a physician. I tried to find out more from Ama Lobsang's daughter, Pasang Gyelmo Khangkar (born 1956), who continues the Dekyi Khangkar Memorial Clinic in McLeod Ganj. The clinic's appearance is simple; the outdoor shutters open up straight into the waiting room, furnished with basic wooden benches. A few Indian patients were standing at the dispensary counter collecting their medicines. The shelves were filled with glass jars of precious pills wrapped in colored cotton silk, pills with different hues of red, brown, and black, and powders wrapped in paper. Noticeably, the reddish coating looked like *chokla* (roasted cinnabar). Since the Men-Tsee-Khang stopped coating their pills with *chokla* at the end of 2010, the crimson red polish is not seen often, even though some pharmacies have developed alternative red-colored herbal coatings.

Soon it was my turn to enter her little chamber, which was separated from the waiting room by a curtain. Behind her desk, I could see into the inner courtyard of the house. As is typical for doctor's consultation rooms in India, there was no privacy. The patients in the waiting room, people in her courtyard, and the woman giving out pills in the dispensary most likely could overhear our conversation. I briefly told her about my project. Unfortunately, she was not inclined to talk about the history of her family tradition of mercury processing. She brushed me off by saying in English, "You Westerners think mercury is poisonous, but we know how to purify it." This was one of those ethnographic occasions where my positioning on mercury toxicity as a foreign anthropologist was cemented before I could even ask a question.

"Do you use *chokla*?" I asked. "We make everything," she replied, pointing to the inner courtyard that apparently housed her pharmacy and living space. No further details followed. Later, I talked several times to her husband who kindly provided the photograph of Ama Lobsang. During later visits, I inquired about precious pills at the dispensary. They were sold over the counter as long as stocks lasted, at a limit of 500 pills per type per day (Gerke 2017a). My questions of who made the *tsotel* and which of the precious pills actually contained it were answered varyingly during several

visits over the years. One time I was told only one out of their six precious pills contained *tsotel*. During another visit, I was told to go to the Men-Tsee-Khang if I wanted precious pills with *tsotel*. If this clinic used *tsotel* at all, I assumed that they might have bought it from elsewhere, since this was an earlier policy.

The few women physicians introduced above who actively processed mercury (at least to some extent) were largely from privileged backgrounds and had long-term teacher-student relationships. Though we know little about the background of Ani Ngawang, she studied with Kyémé Rinpoche for many years and was his closest student (Hofer 2018, 74). We know too little about their *menjor* training, but it seems that they received certain knowledge transmissions on mercury processing individually from their Buddhist and / or medical teachers outside institutionalized settings. It was clearly not easy for these women to overcome the restrictions surrounding this practice and tame mercury.

Where these restrictions come from and how they still impact ideas of potency and taming of mercury today is explored in the next section, which asks: how can we make sense of these prohibitions historically and textually? In addition, what do they tell us about the gendered construction of the potency of a poison?

Body and gender in early Buddhist and Tibetan medical literature

The presentation of the female body in Tibetan Buddhist and medical literature reveals some striking features reflecting the ambiguity that characterizes the issue of women handling mercury in Sowa Rigpa. While early Buddhism in India presented a liberating change for women's lives from the ritual narrowness of Vedic religion, some early Indian Buddhist texts that were specifically written for the edification of Buddhist monks presented the female body negatively, often using derogatory language (e.g. Wilson 1996). It is important to note that early Buddhist *suttas* were contemplating the body in general, not distinguishing male and female bodies. Also, early Buddhist art was frequently commissioned and paid for by secular donors and depicted women more positively (Young 2004). In Tibetan tantric Buddhism, we find a contrasting mix of representations of the female and the role of women.[264] While these examples defy gender generalizations, what transpires from most works is a discrepancy between the role and representations of women in tantric and other Buddhist texts and their status in everyday life.

Early Buddhist meditation manuals were written for male monastics for the purpose of directing them to celibacy. To that effect they commonly

264 For discussions on gender and Tibetan Buddhism in the form of the *ḍākinī*, see Simmer-Brown (2002).

described the female body as distasteful. Having a female body was considered the result of one's negative karma. The description of the vagina by the Buddhist monk Vasubandhu (fl. fourth to fifth century CE) from his *Commentary on the Treasury of the Abhidharma (Abhidharmakośabhāṣya)*, which is part of the foundational Abhidharma literature of Buddhist philosophy in Tibet and elsewhere, serves as an example. His description is quite different from Indian alchemical perceptions of the vagina as a suitable place to refine mercury. Vasubandhu describes the vagina as:

> [A]n excrement-hole, a cruelly foul-smelling, dark pool of ordure, the home of many thousands of families of worms, permanently oozing, constantly in need of cleansing, hot, slimy, and drenched in semen, blood, mucus, and impurities, terrifying to behold, covered by a thin, perforated skin, the great ulcer-like wound in the body, produced from the result of previous karma.[265]

According to Robert Kritzer, Indian medical texts did not follow this trope but described female organs as unpleasant only when diseased, not using derogatory language (Garrett 2008, 77; Kritzer 2009). This is not necessarily the case in Tibetan medical texts. The status of the female in Sowa Rigpa literature has been researched to some extent[266] and reveals a mix of androcentric attitudes, including derogatory medical language concerning women's bodies and their "excessive sexual desire" (Bright 2010–2011), but also emphasizes pragmatic attitudes towards women in daily life situations (Gyatso 2010–2011, 2015). Medical approaches towards women were, however, often influenced by Buddhist doctrine. For example, Frances Garrett (2008, 84) noted in her analysis of gestation in Buddhist and medical literature in Tibet that narratives of embryology were more concerned with encapsulating Buddhist doctrine and the embryo for applications by a practitioner of meditation than about the pregnant woman herself. In fact, embryology became a form of religious theorizing for fifteenth century Tibetan medical authors. Not surprisingly, the "normal body" in these medical texts was male by default.

However, visual depictions of the female body in Tibetan medical art can be quite different. In a set of seventeenth-century medical thankas from Lhasa the male body is predominantly used in anatomical charts, but the gender marking in other vignettes on pulse diagnosis or daily life scenes is more casual and less standardized (Gyatso 2010–2011, 2015). With such differences in gender representation, Gyatso cautions, and I agree: "In the still unchartered waters of gender conception in Tibetan history, it is important to study each example on its own terms as much as possible and certainly without assuming a single, bounded and governing cultural system" (Gyatso

265 Translation by Kritzer (2004) quoted in Garrett (2008, 76).
266 See the edited volume by Fjeld and Hofer (2010–2011), as well as Garrett (2008) and Gyatso (2009, 2015).

2010–2011, 290). Her overall conclusion shows that how we judge the status of women and gender in Tibetan medical literature is an issue of perspective:

> So if we find in the medical treatment of women and gender a set of disparately tending stances that may only be from the perspective of looking for gender justice. From the perspective of clients' needs to have boy children, rule the family, and stay alive and thrive, this medical picture of sexual and gendered states can make eminent sense (Gyatso 2015, 342).

Gyatso's point on perspective links up with Sponberg's concept of multivocality in that both of them ask for nuanced approaches towards gender. When looking at the role of women in mercury processing I keep these two concerns—multivocality and perspective—at the center, asking why and how certain views make sense. In my examples in the Tibetan case, we find a fusion of Buddhist, medical, and tantric views of women in complex multivocal forms. In analyzing approaches towards women in mercury-related textual descriptions, I ask how these have been translated and made sense of by earlier and contemporary Tibetan physicians. While exploring some of these perspectives we should not, however, assume an overarching cultural approach towards the status of women in Sowa Rigpa.

Protected places of mercury processing

My research on why women are not allowed to touch or process mercury in Sowa Rigpa led to textual sources on "place" that also appear in early Sanskrit literature on preparing clean and protected places, largely for rejuvenation therapies and the preparation of elixirs. Some examples from these key textual sources are analyzed in this section. I demonstrate how the gender focus seems to be primarily a practical one, linking women to menstruation and related notions of contamination and thus wanting to keep them away from places of medicine manufacturing. However, as the final part of this chapter will explore, such rules have also opened ways to further erode already established androcentric perspectives on potency linked to male virility (semen) embodied in mercury, and re-establish those on now largely institutionalized levels of knowledge transmission.

I begin this inquiry with an exploration of women in the medical sections on *chülen* and rejuvenation practices in the *Four Treatises* and the corresponding Indian *rasāyana* practices as explained in the Ayurvedic compendium *Aṣṭāṅgahṛdayasaṃhitā* and its commentary, the *Padārthacandrikā,*[267]

267 This commentary, composed by Candranandana (fl. eighth century CE), was translated into Tibetan by Rinchen Zangpo (958–1055) as *Moonbeam of Word Meaning (Tshig gi don gyi zla zer)*, also known as *Moonbeam*, or *Dazer (Zla zer)*. See Yang ga (2010, 79).

both of which were translated from Sanskrit into Tibetan and included in the Tibetan Buddhist Canon. The aspects that link gender to rejuvenating practices are practical descriptions of place. Tracing these descriptions of place from early seventh-century Sanskrit to Tibetan classical and contemporary texts might help us to understand how gender emerges as an issue in the *tsodru chenmo* practice today.

The chapter on elixirs in the *Aṣṭāṅgahṛdayasaṃhitā* mentions that the place where one performs *rasāyana* practices should be free from "smoke, heat, dust, wild animals, women, and stupid people" (Hilgenberg and Kirfel 1941, 711, translated from the German).[268] In the Tibetan translation of the *Aṣṭāṅgahṛdayasaṃhitā* this passage reads: The hut should be "[free from] smoke, hot sun, snakes, and sweat, [and] unreachable for women and female fools."[269]

Notably, neither this phrase nor any reference to women is found in the corresponding chapters of the *Four Treatises*, which otherwise incorporated several sections verbatim from the *Aṣṭāṅgahṛdayasaṃhitā* (see Gerke 2012 [2013]; Yang Ga 2010, 238, 240). In the seventeenth century, however, Sangyé Gyatso, in his commentary on the *Four Treatises*, the *Blue Beryl*, quotes from the *Padārthacandrikā* in the context of rejuvenating *chülen* retreats: "[Avoid] smoke day and night in the ascetic practice [place, and] do not let women and fools pass through."[270] Even though these sections talk about the place where *chülen* fasting and rejuvenation practices are being held and not specifically where mercury is processed, we can detect parallels in the approach to place as a protected area, which is similar in Tibetan descriptions of both *chülen* and mercury practices and frequently described in *tsotel* manuals from the eighteenth to nineteenth century as an important prerequisite. These instructions are still followed by Tibetan physicians today. In the following, I briefly look at the role of women in three such *tsotel* manuals.

Gurupel, the nephew of the eighteenth-century polymath Situ Paṇchen in eastern Tibet, introduced in Chapter 4, wrote a manual on mercury preparations (Degé Drungyig Gurupel 1985, 1986), which was apparently also used when making *tsotel* in Powo Tramo in 1977. He retells the story of the Indian sage Bhalipa, similar to Tenzin Chödrak's quote at the beginning of this chapter. Gurupel mentions the menstruating woman taking a bath near the mercury-processing site, which resulted in mercury's successful transformation (1985, 8/4–9/2). Gurupel acknowledges the requirement of the female (i.e. menstrual blood or sulfur) for the success of mercury preparations. In the preliminary section, he describes the location simply

268 Murthy (1997, 382) translates the same section from the Sanskrit into English as "free from smoke, sunlight, dust, wild animals, women, idiots, etc."

269 Translated from Vāgbhaṭa et al. (1994–2008, 813/17–18): *dud pa nyi tshan sbrul dang rngul/ bud med glen mas ma bgrod par/*. Contrary to the Tibetan, the translations from Sanskrit do not emphasize the female gender of the fools.

270 Translated from Sangyé Gyatso (1982, 1135/13–14): *du ba nyin mtshan brtul zhugs sbrul/ bud med glen pas mi bgrod par/*.

as having to be solitary, without mentioning specific exclusions of women (1985, 11/3). However, during the crucial moment, when mercury is triturated with sulfur, he writes that women are not allowed to touch the material:

> From this point onwards, women should not touch [the preparation] with their hands. Do not expose [it] to the sky or the sun. Do not let dogs, etc., wander around. Wrap it in blue-black silk cloth or fabric and place [it] in a clean, isolated location.[271]

Gurupel only excludes women from touching mercury at a certain point of the trituration. In comparison, Kongtrul Yönten Gyatso, the famous Buddhist master and medical specialist, who taught mercury processing in eastern Tibet during the nineteenth century, bars women from entering the processing compound from the very beginning. His text (Kongtrul Yönten Gyatso 1986), written after a *tsotel* event in 1872, has been quoted in subsequent texts and used at the Men-Tsee-Khang in India since 1982 as the main textual source during the making of *tsotel*. Lamenpa Tenzin Chödrak, who first taught *tsodru chenmo* at the Dalai Lama's residence in 1982, received the transmission of this text from Lamenpa Khyenrap Norbu back in Lhasa and found this text the easiest to follow.[272] Kongtrul Yönten Gyatso writes:

> The dwelling place should be clean, solitary, and spacious, inhibiting [sources of] uncleanliness, "pollution/contamination,"[273] and unrelated visitors [i.e. who have no purpose to be there]. In particular, restrict any incoming movements of dogs and women.[274]

A few folios later, he states:

> Then, during the boiling of mercury and the ritual preparation and enhancement of mixing mercury with sulfur ["meeting the enemy"], in both the "cooking house" *[thab khang]* and "taming house" *['dur*[275] *khang]*, the sky should not be seen and no visitors should roam around, generally, and, specifically, wandering dogs and women

271 Translated from Degé Drungyig Gurupel (1985, 37/4–38/1; 1986, 328/2–4): *da phyin du 'di la/ bud med lag gis mi reg/ nam mkha' dang nyi mar mi bstan/ khyi sogs kyang mi 'grim pa'i dben gtsang sar dar ras gos sogs/ sngo nag gis dril nas/*.

272 Sonam Rinchen (2000, 103).

273 On Tibetan perceptions of *drip* see, for example, Lichter and Epstein (1983), Mills (2005), and Samuel (2007). On *drip* in relation to women see Fjeld (2008).

274 Translated from Kongtrül Yönten Gyatso (1986, 403/4–5) and Lamen Orgyen Tendzin Gyatso (1986, 250/6–251/1): *gnas khang gtsang zhing dben la rgya yangs par mi gtsang grib rigs dang don med kyi 'grul bcad/ khyad par khyi dang bud med kyi 'grims 'grul spang /*.

275 The term *'dur* is another word for *'dul*, both meaning "subduing, taming."

> should not pass through the vicinity, nor come on the [respective] roof tops, etc.[276]

Lamenpa Orgyen Tendzin Gyatso, a personal physician of the Thirteenth Dalai Lama who headed the 1893 mercury processing at the Norbulingkha Palace in Lhasa, copied these lines verbatim from Kongtrul Yönten Gyatso's text into his own treatise on *tsodru chenmo* (Orgyen Tendzin Gyatso 1986, 250/6–251/1, 269/4–6).[277] None of the authors gives a reason as to why women and dogs are not permitted, which, as we shall see, has led to various interpretations of these texts by contemporary physicians.

Mipam Namgyel Gyatso (1846–1912), known as Ju Mipam, was one of Kongtrul's students in eastern Tibet and was present during the 1872 *tsotel* event (Mipam Namgyel Gyatso 2006, 1986). In his writing, he describes the event, its sponsors, and spiritual enhancement rituals. Women are not mentioned, probably because there is no section on preliminary practices including place, where gender is primarily hinged to mercury processing procedures.

The two physicians who were instrumental in spreading the *tsotel* practice in the PRC and India continued these practices. In the PRC, in his elaborate *tsotel* manual, Troru Tsénam (2001, 551/2–6) stresses the need to have a clean, pleasant, and isolated place, preferably fenced and gated to avoid any contact with unnecessary visitors, which includes "dogs, women, and so forth" to avoid any kind of "pollution" or *drip*. He also advocates engaging experts to carry out smoke offerings, libation rituals, and rituals to bless the space and for obstacle prevention, aiming to "[carry] out ancient traditions faultlessly."[278]

In 1982, Lamenpa Tenzin Chödrak followed Kongtrul's approach and did not allow women to process *tsotel* in Dharamsala. Namgyal Lhamo Taklha, wife of the medical institute's director Lobsang Samten Taklha, the Dalai Lama's brother, was the secretary responsible for English correspondence at the Men-Tsee-Khang in the 1980s. She felt the exclusion of women was a form of discrimination. The Men-Tsee-Khang had been admitting female students since 1969 (Tashi Tsering 2005, 189).[279] She complained to Tenzin Chödrak and her husband. We conversed about this issue by email, and she wrote to me:

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276 Translated from Kongtrül Yönten Gyatso (1986, 411/3–4) and Lamenpa Orgyen Tendzin Gyatso (1986, 269/4–6): *de nas dngul chu btso ba dang dgra sprad bsre ba'i sta gon tu/ thab khang dang 'dur khang gnyis ka gnam mi mthong zhing 'grims 'grul spyi dang khyad par khyi dang bud med kyi 'grul nye skor dang khang steng sogs su mi 'byung bar bya/.*

277 Apparently, government officials of the Thirteenth Dalai Lama ordered him to compose this treatise based on the works by Jamyang Khyentse Wangpo and Kongtrül Yönten Gyatso (Czaja 2013, 95).

278 Translated from Troru Tsénam (2001, 551/7–8): *gna' rabs kyi phyag srol ma nyams par mdzad*. Details of Sowa Rigpa ritual *menjor* practice in the PRC were not part of this study and requires further research.

279 For a list of female students who studied at the Men-Tsee-Khang between 1969 and 2002 see Tashi Tsering (2005, 193–194).

> Dr. Chödrak was a very kind and compassionate man. He would never utter a harsh word. He smiled when I said, "This is discrimination!" and he said, "It is said in the medical annals that women are not permitted to be present when tsothel [sic] is made. Woman and dogs are not allowed!" I did not say anything further but I complained to my husband about this. No other women amchis neither mentioned about this matter to me nor did I know if they talked on this subject among themselves. Dharamsala in the early 80s was rather conservative and formal.[280]

Over many visits to Dharamsala (2009–2017), I did not find any significant change in practice at the Men-Tsee-Khang regarding women and mercury. Dawa Ridrak, who participated in the 1994 *tsotel* event, offers more detailed explanations: "In general, any visitor without purpose, and in particular dogs and women, should not enter the courtyard,"[281] and that during the trituration of mercury with sulfur, "in particular, women and dogs should not touch or see it."[282] As justification, he mentions female impurity during menstruation and the potential of dogs carrying infectious diseases. (Dawa Ridrak 2003, 427/17–19).

Across Tibetan societies there are all kinds of *drip,* often involving women (see Fjeld 2008). It is generally believed that any defilement of *drip* is potentially troublesome, since *drip* contamination cannot be removed by removing the cause (in our example, the dog or the woman); once caused, *drip* remains and—as with every kind of obstacle or *barché*—has to be purified by ritual means (Mills 2005, 357). As it is, making *tsotel* is very difficult and *barché* (explosions, broken pots, unsuccessful trituration, etc.) can potentially occur. *Tsotel* practices at the Men-Tsee-Khang in Dharamsala thus include many rituals, which are commissioned from multiple monasteries in the area, including nunneries. Amchi Jamyang Tashi, head of the Pharmacy Department, told me that they take no issue with nuns performing necessary rituals to prevent *barché* while making *tsotel*, but women cannot participate in the pharmacological processing.[283] Dawa Ridrak raises the issue of *tsotel* being a *ḍākinī* practice when explaining the necessity for rituals as follows:

> Generally speaking, the mercury processing itself [follows] strict orders *[ka tsen (bka' btsan)]*,[284] [since] this supreme healing nectar

280 Namgyal Lhamo Taklha, personal e-mail communication of August 9, 2015. On her life, see her autobiography (Taklha 2001).

281 Translated from Dawa Ridrak (2003, 420/23–24): *don med 'grul sna spyi dang khyad par khyi dang bud med nye khor du mi yong bar byas pa dang /*.

282 Translated from Dawa Ridrak (2003, 427/17): *lhag par khyi dang bud med kyis reg mthong mi chog*.

283 Interview, Dharamsala, May 2015.

284 In colloquial Tibetan understanding, *ka tsen* implies something that is not ordinary, also dangerous, and not everybody can do it (Tenzin Demey, personal communication, Dharamsala, December 2012).

> practice [was given] according to the instructions of the *ḍākinīs*. Because it has the absolute power of the blessings, it is completely different from an ordinary task; [therefore] one definitely ought to remove obstacles through rituals, etc.[285]

From the Tibetan perspectives of *drip* and *barché*, the rule makes sense. The rationale is the following: since mercury practices stem from the *ḍākinīs*—the deified female—and involves "female" substances (sulfur), it is full of danger and could divert the potency of mercury and disturb the taming process; therefore, protective rituals are carried out, and women are barred from the venue. However, from a feminist perspective this presents an example of the ambiguity that Janet Gyatso describes as "the misogyny of Buddhist traditions, on the one hand, and the deification of a female principle in Buddhism, on the other" (Gyatso 2003, 89).

The importance of place is not only a matter of gender, but also of practical ideas of cleanliness, of what today would fall under Good Manufacturing Practices (GMP). While GMP rules are not formulated according to gender, they have a strong emphasis on the place of manufacturing and how it should be kept. They address modern concepts of pollution in terms of contamination and hygiene, while the above-mentioned rules of place address pollution and contamination in specific cultural terms of cleanliness, including ritual pollution—for example, through contact with the dead and menstrual blood—and other forms of contamination such as through contact with animals.

None of this is unique to Sowa Rigpa. These are shared notions of place and purity that are found across Asia in descriptions on where elixirs and medicines should be prepared. I illustrate this with two examples from early medieval China and India. The seventh century *Instructions on the Scripture of the Divine Elixirs of the Nine Tripods of the Yellow Emperor (Huangdi Jiuding Shendan Jingjue)*—which was also transmitted by divine female deities (Pregadio 2006)—prescribe similar preliminaries for making elixirs:

> When you compound the Divine Elixirs you should dwell in the depths of the mountain, in a wide moorland, or in a place deserted and uninhabited for endless miles. If you compound them among other people you should stay behind thick, high walls, so that nothing can be seen [...] First undertake the purification practices for seven days and increase your purity with abolitions and the five fragrances *(wuxiang)*. Do not pass by filth and dirt, or by houses where mourning is being observed, or by houses inhabited by women of the age of marriage (translation by Pregadio 2006, 161–162).

285 Translated from Dawa Ridrak (2003, 413/16–18): *spyir dngul chu btso bkru de nyid mkha' 'gros gdams pa'i bdud rtsi sman mchog sgrub pa 'di bka' btsan cing /byin rlabs kyi tshan kha nye bar ldan pa'i phyir/ thun mong bzo mgar gyi las lta bu zhig dang shin tu mi 'dra ba'i khyad par gyis bgegs sel rim 'gro sogs nges par dgos pa*.

The Indian example from the *rasāyana* traditions in the *Carakasaṃhitā* and *Suśrutasaṃhitā* describes practicing rejuvenation therapy "in a hut" *(kuṭīpraveśika)*. According to Dagmar Wujastyk in both treatises women are not listed among "persons deemed unsuitable for [*rasāyana*] treatment, but are never mentioned as potential beneficiaries of treatment either" (Wujastyk 2014, 178). The *Carakasaṃhitā* specifically excludes women from the rejuvenation hut:

> The hut's thick walls would keep out noise and other unwanted sources of stimulation or distraction. Women would not enter. The hut would contain all necessary equipment, and physicians, medicines and brahmins would be ready to attend (Wujastyk 2014, 178, summarizing the *Cikitsāsthāna* 1.1. 16–20).

As explained in Chapter 3, similarities of alchemical instructions between Asian traditions do not necessarily prove historical origins but point to shared cultural concerns and often simple practical insights (see White 1996, 54–55, 2013). My examples here testify to the often practical and apparently shared concerns of preparing a special place for making and consuming rejuvenating *chülen* and special elixir medicines that are also found in texts on Tibetan mercury practices, and that for the most part forbid women to participate.

Apart from matters of place, women also feature in terms of reducing the potency of *tsotel*-containing precious pills once they are fully manufactured. Many classical texts mention that women and dogs can spoil precious pills. In his textual analysis of how to administer precious pills, Czaja quotes several physicians from the early seventeenth to the nineteenth centuries, writing that precious pills should not be "exposed to the sky, women and rats" or that "the sound of dogs and women spoil the pills" (2015, 72–73). If any of these defilements occur, the pills have to be ritually purified and consecrated (2015, 74–75). Here again, potency can be changed by what are considered unfavorable conditions: women (along with rats and dogs) have the power to spoil it.

Gendered voices

During fieldwork, I discussed with both male and female Tibetan physicians the reasons why women are not allowed to make *tsotel*. The comments I received reveal a mix of things, involving ideas of potency as determined by gender, pollution, and female bodily substances, all capable of disrupting the taming process or mercury's potency. Similar to the Tibetan textual perspectives presented earlier, they do not offer a single line of reasoning and thus cannot be traced back to one particular text or author. Some physicians even argued that there is no reason and that they would prefer to involve women in making *tsotel*. One can also detect generational, geographical, and gender differences in the responses. The answers present

individual or institutional positionings and in my view also reveal aspects of power that come with upholding and monopolizing specialized medical knowledge, backed up either by the authority attributed to classical texts, or by modern science.

The younger generations of physicians I met, especially those trained in the PRC, promoted a "scientific" reason for the rules found in mercury texts and combined different epistemologies to do so. For example, Amchi Kunchog Tseten from Amdo, who now lives in New York, did not believe in any of what he called "superstitious reasons" mentioned in the texts, and insisted, "There is a real rational reason!" He explained that it made sense for women not to make medicines while menstruating. "Women smell during menstruation and the smell affects the taste *(ro)* of the herbs; [this] thus affects the potency or *nüpa* of the medicine."[286] When we met in his office in New York, he urged me to only mention the "scientific reasons" and not perpetuate superstitions, thus posing not only a common anthropological challenge of how to turn culturally-specific knowledge into text (Fabian 2008), but also raising questions of what should be presented as science and why (Adams 2002a, b).

Amchi Sherab Tenzin, who was trained by Trogawa Rinpoche at the Chagpori Tibetan Medical Institute in Darjeeling in the early 1990s and established his own clinic and pharmacy in Kathmandu, told me that during their menstruation, women often feel tired, and it is because of pollution, or *drip*, that they should not be in the pharmacy when *tsotel* is made. He said that Trogawa Rinpoche used to say that women should not make *tsotel* when they have their menstruation.[287] Dr. Namgyal Tsering, a previous head of the Men-Tsee-Khang Pharmacy Department, now living in New York, thought the reasons for women not being allowed were transmitted orally and thus they were open to interpretation:

> There are many reasons, not mentioned clearly in the text. It is oral [knowledge]. One reason is menstruation, it is like *drip*. The second reason is that *ngülchu* is the semen, *khuwa [khu ba]*. If there is a woman around, the *khuwa* is ejaculated. It is Hindu, [...] the semen comes from Śiva lingam. The potency of *ngülchu* will decline in power [*nus pa*], if the woman is present. I am not sure about the other reason given, the "over-boiling" is not the perfect reason. Maybe some doctors said it. Maybe, [...] it can be, but I am not sure. The reasons I know I tell you, but about the rest, I am not sure.[288]

The female physicians I spoke with had more liberal views but rarely dared to voice them. While in Dharamsala, searching for female physicians who were involved in refining mercury, I informally talked to a Men-Tsee-Khang-trained

286 Interview, New York, October 13, 2014.
287 Interview, Kathmandu, December 18, 2011.
288 Interview, New York, October 13, 2014.

female physician, who shared with me her views on women and mercury processing. "We were told women are not allowed to make it," she said. "Our teacher said that if women would wear gloves they could touch mercury," she laughed heartily. "Was he joking?" I questioned. "No, he meant it," she said. She was convinced that women could make medicines as well as men, including with mercury. Her approach was experiential. "They should form two groups," she suggested, "one only men, and the other one only women. Both groups make the same medicines. Then you see whether they are effective. Why shouldn't the medicines made by women be effective? They might even be better because women do take more care." "Have you ever suggested this?" I asked. She shook her head in a resigned manner, which I interpreted as her having accepted that the institutional authorities would not open a door for her to get involved in *menjor* practice.

While I kept looking for women physicians who processed mercury, and having read that there was a history of female Sowa Rigpa experts,[289] I found evidence that some Tibetan female doctors received training in mercury processing. In the early winter of 1997, the Tibetan female physician Dr. Tashi Yangchen of the Materia Medica Department and two female medical students (Dhondup Tsering and Tsering Lhamo of the ninth batch) were sent officially by the Men-Tsee-Khang to the Department of Rasa Shastra at Banaras Hindu University (BHU) in Varanasi to learn the Ayurvedic techniques of mercury processing. The Men-Tsee-Khang newsletter reported the event as them "participating in the Course on Drug Manufacturing and purification of crude drugs" (MTK 1997, 2). That they were handling mercury was not publicized. At BHU, the three women learned how to make *kajjalī* and *rasasindūra*, two Ayurvedic mercury sulfide compounds.[290]

When I visited the Department of Rasa Shastra at BHU in March 2015, a group of students had gathered with their teachers to discuss mercury with me; more than half of them were women. When I asked why the female students were allowed to process mercury in Ayurveda, a lively discussion began. Dr. Anand Chaudhary, head of department, said that women get admission in their postgraduate course on *rasaśāstra*, where they do all the processing, including of mercury. One of the other lecturers added, "There are no Sanskrit *ślokas* in our classical texts that maintain women are not allowed to process mercury." Dr. Anand Chaudhary continued, "In fact, females are specifically needed for a particular mercury processing technique. Without her, it cannot be achieved. The texts have clear descriptions of what kind of woman is required for successful processing," he said referring to the *Rasaratnasamuccaya*. Another lecturer added, "In practice, the processing was kept secret during several historic periods and was of

289 These female experts have been introduced in various works. See Fjeld and Hofer (2010–2011), Hofer (2015, 2018), and Tashi Tsering (2005).

290 Personal communication with Dr. Jah, who was present during their training in 1997. BHU, March 2015. See Bhatt (2013) on how to make these preparations; *kajjalī* is black in color and is metacinnabar (β-HgS), and *rasasindūra* is red cinnabar (α-HgS).

course mostly carried out by men, since Ayurvedic physicians were largely male in the past, but there is no restriction in the texts."

Then I asked whether they use any similar terminology to describe mixing mercury with sulfur, explaining the Tibetan meaning of *dratré*, which translates as confrontation or meeting the enemy. One lecturer explained: "As you know, mercury is linked to Śiva and sulfur to Parvatī. We consider sulfur and mercury good friends, we have no tradition to call it 'meeting the enemy.' They are good friends because from the safety point of view, mixing mercury with sulfur will reduce the toxicity of the compound." A female student then had the idea that "Maybe the Tibetans call it meeting the enemy because the [female] sulfur has the power to change the physical form of the [male] mercury. The white substance turns really black." We concluded that both traditions, although having different approaches to sulfur and mercury, were in unison that after mercury was bound to sulfur the compound was considered very safe.

Later, in a discussion with a senior *rasaśāstra* teacher and one of his female students, the teacher said: "Many instances in our literature describe how menstrual blood is used for the processing of mercury. So you needed women to obtain menstrual blood for the mercury process; it has a practical reason." He then also explained that:

> There are certain opinions among some *rasaśāstra* people, who do not allow women. It is mentioned in some text related to place: you have to prepare the place where you process mercury well, if you want to succeed without failure. You first worship lord Śiva and *pārada* [mercury], and everything should be done properly. When ladies have their menstrual period, they have certain instructions to follow. [...] It is linked to concepts of contamination, not to have impurities around the house, it is a practical issue.

Thus, the issue of gender once again centered on "place" and "pollution," where culture-specific perceptions of purity translate into making potent medicines.

At the Sowa Rigpa Department at CIHTS in Sarnath (introduced in Chapters 1 and 3), I discussed the gender issue with the dean of the department, Rakdo Rinpoche. He teaches *tsotel* manufacturing to all his students, including women, following Gurupel's text. Female students are allowed to participate in all steps except on the day when mercury is triturated with sulfur. Rakdo Rinpoche said:

> Orgyenpa received his lineage from yoginīs; he wrote about it. I don't know what happened. Usually, for *ngülchu* practices mentioned in the *Kālacakratantra*, and also generally in other tantra texts, women are very important. I don't know why Tibetans do it like this, keeping women away from *ngülchu* practices [...]. Our vice chancellor here at the university is not a Tibetan doctor. One day,

> he asked me, "Why do you keep the women away? Do you have any reason?" I said, "We don't have a reason. People always say it has to be done like this, but there is no reason." He then asked me, "What do you think about it yourself?" Then I told him the history of Nāgārjuna [he mentions the story of Bhalipa, who received the missing ingredient from a woman] and what is said about women in the Vajrayāna tantras. Our vice chancellor then told me, "Since there is no reason, it is not necessary to keep the women away." I also think so. But if we change the tradition a little bit and we allow women to practice, some people start talking about it, and then there is a problem [...].
>
> We taught how to make *tsotel* at our department three times. The women do not attend the *dratré*, all the other things like burning gold and silver, we do together. [...] You see, when we make *tsotel*, the female students just ask me, "So, what else to do?" So, if I would say, "Now, put the mercury and sulfur together and mix it well," they would have done it without hesitation. They did not do it, because we did not allow them.

Rakdo Rinpoche had to find a compromise. By following Gurupel's advice of only keeping the women away from the *dratré* step of processing, he passes on the overall *menjor* knowledge and practical techniques of making *tsotel* to his students. His concern is not about the effect of women on mercury; it is about the reaction of other contemporary male physicians who hold different views on the issue. Even at CIHTS, I heard conservative views from other male physicians, who believed that if things went wrong during making *tsotel* it was due to the female presence. Female students were thus quite vulnerable in the case of processing errors.

The mercury-gender debate is not only influenced by political contexts but also by personal beliefs regarding the authority of texts and the secrecy of the sacred practice. During the aforementioned Sowa Rigpa workshop in Kathmandu, we discussed mercury processing and one of the anthropologists asked Gen Gojo Wangdu, the senior physician from Lhasa (introduced in Chapter 4), why women are not allowed to make *tsotel*. He answered extensively:

> Some people said [during the Chinese reforms] that this is the fairy tale of feudalism, and they scolded [us] saying that this is not a good custom, making men supreme and women low. [...] However, it is not like that. The teachings state that women cannot participate during the practice of the Great Mercury Refinement, and it cannot be exposed to the sky and the sunlight. It is not at all to make men supreme and women low. I am not a person who is against investigating all the things from the past; for some, investigation is essential. However, in this, I think it is better for women not to participate. This is my personal opinion. The reason is that it says if

> women participated in it, the power of *ngülchu* would decline. How it declines, we do not know. These are *sang tsik [gsang tshig]*, secret words. If the secret words are to be explained, according to our Buddhism, these secret words should be pronounced by the highly realized ones; if we ordinary people talk about it, it is like lying. We are not able to realize the meaning. So I still think that women should not participate in the practice of the great mercury purification, not when *dratré* is done. [...] If we just step on the teachings from the past saying, "Oh, this is a backward belief making men supreme and women low," [...] we are not able to realize the real meaning of the secret words. Therefore, I think it is better for women not to participate.[291]

Afterwards, we asked the only female amchi present what she thought of Gen Gojo Wangdu's explanation. She was frank in disagreeing with him, arguing that if women were trained in the process, they could prepare *tsotel* as well as men. Other female amchi I spoke with in Dharamsala also did not hesitate to speak up in private, expressing confidence that they could make *tsotel* if they were trained. Nevertheless, it has not become an openly-debated issue. To date, female amchi have not publicly challenged the existing Tibetan medical reasoning on women making *tsotel*, which fluctuates between the textual positions presented by Kongtrul and Gurupel. The cutoff point for women's participation remains the *dratré*, to which even the most open-minded physicians adhere.

That Tibetan female physicians, who by now make up approximately 50% of Sowa Rigpa practitioners in India, have not spoken out collectively against the gender inequalities in *menjor* practice reflects how the position of women in practical life and on institutional levels has not reached forms of equality many aspire to. Those few women who tamed mercury in the past had a privileged social status that supported their training and practice outside the status quo, in part with the help of some form of traditional *chöyön* support.

In Chapter 3, I outlined how Petryna and Kleinman (2006, 21) approached the pharmaceutical nexus as a "problem," taking into account the different views of various stakeholders on a drug or pharmaceutical substance. This chapter has shown that mercury as a poison poses a problem with its deeply gendered aspects, which not only affect interpretations of the toxicity, safety, and potency of mercury, but also exclude many Sowa Rigpa physicians from actually studying and manufacturing *tsotel*. As we have seen in previous chapters, there are many factors impacting *tsotel* production, including the changing *chöyön* networks in exile (Chapter 3) and changes in knowledge transmission (Chapter 4). Nevertheless, taming mercury still contains elements of male control, which are exercised not

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

only in the creation of the place where mercury is tamed, but are also paralleled by the control of women in larger social processes and at medical institutions. In some cases this continues to translate into social fears of the unsafe female.

The above examples on gender and mercury tell us that for many male physicians the presence of women makes processed mercury not only less potent but also less safe. The absence of any textual reasoning has given rise to a variety of individual interpretations, ranging from ideas of hygiene, to a religious belief emphasizing the secret *ḍākinī* transmission practice, to more liberal and pragmatic views in a central university setting. Ideas of taming in the handling of mercury are thus also an example of how the secrecy and exclusivity of a practice when transmitted along the lines of gender can translate into the exclusion of women for a long time.

In sum, we find a "rich multivocality" (Sponberg 1992, 4) of gender ambivalence in Sowa Rigpa mercury processing: In its empowered form as a *ḍākinī* practice, making *tsotel* can further the practitioner on the path to enlightenment; during *menjor*, the male (mercury) and female (sulfur) substances have equal status and importance in successfully taming *ngülchu* into the potent *tsotel* ash; but the female is also perceived as a hindrance in her disturbing role as sexually arousing, and polluting, which manifests in the requirement of women-free clean places to make potent and safe medicines. In the specific case of *tsodru chenmo*, making sense of gender requires both an understanding of the culturally-specific reasons why—from a Sowa Rigpa perspective—women are barred from making *tsotel*, while at the same time being sensitive to how this relates to the unequal status of female amchi in today's Sowa Rigpa communities.

Evidence of mercury's safety is established in many ways, gender being just one aspect of it. The next chapter delves into the assessment of risk while working with mercury and the actual Sowa Rigpa processing techniques of taming it. Physicians experience with their senses how mercury is transformed and tamed. Based on their empirical engagement with substances, using sulfur and other ingredients, they assess why certain processing techniques are considered safer than others.

Chapter 6

The Evidence of Safety

This chapter explores the *ngülchu tsodru chenmo* technique of making *tsotel* not only as a complex *menjor* practice that employs many other substances, such as the eight metals and eight minerals, but also as a spiritual and fundamentally sensory engagement with poisons in need of taming. Making *tsotel* is considered a *choga* (skilled practice) of taming, not only of mercury but also of any negativities surrounding the manufacturing event. In this chapter, it will become clear how making *tsotel* in a pharmacy re-enacts the early Tibetan subjugation myths introduced in Chapter 2, which can be summarized as: the entire taming process is not about taking something out from what is considered poisonous, but about transforming an existing poison into something beneficial.

Successful taming is also key to a toxic substance's safety. But how exactly do contemporary Tibetan physicians provide evidence that a substance has been tamed and made safe for themselves, their medicines, and their community? In my exploration of various mercury processing methods below, I argue that the amchi's sensory engagement with the transforming substance is at the core of the taming process and the construction of safety. It also influences how physicians assess the risk of working with different forms of mercury and how they protect themselves while doing so. Taken together, these analyses will allow us to draw insightful conclusions on the nature, status, and perceived toxicity and safety of mercury in Sowa Rigpa and see how risk assessments and "poison cultures" (Arnold 2016) are socially constructed.

Assessing risk

> *Risk is a social experience of an uncertain reality, not an absolute scientific value (Cordner 2016, 53).*

Toxicity is a variable and is contingent on social contexts. This is demonstrated by recent studies on toxic substances from the fields of history, anthropology, and sociology, of which I will give three examples from South Asia and North America. The first is on how toxicity is shaped by historical ideas of poisons (Arnold 2016), the second is on the subjective perceptions of toxins through sensory engagement with chemicals (Shapiro 2015), and

Published in: Gerke, Barbara, 2021. *Taming the Poisonous. Mercury, Toxicity, and Safety in Tibetan Medical Practice.* Heidelberg Studies on Transculturality 7. Heidelberg: Heidelberg University Publishing. DOI: https://doi.org/10.17885/heiup.746

the third example shows how toxicity is (re-)defined and negotiated by different stakeholders in pursuit of different goals (Cordner 2016). Each example highlights a different angle I consider essential to understanding the pharmaceutical nexus of Sowa Rigpa mercury practices, in particular, and of traditional Asian medicines in general.

First, David Arnold transports Buell's idea of the "toxic discourse" (Buell 1998) into South Asia, analyzing its "long history" and "close rhetorical association between concepts of pollution and poisoning" (Arnold 2013, 133; 2016, 12). Arnold demonstrates how in nineteenth-century India the words poison and pollution were employed almost synonymously by British colonial administrators, influencing urban public health activities. Pollution was polysemous in Indian poison culture. It coexisted as a religious concept, which demarcated social castes and regulated contact with bodily substances, alongside pollution as an environmental concept that, for example, shaped sanitary measures and the management of dead bodies. Not surprisingly, the poor were frequently targeted as causes of pollution, poisoning, and toxicity in urban India. This was paralleled by a pharmacological toxic discourse on available poisons (e.g. arsenic, opium, aconite) used in medicines as well as for murder and suicide. The emerging British medical jurisprudence was also propagated by British fears of anticolonial resistance. Arnold's examples raise questions on how specific socio-political fears of toxicity can develop into specific poison cultures. The ways in which certain ideological biases crept into the development of colonial toxicology also impacted the kind of authority given to science and the exchange between biomedical and indigenous medical systems (Arnold 2016, 15).

Notwithstanding the fact that toxic substances are harmful and available poisons cause deaths, all of these examples demonstrate how ideas of poisoning are culturally and historically constructed over time. Arnold also illustrates how "India's poison pasts still speak to its toxic present" (2016, 208), especially with the growing concerns about adulterated and contaminated food and medicinal raw ingredients, unregulated drugs, air pollution, and environmental chemical pollution. These are all core issues that have also been affecting safety perceptions of the various actors who make up the pharmaceutical nexus of the emerging Sowa Rigpa industry and the traditional medicine industry in Asia at large, and therefore should prompt us to reflect on ethical and environmental concerns of this industry. Chapter 7 will address some of these environmental toxicity concerns, which have impacted the making of traditional medicines in India today.

The second example relates to the notion of embodied sense of toxicity as an additional element to the pharmaceutical nexus of Tibetan mercury practices, introduced earlier in this book. Below, I present an ethnographic event of coating pills with roasted cinnabar or *chokla* that highlights how our own embodied sense of toxicity leads to different risk assessments of mercury's toxicity and safety. Here, Nicholas Shapiro's "Attuning to the Chemosphere" (2015) offers a culturally different but still valid example from the anthropological literature for comparison.

Shapiro ethnographically follows the toxicity of formaldehyde from toxic breathing spaces to human body experiences among residents across North America who have been exposed to chronic low-level formaldehyde. Shapiro (2015, 375–376) emphasizes the "deep phenomenology of bodily formaldehyde detection that focuses on visceral and indeterminate sensorial facilities" and explores bodily sensory impressions as the "epistemic basis for chemical knowledge of everyday, ongoing, and low-level intoxication." While this level of exposure is quite different from the exposure to mercury fumes during rare *tsotel* events as well as when processing *chokla*, his phenomenological approach towards toxic substances allows for some comparison. Shapiro argues that "such microscopic encounters between bodies and toxicants are most readily sensed by less nameable and more diffuse sensory practices" (2015, 338), but nevertheless lead to a certain knowledge of and engagement with toxic chemicals.

Shapiro takes a phenomenological approach to chemistry and calls this process the "chemical sublime," which here refers to a chemical transformation of a toxic substance from a solid / liquid state into vapor when heated. He uses the chemical sublime both as a practice and as an embodied experience in his case studies on formaldehyde microemissions in people's homes causing various toxicity symptoms. His ethnography deciphers the concept of toxicity as a somatic variable that can potentially be perceived through our bodies even though sensory experiences are often diffuse and difficult to measure and evaluate. I allude to this in my analysis of the cultural *habitus* of toxicity and the differences in how my interlocutors and I reacted physically to different forms of mercury (mainly liquid mercury and fumes from heating cinnabar).

Below we learn about how Tibetan physicians assess mercury's toxicity and evaluate its risks through their own embodied conceptualization of exposure, risk, and safety. The documented experiences have ranged from physicians feeling safe to sometimes experiencing physical discomfort—difficult to measure somatic variables. As we shall see, risk assessments depend largely on the frequency of exposure, the use of sulfur, the visible transformations of mercury's character during the taming process, and the individual's physiological response to the taming process.

The third example from the literature shows how risk assessments of toxic substances might play out on larger economic and political stages. This becomes relevant when approaching the pharmaceutical nexus as a method of ethnographic inquiry in order to rethink the role of global toxicity regulations for mercury-containing Asian medicines and question what is at stake in the cultural translation of toxicity. Alissa Cordner (2016) illustrates how interpretations of science and risk assessments of toxic substances are manipulated and strategically used depending on the economic interest of certain stakeholders. With her case study on flame-retardants in the United States, Cordner analyzes different modes of what she calls strategic science translation, which depend on how toxic risks are interpreted and communicated by different stakeholders, taking

advantage of the uncertainties that come with risk assessments. Her presentation of various conceptual risk formulas depends on how the terms "hazards" and "exposure" are defined, which varies widely and leads to different understandings of risk. With regard to flame-retardants in the United States, Cordner shows that the industry has more power to define risk and interpret science to their advantage in the process of influencing policy makers than the consumers and fire fighters who suffer the unsafe effects of flame-retardants. Cordner's book teaches us that defining toxicity in today's context is not only a question of applying science; it is also a question of how it is applied, by whom, and with what intention. I return to these questions in Chapter 7 and in the Conclusions.

For now, the above historical, anthropological, and sociological toxicity studies invite us to revisit our concepts of risk and safety, detecting underlying cultural ideas of what is considered dangerous. Boundaries of risk and safety are defined differently by different actors. Risk studies offer ample examples of the heterogeneous character of risk assessment, the analysis of which is beyond the scope of this book.[292] I present ethnographic examples from the Tibetan medical contexts of taming mercury to explore questions such as how safety is established and negotiated through, for example, subjective sensory perceptions of toxins, occupational safety measures, imposed legislation, and certain politics of toxicity.

The examples from the Tibetan world are not unusual in that they cross boundaries between what is considered potent on the one hand and toxic on the other. Tibetan physicians address poisons through meticulous *menjor* processing: the danger of mercury unleashes its very potential as a powerful medicine. These fluid boundaries are expressed in the Tibetan terms of *men* (alluding to efficacy and medicine) and *duk* (alluding to toxicity and poisons), which were introduced earlier. Anthropologists Sienna Craig (2012) and Jan van der Valk (2017, 2019) have shown that these boundaries are not straightforward but quite dynamic when determining "the full spectrum of potency—the 'good' and the 'bad,' the 'wanted' and the 'unwanted'—without presuming the universal validity of biomedical notions of toxicity, side effects and risk" (van der Valk 2017, 205). Crossing such boundaries between the beneficial and the harmful might cause ambiguities since what we consider poisonous might be considered pure and safe in another culture.

There are many examples in medical history of how a poison can also become a medicine; the dichotomy of poison and medicine both intersect in the Greek term *pharmakon* (Grell et al. 2018). Paracelsus' notion of "the dose makes the poison" strongly influenced the development of

292 For a brief summary of risk assessment and conceptual risk formulas see, for example, Cordner (2015a). For an example of how differently the risk of consuming methylmercury in tuna fish was assessed by different stakeholders, see Joyce (2012).

biomedical toxicology. Dose-response effects are fundamental to modern toxicology, culminating in the widespread use of chemotherapy, which is therapeutically effective, but at the same time harmful and experienced as toxic by most patients. "The dose makes the poison" is a limited paradigm for the Sowa Rigpa medical context (see van der Valk 2019), where poisons have been approached differently and—as we have seen in the case of mercury—intersect with broader cosmological and tantric ideas. This study on *tsotel* contributes to 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 ratio between risk and benefit is indeed fluid, often difficult to define, and needs to be contextualized. Particularly revealing were those instances during fieldwork in which my own perceptions of safety clashed with those of Tibetan (and also Ayurvedic) physicians when boundaries of what is poisonous and thus dangerous fundamentally differed in expressions of our embodied sense of toxicity. As we shall see in the ethnographic example below, the risk assessment of processing cinnabar varied considerably between the physician processing and the ethnographer documenting it. In what follows, I unpack mercury-related notions of safety in Sowa Rigpa *menjor* practices and analyze how they are linked to concepts of taming. How is evidence of safety created and what is it based on?

COATING PILLS WITH CINNABAR

As we walked down the hill, along small paths and across terraced fields, Dr. Kelsang Dhonden, the nephew of the famous physician Dr. Yeshi Dhonden (introduced in Chapter 3) was on his phone listening to *WeChat* messages that had come in during the morning while he was assisting in his uncle's private clinic. These were his few minutes off during a long day of work and he laughed heartily as he returned audio messages to his friends with jokes in Tibetan. I followed him downhill, struggling to keep up with his pace. We finally reached his new pharmacy, which he had set up with the help of a local Indian family who worked under his guidance. Kelsang was a young amchi and entrepreneur who combined a family lineage with Men-Tsee-Khang training, now working independently. He did everything from buying raw materials and supervising the cleaning and pre-processing of substances, to actually making medicines. A storeroom was packed with bags of pills, and some women were stitching up parcels, readying them for the mail.

Kelsang knew about my project and wanted to show me how to process *chokla*, which is used to coat certain pills. There are no standardized techniques for processing *chokla*; even the identification of the raw ingredient is not uniform among physicians. The head of the Dharamsala Men-Tsee-Khang Materia Medica Department, Dr. Tsering Norbu, who was trained in Lhasa, had a point to make on the identification: "Actually, *chokla* refers

to natural cinnabar rock; but nowadays only artificially made vermilion is available, which is called *dachu*. This is confusing because doctors continue to call it *chokla*."[293] Moreover, the darkish-red powder after processing is also called *chokla*, although powdered cinnabar is typically called *tsel*.

Sowa Rigpa attributes therapeutic efficacy to the use of roasted *chokla* powder, especially for broken bones and skin diseases. It also adds a warm reddish color to the pills, similar to the red coral color of which Tibetans are very fond. *Chokla* is used to coat, for example, Gawa 16, Gurkhyung, Mutik 25, and Samnor, as well as the precious pill Jumar 25. It is also an important ingredient in some formulas, such as Gurgum 13. Whether as an ingredient or as a coating, it is always processed and contributes its *nüpa* to the formula. Kelsang Dhonden explained: "*Chokla* is good for channels *(rtsa)*, for bone density and to stop bleeding; it is good for all nerves." The formula Samnor[294] especially requires *chokla*. Kelsang Dhonden explained:

> Nowadays, at the Men-Tsee-Khang, Samnor medicine is made without *chokla*. But I am still using it, because without it Samnor does not have such a good effect on paralysis, muscle diseases, and brain damage. [...] For internal wounds Samnor is so effective. Especially sores inside the colon dry out and patients are fine; [...] patients with blood cancer take Samnor often for a long time, at least eight to ten months. [...] I know the Men-Tsee-Khang stopped *chokla* coating for safety reasons. If the procedure is not done well, then it will have mercury, which will be harmful; so you have to process it well.

The use of *chokla* among Tibetan *menjor* practitioners is controversial to say the least. Most small-scale pharmacies I visited do not use it at all. Those who use it believe that the mercury evaporates during the heating process. Mercury levels in Asian medicines became a contested issue during the late 1990s (see Chapter 7). About a decade later, at the end of 2010, the Men-Tsee-Khang discontinued the coating of pills with *chokla* because Hg levels of their tested pills were too high. The appearance of lead and arsenic in tested *chokla* was also troubling for Tibetan physicians.[295] There was no talk about the UNEP mercury ban at the time.

The Men-Tsee-Khang-trained physician Dr. Tsering Thakchoe Drungtso was on the board of the Central Council of Tibetan Medicine (CCTM)[296] when the Men-Tsee-Khang stopped using *chokla* for pill coating. In 2016, when Tibetan physicians had become more aware of the UNEP mercury ban, I interviewed him about the mercury and pill-coating issue (see also Chapter 7). He said:

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293 Interview, Dharamsala, May 14, 2015. See Chapter 2 on the meanings of *dachu*.
294 Blaikie (2015) studied the social, clinical, and therapeutic significance of this formula in Ladakh.
295 Dr. Tenzin Namdul, personal communication, Dharamsala, May 2016.
296 The CCTM was founded in 2004 and regulates practitioners of Sowa Rigpa in exile. See Kloos (2011, 2016) and Blaikie (2016).

> We just raised some questions: How can we improve the situation in the near future? How can we face all the questions about mercury toxicity that might come? We thought at least the amount of mercury would be less if we take out the *chokla* coating. We also have to do some research, whether the potency of the medicine is affected or not. We do not know. We should do research, because if it affects the potency, that is also difficult.

I asked, "So, right now if a pharmacy is recognized by the CCTM they can make *chokla*?" He responded, "That is quite OK. In India there is no objection, yet. The only concern is raised from outside, from Europe and other countries. [...] We cannot prove whether *chokla* is harmful; we have used it for thousands of years; that is the reason why we allow recognized pharmacies to use it."[297]

Some Men-Tsee-Khang physicians I spoke with supported the decision to discontinue the coating practices, but felt that when *chokla* was mentioned as an ingredient in a given formula, it could not be taken out, because it would change the efficacy of the entire formula. The decision to stop coating but continue using it as an ingredient was a compromise that would not satisfy any regulations based on counting atoms of mercury in a substance or compound. However, it was a conscious step aimed at reducing the use of cinnabar in the pharmacy. It also raised questions about what constitutes an ingredient and how and for what reasons a formula could be changed (Gerke 2018a). For Kelsang Dhonden, the *chokla* coating of the pills was not only a beautifier, but also added considerable *nüpa* to the medicine. This he knew, not through research, but through personal clinical experience observing his patients under treatment with Samnor, with and without *chokla* coating.

Kelsang Dhonden's pharmacy was one of the few recognized pharmacies that used *chokla*. A committee of four members (from the Men-Tsee-Khang, the CCTM, the Health Department, and the Tibetan Welfare Office) had inspected and certified his pharmacy. He proudly showed me the certificate, framed on the wall between shelves of bagged pills. He had been trained in the *chokla* technique by both the Men-Tsee-Khang and his uncle, but followed his uncle's technique, roasting the cinnabar for a lot longer, which he considered safer.

At his pharmacy, Kelsang Dhonden prepared everything for the *chokla* processing. First, he showed me a piece of the artificial cinnabar he had bought in the open market in Amritsar (Fig. 34). His female assistant crushed it to a fine powder in a steel container with a metal mortar and pestle (Fig. 35). While crushing it one could see shiny mercury, but with trituration it turned into an even, bright red-colored powder, well-known among artists across Asia and Europe as vermilion pigment (Miguel et al. 2014). Kelsang Dhonden tested its fineness with his finger. The powder had to

297 Interview, McLeod Ganj, March 25, 2016.

Figure 34: A piece of artificial cinnabar before grinding (right) and ground up powdered cinnabar (left). Photo by author (Gerke 2015 / CC-BY-SA 4.0).

Figure 35: Grinding cinnabar in a metal mortar with a pestle. Photo by author (Gerke 2015 / CC-BY-SA 4.0).

be so finely triturated that it would fill the lines of his fingerprints (Fig. 36). He and his assistant then roasted the crimson red powder on a metal pan (Fig. 37) over a low gas flame until the color darkened (Fig. 38). The change of color indicated the level of detoxification. "If you roast *chokla*, you have to roast it for the right amount of time," Kelsang Dhonden explained. "You have to check the color. When it has the right darkness, then it can be used safely to coat the pills" (Fig. 39).

Kelsang Dhonden prepared *chokla* twice a year, each time around four kilograms, which was enough to coat his pills. While he heated the cinnabar, a sulfuric smell hung in the air. Sulfur reacts with oxygen when burned and forms sulfur dioxide, which can cause breathing problems. He wore only a simple cloth mask to cover his mouth and had handed one to me and his female assistant as well. I kept my distance and stayed outside, only coming close to take photos while holding my breath. At the end, I was the one coughing; they did not. He came out into daylight every few minutes to show me the change of color of the cinnabar powder that he mixed with a metal tea spoon. After about twenty minutes, he was satisfied with the darkish red hue.

I could not get myself to stay inside the room where cinnabar was heated and was surprised to see Kelsang Dhonden and his Indian assistant dealing with the substance so casually. He knew that, as part of the processing, mercury would be burned off into the air. The end product was considered safe. Questioning him on the safety of the procedure, he said: "I know mercury is toxic, especially the fumes. But if you only do a small quantity it is not a problem. I only make *chokla* twice a year and process only four to five kilos. I only need two to three spoonfuls of powdered *chokla* to coat thirty to forty kilos of pills. When I require more *chokla*, I will process it outside."

We both went to the water tap beyond the veranda and thoroughly washed our hands and rinsed our mouths with water. The sulfur stench stayed with me all day, permeating my clothes and hair; concerns about the safety of this technique, especially for those carrying it out, remained with me as well. However, I was grateful to have finally witnessed and documented this processing technique—I had waited a year for the opportunity. I was thankful since Kelsang Dhonden was helpful and open, allowing me to document and photograph his activities extensively, especially after some of my other attempts to witness mercury processing had been unsuccessful. Observing the making of *chokla* also had no gender issues attached to it. His female assistant was handling the cinnabar, the trituration, and the roasting. It was a totally different technique, not related to *tsotel* and any of the gendered cosmologies explored in the previous chapter.

How did Kelsang Dhonden establish his evidence of safety? The ethnographic account illustrates how the taming process is deeply related to the physician's direct sense experiences and the visually observable changes during processing. For him, the safety of the final product was established

Figure 36: Testing the level of trituration.
Photo by author (Gerke 2015 / CC-BY-SA 4.0).

Figure 37: Beginning to roast triturated cinnabar powder.
Photo by author (Gerke 2015 / CC-BY-SA 4.0).

Figure 38: The transformed darkish-red color of processed cinnabar.
Photo by author (Gerke 2015 / CC-BY-SA 4.0).

Figure 39: Samnor pills coated with *chokla.*
Photo by author (Gerke 2015 / CC-BY-SA 4.0).

through the color change of the cinnabar powder, first when grinding vermilion and then while heating it. Time also played a role, since he judged a longer roasting safer than a shorter one. As for his own safety, he knew that mercury fumes were toxic and that long-term exposure would affect him. He assessed his occupational risk as low when processing small amounts infrequently.

It is beyond the scope of this project to research the history of the use of *chokla* in Sowa Rigpa and how and when it was established in Tibet. Working with vermilion as a pigment in art was widespread across Asia and Europe, and techniques of creating vermilion from mercury and sulfur were known early on (Miguel et al. 2014). The early eighteenth-century Tibetan physician and scholar Deumar Geshe Tendzin Püntsok describes the use of vermilion to create different shades of brown, maroon, and pink colors for painting; many of the ingredients he lists are also known as medicinal in Sowa Rigpa (Onoda 2011).

Asian medical traditions have handled the heating of cinnabar varyingly. For example, Liu et al. (2008, 812, 814) state that the contemporary Chinese pharmacopoeia restricts the heating of cinnabar to reduce toxicity through escaping mercury vapors. In Arabic and Unani-Tibb[298] medicine, processed cinnabar is known as "killed cinnabar" or *Kushta Sangraf* (Preckel 2015, 915, 922–923). It is triturated with herbal juices for a long time, and is considered a strong rejuvenator. The Ayurvedic practitioner Andrew Mason[299] describes a Unani-Tibb preparation of *Kushta Sangraf* through applying heat using cow dung cakes (Mason 2014, 198–199). An energy-dispersive x-ray analysis (EDX, which detects the elements in a substance) of a *Kushta Sangraf* sample showed the absence of mercury; sulfur had largely oxidized to sulfur dioxide (SO_2). What was left was "silicon, calcium and iron, with trace amounts of sulfur, aluminum, phosphorus, potassium and sodium, typical of rock forming minerals" (2014, 200). Since there is no standardization of the different processes of heating cinnabar, and Kelsang Dhonden's sample was not tested, we do not know its mercury and sulfur content.

I interviewed several other independent pharmacists on their use of *chokla*. Men-Tsee-Khang-trained Dr. Namgyal Qusar, who does not use any mercury in his own pharmacy, once experienced physical discomfort during *chokla* processing. In his case, what Shapiro would have called the "chemical sublime," an "embodied apprehension of human vulnerability" (Shapiro 2015, 369) led to a change in medical practice:

> In my case, I never used mercury from the beginning. It is much too risky. I used *chokla*, that is right, but for the last eight years we

298 Unani Tibb refers to the Graeco-Arab medicine that is practiced in South Asia.
299 Mason trained as an Ayurvedic practitioner in the UK and spent years in Sri Lanka studying traditional techniques of making *rasāyana* tonics. He offers *rasāyana* workshops in the UK and publishes processing techniques and laboratory analyses of some of his products (Mason 2014).

> stopped. Once, I felt uncomfortable from the fumes while roasting it. Then I thought this is not good for me, even if the final product might be safe. So, I decided to stop making *chokla*. Also, cinnabar used to cost 300 rupees a kilo; then it went up to 3,000 rupees a kilo. It was turning out too expensive.[300]

Several of the private amchi I interviewed export their medicines abroad and are aware of the mercury toxicity issues. They do not want to create problems for their clients abroad and thus do not use any mercury or cinnabar. Though they still consider *chokla* of medicinal value, they do not want to take the risk. Alternative herbal coating techniques have been adopted instead. Trogawa Rinpoche in Darjeeling developed an herbal substitute coating from red sandalwood powder.[301] The Men-Tsee-Khang has also developed herbal coating techniques after phasing out *chokla* coating in 2010. Of the seven private pharmacies I visited in the Dharamsala area, by 2016 four used *chokla* for coating. These were small-scale private pharmacies, run largely by family lineage amchi who relied on their long-term practice and experience and did not seem to be affected by institutional oversight and the global mercury toxicity issues.

In the following, I discuss how Tibetan physicians assess the safety of short and long mercury taming techniques that are mentioned across Tibetan medical texts. They typically begin with raw, liquid mercury, which is transformed through interaction with preprocessed sulfur and / or numerous other ingredients into various forms of mercury sulfide compounds, which are then used as an ingredient in specific formulas.

Short mercury processing techniques and their evaluations of safety

> *There are an inconceivable number of different procedures of cooking, washing, purifying, and killing [mercury]; cooking [it] for one or two years, for one or two months, or for days and hours, and so forth (Zurkhar Nyamnyi Dorjé [1439–1475]).*[302]

With this statement, the fifteenth-century physician Zurkhar Nyamnyi Dorjé, representative of the Zur medical lineage and practitioner of the Buddhist Kagyü tradition, opens the section on precious black pill formulations in a long chapter on treating poisoning. Although he was aware

300 Interview, Sidhpur, May 2016.

301 He, however, used "detoxified *chokla* when required as an ingredient." Teinlay Palsang Trogawa, personal communication, Vienna, December 2016.

302 Yonten Gyatso's (1991, 40) translation of: *de yang btso bkru sbyang gsad cho ga'i phyag len mi 'dra ba bsam gyis mi khyab ste/ lo gcig gnyis btso ba dang / de bzhin zla ba gcig gnyis/ zhag dang chu tshod sogs du mar 'tshod pa dang/*. Zurkhar Nyamnyi Dorjé (1993, 287 / 13–15).

of the numerous mercury processing techniques that circulated in Tibet at the time, he was of the opinion that among "all these, the most outstanding [method], more profound than the profound ones, with undiminished blessings of the *ḍākinīs* and an unbroken lineage in practice of highly realized yogis, with less complication and great purpose" was the *tsodru chenmo* technique that Orgyenpa had brought to Tibet two centuries earlier (Gyatso 1991, 40).[303]

Nevertheless, different processing methods continued to occupy Tibetan medical authors for many centuries. Deumar Geshe Tendzin Püntsok, the famous Drukpa Kagyü physician from Konjo, records fifteen methods of taming mercury.[304] They represent a systematic collection of heterogeneous mercury processing techniques of the early to mid-eighteenth century in Tibet. Of the fifteen methods—which also include spiritual techniques of taming mercury through mantras called *ngak dül (sngags 'dul)*—only seven contain sulfur. We do not know if any of these methods were actually practiced during Deumar's time and, if so, to what extent. I found that only three of the fifteen methods are practiced under the same name today among Tibetan physicians in India and Nepal: the hot taming called *tsadül*, the cold taming called *drangdül*, and Orgyenpa's *tsodru chenmo* technique to make *tsotel*.

Dr. Dawa Ridrak (introduced in Chapter 4) copied eleven of Deumar's taming methods largely verbatim into his contemporary *menjor* book (2003, 399 / 22–401 / 25), followed by a detailed description of Orgyenpa's *tsodru chenmo* technique. He also added two more versions of the hot and cold taming methods, both of which include sulfur (Fig. 40). Below, I discuss the hot and cold methods and show that relatively recent changes in these processing techniques center on the use of sulfur. I suggest that these modifications might indicate changing perceptions of the safety of mercury compounds over time.

THE IMPORTANCE OF SULFUR: THE HOT AND COLD TAMING OF MERCURY

Today there are two short processing methods for mercury in Sowa Rigpa. The first method is known as hot taming, or *tsadül*. The second is known as cold taming, or *drangdül*, which is frequently also called "taming [with] tin," or *kardül*, referring to a silvery-white metal ingredient, *kar (dkar)*, by abbreviating *shakar (bsha' dkar)*, which means tin. Some call *kardül* the "medium *drangdül*" *(grang 'dul 'bring po)*, referring to Tibetan practices of transmitting formulas and *menjor* practices in minor, medium, and major versions.

303 Yonten Gyatso's translation of: *kun las khyad par du 'phags shing zab pa las kyang ches zab pa mkha' 'gro'i byin rlabs ma yal ba/ grub thob brgyud pa'i phyag len ma 'phyugs pa/ tshegs chung don che ba'i gdams pa/*. Zurkhar Nyamnyi Dorjé (1993, 287 / 18–288 / 2).

304 See Deumar Tendzin Püntsok (2009, 577 / 16–585 / 13); Dawa Ridrak lists eleven of these methods (2003, 399 / 22–401 / 25) and Sonam Dolma (2013, 115) fourteen.

Figure 40: Unprocessed yellow sulfur, Khari Baoli market, Old Delhi, March 2016. Photo: Thomas K. Shor (Shor 2016 / CC-BY-SA 4.0).

These versions differ according to grades of technical difficulty and availability of precious ingredients and might also affect lines of knowledge transmission (Czaja 2013). They demonstrate the inherent flexibility of *menjor* practices, characteristic of Sowa Rigpa and its many lineages and orally transmitted *laklen*, which by their very nature defy standardization (Gerke 2018a). Most physicians I interviewed use *kardül* and *drangdül* interchangeably, also referring to the final compound, but several texts present them as different methods / compounds (e.g. Nyima Tséring 2009, 59–70), which can easily cause confusion.

The labels hot and cold generally refer to therapeutic efficacy: the cold method is beneficial for hot diseases and vice versa. It also sometimes refers to the temperature applied during processing, but this is not consistent since some cold techniques involve heating mercury. Notably, hot

and cold methods of taming substances are not only applied to mercury, but also to other substances, for example types of calcite called *chongzhi* (*cong zhi*; Tupten Tséring 1990, 361/14–20). As processed compounds, *drangdül*, *kardül*, or *tsadül* are added to specific medicines to contribute to and increase their potency, again with great variety.[305] For example, the formula Ngülchu 18 can be found in the literature with either *tsadül* or *kardül*.[306] Interviewing physicians also revealed variety: Amchi Wangchuk Lama in Kathmandu adds *tsadül* to Ngülchu 18; the Men-Tsee-Khang in Dharamsala adds *kardül*; but both formulas circulate under the same name.

Drangdül and *tsadül* do not appear in the *Four Treatises* and are mentioned only very briefly in the main commentaries of the sixteenth and seventeenth century, written by Zurkhar Lodrö Gyelpo (1509–1579) and Désí Sangyé Gyatso. They both list them in the chapter on purgative therapies, briefly stating that *tsadül* is beneficial for infections and *chuser (chu ser)* diseases while *drangdül* treats other "old" or chronic diseases (Zurkhar Lodrö Gyelpo 1991, 657/24–25; Sangyé Gyatso 1982, 1314/13–14). Later medical texts mention the hot and cold methods, but with strikingly different techniques and ingredients, as well as different therapeutic applications. Comparing and translating several of these descriptions by eighteenth- to twenty-first-century authors, I made two observations.

First, over time descriptions of the cold methods show increasingly more similarities to certain phases of making *tsotel*, although they are simplified. For example, in the cold methods they use tin or *shakar* as the additional metal and mustard oil, while *tsotel* processing requires eight metals and the use of five different types of oil. These simplified ingredients lend the impression that the cold methods were at some point established as more simplified processing methods to replace *tsotel*, possibly for practitioners who could not afford or obtain the more elaborate and expensive ingredients. One such example of *drangdül* substituting for *tsotel* is found at the Men-Tsee-Khang in India, where they prepared the precious pill Mangjor Chenmo with *drangdül* a decade before they first were able to make *tsotel* in 1982.[307]

Second, earlier textual descriptions of *drangdül* and *tsadül* do not mention sulfur (e.g. Deumar Tendzin Püntsok 2009, 583/3–11), whereas most of

305 They are added variously to Dashel 37, Gawa 16, Gurkhyung Chakdor, Goyu Dépak, Jangchö 37, Khyunga Nila, Ngülchu 18, Nyenpo 18, Sarkhyung, Sengdeng 25, Yukhyung Karnen, and Yukar (Amchi Wangchuk Lama, personal communication, Kathmandu, December 2011 and Dr. Ngawang Soepa, personal communication, Dharamsala, December 2012). See also Sallon et al. (2017, 327).

306 The formula includes *tsadül* in Khyenrap Norbu (2007, 154/5), Tsering Norbu (2005, 134/3), referring to the *Relics of Countless Oral Instructions* by Zurkhar Nyamnyi Dorjé (1993), and in the Chinese Pharmacopoeia (Ministry of Health [PRC] 2000, 236/2). Dawa Ridrak (2003, 147/15) lists the formula with *kardül*, reflecting more recent Men-Tsee-Khang practice.

307 Dr. Namgyal Tsering, interview, New York, October 13, 2014. See also Chapter 3.

the later techniques circulating under the same names do involve the trituration of mercury with sulfur. For example, in 2011, Amchi Wangchuk Lama in Kathmandu showed me a detailed description of *drangdül* and *tsadül* with sulfur by Tupten Tséring (1990, 360/18–361/13), who was the last principal of the Chakpori Medical College in Lhasa before its destruction by the People's Liberation Army in 1959; he later worked at the Mentsikhang in Lhasa. Although Amchi Wangchuk practiced both techniques according to his own lineage that he had received back in Kyirong, southwestern Tibet, he thought Tupten Tséring's description was good.

While these textually recorded methods might not necessarily correspond to actual practice, they demonstrate the variety of heterogeneous mercury processing techniques passed down textually under the same names, copied and often modified from one text to the next. As we shall see, in practice, amchi follow their teachers' oral transmissions rather than the texts, which are often not updated. The next two sections will explore the two short taming methods in more detail, particularly considering their perceived safety and how they differ from making *tsotel*.

THE HOT TAMING *(TSADÜL)*

The *tsadül* methods found across Tibetan medical texts are very heterogeneous and show a rather confusing picture. Deumar Tendzin Püntsok (2009, 583/9–11) describes the hot method as boiling mercury with fermented barley beer *(chang)*, unadulterated red rock salt *(tshwa dmar lhad med)*, and soda *(bul tog)* in molten bone-marrow grease *(zhun rkang tshil)*. The liquid is filtered three times, until finally, everything is poured into melted fresh butter *(mar gsar)* and cooked.

This description includes only basic elements of the techniques practiced today and entirely leaves out sulfur. Tupten Tséring's description of the hot method written around the 1950s has no resemblance to Deumar's version. His way of making *tsadül* is a simple trituration of mercury with sulfur (similar to the processing step called "meeting the enemy" in making *tsotel*). The same amounts of pre-processed sulfur and non-processed mercury are triturated in a heated stone mortar, *do zhong (rdo gzhong)*, "preheated by the sun to the extent that you cannot touch it with your hand," until the mercury is "without even a hint of brightness" and the mixture turns "black, deep-blue in color. After that it may be used in medicine."[308] A similar description is found in Namgyal Tsering (1997, 15/9–13). Dawa Ridrak briefly states that making *tsadül* follows the same method as *kardül,* but it is heated without tin and lead (Dawa Ridrak 2003, 401/24–25). Gen Gojo Wangdu explained during the Kathmandu workshop[309] that the hot method is believed to tame the "three poisons of mercury," *ngülchü duk*

308 Translated from Tupten Tséring (1990, 361/8–9): [...] *nyi mar bsros nas lag pas reg mi bzod pa'i* [...] *dngul chu'i 'od cung zad kyang med pa nag mthing ma song bar du dbur rjes sman nang bed spyod btang chog*.

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

sum (*dngul chu'i dug gsum*; see next section) "not fully, but to the extent of not being harmful," but he did not specify which type of *tsadül* this refers to.

THE COLD TAMING *(DRANGDÜL)*

Deumar Tendzin Püntsok (2009, 583/9–11) describes *drangdül* only briefly and does not mention sulfur. Accordingly, mercury is rubbed with salt *(tshwa)* and sour fermented barley beer for seven days. Thereafter, it is boiled in "black butter" *(mar nag)*, translated to me by contemporary physicians as mustard oil. When comparing more elaborate descriptions of *drangdül* in more recent texts, one realizes that—though shorter and simplified—they are similar to the four processing phases of *tsotel* (see next section).

In summary, according to Tupten Tséring (1990, 360/18–361/6), *drangdül* involves rubbing liquid mercury with the powder of *gapiposum* (ginger, long pepper, and black pepper) in a goat's skin bag for eight hours to remove the oxidation or rust called *ya (g.ya')*. In conversation, Tibetan physicians largely used the English term rust for *ya,* referring to external impurities, stains, and oxidized particles on the surface of metallic mercury.

The technique of making *drangdül* is much shorter but very similar to the first phase of making *tsotel,* called "removing the rust/oxide" or *ya chi (g.ya' phyis)*. Mercury is then boiled for several hours in various types of animal urine, washed frequently with water, boiled for several hours with the sour juice of *tarbu* (seabuckthorn berries), and again rinsed many times with water. This process is meant to cleanse the mercury of all kinds of *ya* and adulterants. It is similar to the second phase of *tsotel* making, which is more elaborate and called "expelling the rust/oxide liquid" or *ya khu dön (g.ya' khu 'don)*. Then, mustard oil is heated in an iron pan and mercury is boiled in this oil for several hours together with very thin sheets of pre-processed tin (some *kardül* versions also add pre-processed lead, *zha nyé [zha nye]*). This is a simplified version of the much longer and more complex third step of making *tsotel*: the "cooking and washing" process, *tsodru.* Finally, Tupten Tséring concludes, the mixture is triturated in a stone mortar with pre-processed yellow sulfur, or *muzi,* into a fine powder of a blackish deep blue color until no silvery brightness remains. In the making of *tsotel* this corresponds to the last and more elaborate phase of "meeting the enemy," or *dratré*, where mercury is triturated with sulfur.

There are of course detailed textual descriptions of both short taming methods in Sowa Riga textbooks published by Tibetan physicians in the PRC (e.g. Tsüntargyel 2007).[310] However, since *menjor* practice often differs from what we find in texts, here I analyze publications by Men-Tsee-Khang

310 Amchi Gege of the Bonpo medical school in Nepal followed the text by Tsojé Jikmé Namkha Dorjé (2006) to teach *tsadül* and *drangdül*, but made *tsadül* only once. Amchi Nyima Sampel, personal communication, September 11, 2013, IASTAM conference, South Korea.

physicians in India, which I was able to follow up with interviews in order to document the recent changes introduced to these techniques by experienced *menjor* experts at the Men-Tsee-Khang in Dharamsala.

There are two textual versions of *kardül* published by contemporary physicians from the Men-Tsee-Khang in India. Dawa Ridrak's *kardül* description (2003, 401/13–23) is strikingly similar to Tupten Tséring's *drangdül* method from Lhasa (1990, 360/18–361/6), described above. The two main differences are the length of the *ya chi* method (two days instead of only eight hours) and the additional inclusion of lead in the boiling process. The second published *kardül* method is found in Namgyal Tsering (1997, 12/6–15/2), who also notes that lead, tin, and sulfur have to be pre-processed.

I only began to understand these variations and how they link up with perceptions of safety when I consulted Dr. Dorje Damdul, a Men-Tsee-Khang-trained Tibetan physician and associate professor at the Sowa Rigpa Department at CHITS. He explained:

> Basically, *tsadül* is the same method as *drangdül*. Only they do not add lead and tin, and also no oil, to *tsadül*. Now sometimes they do not add lead at all in *drangdül* because people think it is toxic, so they stopped using it as well. These changes are not always written down in the text, but it is practiced that way. No one has updated the literature.[311]

Dr. Dorje Damdul thought the most up-to-date descriptions of the two processing methods were written by Dr. Namgyal Tsering (1997), who made *tsotel* several times at the Men-Tsee-Khang, once as the leading physician (see Appendix B). Dr. Namgyal Tsering states that *tsadül* has many traditions, and the one taught at the Men-Tsee-Khang is more elaborate and less harmful; it definitely involves sulfur. He writes:

> Most books mention the practice that during the *tsadül* taming there is no need of cleaning the *ya* and extracting the *duk* to cast away the untamed, but in our tradition, just as with the *tsodru* [process of making *tsotel*], if one cleans the *ya* and extracts the *duk*, then it is less harmful for the digestive power of the stomach and the sense faculties, etc. It [the tamed mercury compound] is rather perceived to be particularly "smooth." This was mentioned by my *menjor* teacher, [and] that is sufficient for me. [...] During *tsadül*, cleaning the *ya* [...] is similar to the above [mentioned] *drangdül*; one must apply the same method.[312]

311 Interview, Sarnath, December 21, 2012.

312 Translated from Namgyal Tsering (1997: 15/3–9): *phyag deb mang bar tsha 'dul la dngul chu g.ya' phyis dug 'don byed mi dgos par rgod po btang srol 'dug kyang rang lugs la btso bkru'i skabs ltar g.ya' phyis dug 'don byas na pho ba'i 'ju stobs dang dbang po sogs la mi gnod cing 'jam pa'i khyad par mthong zhing sman sbyor*

Dr. Namgyal Tsering also explains that none of these methods could be practiced without the "seeing transmission," as visually observed when guided by a teacher. He further states that Tibetan scholars gave more importance to the hands-on practical transmission of mercury processing and therefore "did not write clearly [about the practice]" (*gsal bar bkod ma gnang bas*, Namgyal Tsering 1997, 16/6–7).

In summary, this short textual excursion demonstrates that mercury-processing techniques changed over time and that the shorter cold and hot methods were modified considerably from Deumar's description in the early eighteenth century. As far as I know, only three mercury processing methods are currently practiced among Sowa Rigpa practitioners in India and Nepal *(drangdül/kardül, tsadül,* and *tsotel)*, all of them containing sulfur. The short methods transmitted by the Men-Tsee-Khang in India today are in fact shorter versions of making *tsotel*; *drangdül/kardül* are similar to the first phase of making *tsotel*. *Tsadül* now includes all stages of making *drangdül*, except the heating with tin and/or lead (which is now usually left out). It also omits the step of boiling mercury in oil (which Ama Lobsang practiced in the 1980s, see Chapter 5), but includes the trituration of mercury with sulfur.

The main difference between the two methods is the amount of time and number of processing steps involved, which reintroduces the discussion of perceptions of safety. Making *drangdül/kardül* takes only a few days; *tsadül* can be made in a few hours. The cold method is considered safer by Tibetan *menjor* specialists, since mercury is supposed to "become more stable during the longer processing."[313] As the senior Men-Tsee-Khang physician Dr. Choelothar explained, "All recipes of *kardül* and *tsadül* have been enlarged by additional safety measures of doing *ya khu dön* and *ya chi*."[314] Nevertheless, the Men-Tsee-Khang stopped using the hot method around the early 1990s.[315] Dr. Tenzin Thaye explained that they considered the processing of *tsadül* "too short, and not very safe."[316] As of the time of writing, it is only made by a few independent, small-scale pharmacies.

I conclude that the principle techniques that survived centuries of *menjor* experience with mercury and are practiced by Tibetan physicians today in India all build on Orgyenpa's *tsodru chenmo* method, and that perceptions of safety are mainly, but not exclusively, based on the necessity

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rgan lags kyis kyang de ltar gsungs pas de rang chog/ tsha 'dul la g.ya' phyi [...] *gong gi grang 'dul skabs dang gcig pas rigs 'gre dgos/*.

313 Dr. Tenzin Thaye, personal communication, McLeod Ganj, May 2016.

314 Personal communication, Chontra, June 2016.

315 Dr. Dorje Damdul still made *tsadül* at the Men-Tsee-Khang in the 1980s. Dr. Namgyal Tsering's description of *tsadül* is from 1987, though published in 1997. Dr. Tenzin Thaye, who came to the Men-Tsee-Khang a few years later, never saw it during his time. I assume they stopped making it sometime in the early 1990s.

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

of triturating mercury with sulfur.[317] However, to conclude from the above that the main aspect of mercury processing is making mercury sulfide is missing the essence of the taming process, which is a lot more time-consuming and involves many steps. As Dr. Tenzin Thaye explained:

> I think that if you just mix mercury with sulfur, it still has *duk*. Only when purifying all the substances is it usable. Just triturating mercury with sulfur is not enough. I would not take it, it is not safe.[318]

So what exactly are the *duk* of mercury and how is safety fully established in the *tsodru chenmo* taming process? In the following analysis I focus on the relationship the *menjor* specialists processing mercury have with the metal and how they engage their senses to determine its safety in its various stages of taming. Then I discuss their methods of protecting themselves from mercury toxicity.

Taming the poisons of mercury: The long processing technique *Tsodru Chenmo*

> *Sulfur is like an atom bomb. When mercury meets sulfur, it totally changes, and the three poisons are really transformed (Dr. Choelothar).*[319]

During *tsodru chenmo* mercury is tamed through confronting it with many substances that bind and transform its poisonous nature, and "invoke the essence" (*bcud du 'gugs pa*, Dawa Ridrak 2003, 420/14). For Tibetan physicians, *ngülchu* has many poisons. Their textual descriptions paint a rough character: mercury is heavy, penetrating, sticky, mobile or fast, wild, and full of rust. These modalities are expressed in Tibetan terms of "poison of heaviness" or *chiba duk (lci ba'i dug)*, the "poison of penetration" or *bikpé duk ('bigs pa'i dug)*, the "poison of adherence" or *tsi duk (rtsi'i dug)*, the "poison of mobility" or *yoba duk (g.yo ba'i dug)*, the "poison of wildness" *göpé duk (rgod pa'i dug)*, and the "poison of rust/oxide" or *ya duk (g.ya'i dug)*. All of these *duk* have to be tamed during processing. The focus is on manipulating the qualities of mercury's character with other substances. For example, the poisons of mobility and wildness will be bound through the pre-processed eight metals (iron, lead, copper, brass, bronze, gold, silver, and tin) during manufacturing.

317 It might be worthwhile to investigate a parallel, though earlier development in Sanskrit medical texts here. Wujastyk (2019, 78) notes that sulfur was rarely mentioned in Sanskrit medical works before the eleventh century CE and that "early Sanskrit medical works did not include sulfur in their descriptions of making iron tonics or other *rasāyana* formulae [...], but it seems to have become a more common ingredient after the eleventh century."
318 Personal communication, McLeod Ganj, December 7, 2014.
319 Personal communication, Chontra, May 6, 2016.

They will become immobile and tame, while the poisons of heaviness and penetration will be "devoured" by the eight minerals, making mercury light.

The eight minerals are difficult to identify. Their scientific identification and illustrations in modern Tibetan *materia medica* differ; I therefore use their Tibetan terms and provide approximate identifications.[320] Dr. Tsering Norbu, the head of the Materia Medica Department at the Men-Tsee-Khang, explained that the existing identifications of the eight minerals are often wrong and the substances available in the market frequently fake. They have to be carefully checked. The eight minerals are first pre-processed into a powder and then used to "eat the toxins of mercury."[321] Therefore, they are also called the eight devouring minerals, or *zajé kham gyé (za byed khams brgyad)*.

Dr. Penpa Tsering, who trained at the Men-Tsee-Khang and established his own pharmacy in the Dharamsala area, where he does not use mercury, said the texts are not very clear about which type of poison is affected exactly by which type of processing. However, texts warn how *duk* will collectively affect the body if improperly processed. In the *menjor* texts, the poisons of mercury are often conflated into the single label *chibik*, referring to the first two poisons of heaviness and penetration. Dr. Choelothar said that *yoba duk* (poison of mobility) is a more familiar term than *tsi duk* (poison of adherence), since it refers to the very visible mobility of mercury,[322] but most texts just use *chibik*. In turn, Dawa Ridrak directs that "the three main poisons" *(dngul chu dug gsum)*—those of heaviness, penetration, and adherence—all must be made "smooth" *('jam)* through cooking the mercury with various substances (Dawa Ridrak 2003, 421/5). Below, I explore how Tibetan physicians perceive and describe the characteristics of some of the main poisons and outline the related methods of taming. They also conduct certain tests to verify whether the taming of these poisons has been successful or not.

THE POISON OF HEAVINESS

As anyone who has held a small container of liquid mercury can attest, the specific gravity of mercury is very high. Tibetan physicians interpret this heavy characteristic in terms of Sowa Rigpa cosmologies, somatic

320 The eight minerals with varying existing identifications are: (1) sour-water stone *(chu skyur rdo* or *rdo chu)*, which is described as a calcareous sinter, $CaCO_3$, "a solidified deposit formed at a spring and having a sour taste" (Gyatso 1991, 48), also identified as a type of actinolite (Clark 1995, 135); (2) lepidolite, also called red mica *(lhang tsher dmar po)*; (3) gold ore *(gser rdo)*, a chalcopyrite, $CuFeS_2$ (Kelden Nyima 2010, 71); (4) orpiment *(ba bla)*, an arsenic trisulfide, As_2S_3; (5) magnetite *(khab len)*, a magnetic iron ore, Fe_3O_4; (6) pyrite *(pha wang long bu*, also *pha bang long bu)*, which is an iron sulfide, FeS_2 (Pasang Yonten 1998, 139), also identified by Dan Martin as galena, which is lead sulfide, PbS (THL 2011); (7) realgar *(ldong ros)*, an arsenic II sulfide, AsS; and (8) silver ore *(dngul rdo)* identified as a pyrargyrite, Ag_3SbS_3 (Kelden Nyima 2010, 72). Several of these minerals contain sulfur. See Simioli (2015, 42) for a different set of identifications.

321 Interview, Dharamsala, May 14, 2015.

322 Personal communication, Chontra, May 6, 2016.

physiologies, and the basic principles of *menjor* practice: the five elements *('byung ba lnga)*, the eight characteristics *(nus pa brgyad)*, and the three *nyépa (nyes pa gsum)*.[323] With these modalities Sowa Rigpa theory explains the complex metabolism of poisons in the body. The Men-Tsee-Khang-trained female physician Dr. Sonam Dolma[324] wrote about the effects of *chiba duk* on the body if one were to consume unprocessed mercury:

> The heavy characteristics would increase the elements earth and water in the body thereby accumulating *béken*[325] disproportionately. The heavy nature of mercury would extinguish the digestive heat, thereby slowing down the metabolism and causing hindrances in the synthesis of food and its subsequent benefits for mind and body (Sonam Dolma 2013, 113).

The way to tame *chiba duk* is through cooking and washing techniques, which will make mercury's properties lighter. During this application, the pre-processed eight minerals devour *chiba duk*. In the end, the processed *tsotel* substance will swim on the surface of a glass of water (see photo in Dawa Ridrak 2003, 427). If it sinks, the processing steps have to be repeated until the heaviness has been transformed into lightness, and the mercury refinement has been accomplished, *ngülchu drup* (see Chapter 2).

MOBILE, PENETRATIVE, AND PIERCING POISONS

Elemental mercury is very mobile, rolling across surfaces in the form of globules; thus its association with the fitting name "poison of mobility," or *yoba duk*. This mobility also makes it penetrating. *Bikpé duk* mainly refers to mercury's ability to penetrate the entire body and pierce any tissues it comes in contact with. It means that with this type of *duk*, mercury's toxicity can reach anywhere in the body. In the words of Dr. Dolma:

> The "penetrative" or "mobile" characteristics are better understood in lay language as "fast" *(myur ba)* and "unhindered" *(mi gtong ba)*. It means that mercury passes through the passages and immediately disseminates into the entire system of the body, making it vulnerable. Due to it being "fast," which also has the connotation of being "sharp" *(rno ba)* in nature, there would be no time to apply any methods against its detrimental effect. The toxic effect of unprocessed

323 The three *nyépa* were introduced in Chapter 2. The basic building modules of potency in Sowa Rigpa *menjor* theory are the eight *nüpa* (heavy, oily, cool, blunt, light, coarse, hot, and sharp), which are intertwined with the six tastes *(ro drug)*, and the three postdigestive tastes *(zhu rjes gsum)* of substances.

324 Dr. Dolma received theoretical instructions on making *tsotel,* interpreted for many senior physicians, and until 2013 worked at the Men-Tsee-Khang Translation Department (now called the Documentation and Publication Department).

325 *Béken* is one of the three *nyépa* predominated by earth and water and has the characteristic of heaviness.

> mercury is therefore also a time-bound factor, which hinders the physician from counteracting its poison once it has been ingested (Sonam Dolma 2013, 114).

The poisons *chiba duk, bikpé duk*, and *yoba duk* are "devoured" by the eight minerals, "bound" by the eight metals, and "tamed" through extensive cooking and washing processes, described below. Eventually, "mercury's 'penetrative' and 'mobile' nature, [...] is transformed into a curd-like matter, which can be easily held between one's fingers" (Sonam Dolma 2013, 116; see also Dawa Ridrak 2003, 424/11, 424/16). When its mobility has been tamed, it becomes "similar to a cleaned mirror" (*me long phyis pa ltar*, Dawa Ridrak 2003, 424/11) and can no longer move around unhindered. A so-called safety test involves putting a matchstick into the shiny matter to see if it stands on its own. If it does not, the processing steps have to be repeated.[326]

RUSTY AND ADHERENT POISONS

Because of its rusty and sticky nature, *tsi duk* is very similar to *ya duk* (poison of rust/oxide) and requires special processing by washing mercury with various plants and acids. Dr. Dorje Damdul at CHITS explained that *tsi duk* is related to the term *jartsi (sbyar rtsi)*, which means a glue-like or gummy substance. He explained, "*Tsi* is something sticky, and *jar* refers to something very attached."[327] *Ya* is like a rust that has to be washed. Dr. Penpa Tsering compared it with the Tibetan cultural practice of cleaning off the *ya* from a copper vessel with fermented barley beer, *chang*. *Chang* is a crucial ingredient in washing off the *ya duk*, not only from mercury but also from the stomach linings of physicians exposed to its toxicity (see last section).[328]

Dr. Dawa Ridrak, during our conversation in New York, translated *tsi duk* as a form of oxide, or *ya*:

> It is like the oxide from the silver and gold. *Tsi* literally means essence, but here it is an oxide, called *ya*. When you touch silver it will be black; the black stuff has to be removed. Likewise the *ya* has to be removed from mercury.[329]

Dr. Sonam Dolma explains *tsi duk* using an allegory that was mentioned by her Men-Tsee-Khang teacher, the late Lobsang Chöpel of Phagri, who participated in making *tsotel* in 1982 (see Fig. 20 in Chapter 3):

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326 See a photo of this test in Dawa Ridrak (2003, 424). See also Simioli (2016, 404, note 56), who refers to this test in Sangyé Gyatso's *Blue Beryl*.
327 Interview, Sarnath, December 21, 2012.
328 Interview, Sidhpur, June 4, 2016.
329 Interview, New York, April 1, 2012.

> The "adherent" nature of mercury is explained in the form of a metaphor of oil being absorbed by a cloth. In this metaphor, the body is described as a piece of cloth which, once it comes in contact with the toxicity of unprocessed mercury, cannot be purged from the stain of the oil. Like the oil clinging to the piece of cloth, the "adherent poison" of the mercury stays with the body. The cloth wastes away on trying to wash off the oil stain; similarly the body literally gets tormented and wastes away in the process of cleansing and purging the toxic [unprocessed] mercury (Sonam Dolma 2013, 114).

We can understand from all these quotes that the entire taming process is not about taking something out, but about manipulating existing modalities that are characteristic for poisonous substances into smoother qualities that make a substance beneficial. Safety is articulated in terms of how well the various types of *duk* have been tamed. This also includes a temporal element: the longer the processing—attending to all the steps that have to be carried out accurately—the safer the substance. I alluded to this temporality in Chapter 2, where I explained the meaning of *choga* (practice / procedure) and the importance of agency, skill, and effort in processing mercury. This interrelationship between time spent on *choga* and the accomplished or perfected level, or *drup*, of the tamed final product adds to my argument that perceptions of safety and potency are deeply encapsulated in the human effort and "enskilment" of processing, to use Ingold's fitting term (Ingold 2000). Moreover, Sowa Rigpa *menjor* taming processes are also metaphorically linked to the skills of Buddhist mind training. Dawa Ridrak expresses this elegantly:

> For example: *chang* [Tibetan roasted barley beer], garlic, meat, and butter have a smooth quality; they tame the adherent poison of mercury, which has the characteristic of roughness. Metaphorically speaking, it is like love conquering hatred.[330]

In the following, I specifically explore the nature of *choga* in the main processing steps for making *tsotel*, beginning with a myth that symbolically describes the main ingredients and steps involved in the process.

THE MYTH OF THE EIGHT SAGES AND THE QUEEN OF POISON

Following Tibetan literary tradition, Dawa Ridrak places this myth at the beginning of his *tsotel* chapter.[331] It briefly describes the active agents involved in mercury processing, personifying key substances as a queen,

330 Translated from Dawa Ridrak (2003, 420 / 11–13): [...] *dper na/ chang sgog sha mar gyi yon tan 'jam pas/ dngul chu'i mtshan nyid rtsub pa'am rtsi'i dug 'joms te/ dper na byams pas zhe sdang 'joms pa lta bu dang /*.

331 The myth is also found in Degé Drungyig Gurupel (1986, 306 / 5–307 / 3) and Lamenpa Orgyen Tendzin Gyatso (1986, 185 / 6–187 / 1).

serpents, and sages. This symbolism is understood as a tool to transfer knowledge more securely. Without the explanations of teachers, the myth does not make much sense. Most physicians could not explain it to me. It required experts who had made *tsotel* and had studied the texts to decipher the symbolism. Here I summarize the myth and add explanations and key Tibetan terms in parenthesis:[332]

> Among the inanimate poisons [created during the churning of the ocean] the main [poison] was mercury, which was eaten by the eight serpents *[klu brgyad]*, who then died [of the poison]. The corpses [of the eight serpents] turned into the eight devourers [*za byed brgyad*, which are flesh-eating demons, in this case the eight minerals—orpiment, realgar, magnetite, etc.—that devour mercury]; the queen of poison [the necessary, but disquieting, female principle] instigated trouble inside by mixing roasted barley beer *[chang]* and urine *[dri chu]* into the poison, which became intoxicated. [This refers to the nature of mercury being rough and mobile, and its strong reaction when exposed to the acid substances used to refine it], at which time, the eight sages [*drang srong brgyad*, resembling the eight metals] bound [mercury] and burned it.
>
> Negativities *[sdig pa*, i.e. the various types of *duk]* were washed and cooked, and the purified [*sbyang*, referring to mercury] turned into nectar. And due to the power of prayers the queen [of poison turned into] sulfur *[mu zi]*, the beer into the three sour ones [*skyur gsum*, which are sour *chang*, yellow and black types of soil*,* and *tarbu* juice, needed during the mercury cooking process], the urine into *tsurchu* [*mtshur chu*, which refers to *ser mtshur* or *nag mtshur*, which are types of soil], and the eight sages [transformed into] the eight binding metals [*'ching byed lcags brgyad*—gold, silver, copper, etc.], and the eight serpents [transformed] into the eight devourers [*za byed brgyad*, which are the eight minerals]. The fire that burned [mercury] transformed into the three hot ones [*tsha ba gsum*, which are ginger *(lga skya)*, long pepper *(pi pi ling),* and black pepper *(pho ba ris)* needed during the first stage of processing]. The fire itself transformed into all realities. Due to the power of interdependence *[rten 'brel gyi mthu]*, the practice went well. [...] This is the legend regarding mercury preparations, and there are many short and extensive treatises and processing practices extant until this day.[333]

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332 Special thanks to Dr. Tenzin Thaye and Dr. Dawa Ridrak for explaining this myth to me.

333 Translated from Dawa Ridrak (2003, 402 / 24–403 / 4): [...] *mi rgyu ba'i dug gi gtso bo dngul chu klu brgyad kyis zos pa'i shi ba'i ro za byed brgyad yin la dug gi btsun mos nang dbyen byas nas dug la chang dang dri chu sbyin pas myos pa'i tshe drang srong brgyad kyis bkyig nas mes bsregs/ sdig pa bkru shing btsos te sbyang pas bdud rtsir 'gyur/ de nas smon lam dbang gi btsun mo ni mu zi/ skyur gsum ni chang dang dri chu mtshur chu bcas dang / drang srong brgyad ni 'ching byed lcags brgyad/ klu brgyad ni za byed brgyad/ bsreg byed me ni tsha ba gsum dang*

The myth reveals that the main ingredients used during the *tsotel* practice are catalyzed and undergo a transformation themselves before they can be used to tame mercury. Thus, not only mercury and sulfur are pre-processed, but many of the other ingredients, especially the eight minerals and eight metals; each undergo extensive pre-processing as well, contributing to the complex, time-consuming, and challenging *tsodru chenmo* event.

Most modern Tibetan texts divide the *tsodru chenmo* technique, which can take up to forty days or more to complete, into four main processing phases[334]: (1) to "remove the rust / oxide," *ya chipa (g.ya' phyis pa)*; (2) to "expel the rust / oxide liquid," *ya khu dönpa (g.ya' khu 'don pa)*; (3) to "tame the heavy and penetrative poisons of mercury through cooking and washing" (*dngul chu lci 'bigs btso bkrus 'dul ba*; Dawa Ridrak 2003, 420 / 21), briefly called "cooking, washing" or *tsodru (btso bkrus)*; and (4) to "transform the natural form [of mercury through] confrontation" (*dgra dang sprad nas rang gzugs [su] bsgyur ba*; 2003, 424 / 27), briefly known as "meeting the enemy" or *dratré*. These four processing phases are often succinctly presented as the three main steps of cleansing, cooking, and confrontation (Sonam Dolma 2013, 116).

Several modern works published by Tibetan medical practitioners in the PRC describe these processing methods in great detail (e.g. Troru Tsénam 2001, vol. 4, 510–625, 2012; Tsoga Jikjé Tséring 2003; Tsüntargyel 2007), and some are illustrated with photos (e.g. Nyima Tséring 2009; Sönam Bakdrö 2006). They are all ultimately based on the famous *tsotel* manuals by eastern Tibetan authors discussed in Chapter 4. Dawa Ridrak's account (2003, 412 / 18–451 / 18) documents making *tsotel* at the Men-Tsee-Khang in 1994 and is based on Kongtrul Yönten Gyatso's work.[335]

In respect for what is considered a secret practice, in the following I will only describe some of the principle characteristics of taming. Physicians perceive these characteristics directly through their senses, which I argue also determines how they think of mercury's toxicity and safety. Some of the processing techniques also have a strong resemblance to Tibetan ways of preparing food, thus revealing culture-specific enskilments, probably developed over time with tools that were available in Tibet. It would be a worthwhile study, which is beyond the scope of this book, to compare the Tibetan techniques with the *saṃskāras* in Indian alchemy (e.g. Murthy 2008; White 1996, 265–269).[336]

The four principle phases of taming mercury into *tsotel* are:

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me dngos rnams su 'gyur/ rten 'brel gyi mthu las lag len 'di 'byung ba'i [...]*/ ces pa'i gtam rgyud dang 'brel ba'i dngul chu'i sbyor ba rgyas bsdus shin tu mang ba'i bstan bcos dang lag len gyi sbyor tshul da lta'i bar yod* [...].

334 Here they are summarized from Dawa Ridrak (2003, 414 / 13–428 / 25) and Penpa Tsering (1997, 29 / 3–32 / 9).

335 Interview, New York, April 1, 2012.

336 Simioli (2015, 43) argues that the processing steps in the two alchemical texts from the Tibetan Buddhist Canon authored by Bhalipa "basically conform to the eighteenth canonical *saṃskāras* or alchemical operations of Indian alchemy."

(1) Removing the rust / oxide, *ya chipa*
In order to remove the *ya*, liquid mercury is kneaded over the course of several days with the "three hot ones" (ginger, black pepper, and long pepper) in a sealed animal-skin bag placed in a large round iron pan. Mantras are recited during kneading. The technique resembles a Tibetan custom of kneading roasted barley flour, or *tsampa (tsam pa)*, in an animal skin bag (today made of goat's skin) that was also used in Tibet to transport *tsampa* while traveling. The mercury is frequently washed in a special water solution and the liquid is replaced. After this processing phase, mercury is considered free from any possible impurities. This also includes the contaminants found in adulterated, commercially-bought liquid mercury (e.g. lead), of which Tibetan physicians in India are cognizant.

(2) Expelling the rust / oxide liquid, *ya khu dönpa*
During this phase, mercury is churned with a variety of acids (such as urine, sour seabuckthorn berry juice, or *tarbu*), many different types of salt, and other substances in a metal container with a large churning stick. The equipment and technique resemble the Tibetan method of churning butter or making butter tea (see photo in Dawa Ridrak 2003, 416). The churning is followed by frequent washing and rinsing, as well as expelling the liquid that contains the *ya.* This cycle goes on for many days with mantra recitations. Foods perceived to have the quality of smoothness while also having the ability to tame the roughness of mercury, such as fermented barley beer, garlic, meat, and butter—all part of the staple Tibetan diet—are used in this process (Dawa Ridrak 2003, 420 / 11). At the end of this step, the aforementioned matchstick test is performed and provides visible evidence of whether the processing was successful. If the stick does not stand up, they must repeat the same procedure the next day. Dr. Tenzin Thaye described this test as a form of safety, as well as standardization, noting, "Each step of taming has its challenges, so the tests show if the taming has been successful."[337]

(3) Cooking and washing, *tsodru*
The *tsodru* phase has three parts—the greater, middle, and lesser. This phase involves cooking the mercury in a caldron (see Fig. 19, Chapter 3) with a number of ingredients, including the pre-processed powder of the eight minerals and the pre-processed ashes of the eight metals. This cooking occurs in three stages at varying temperatures: first for ninety-six hours (greater), then forty-eight hours (middle), and finally for twenty-four hours (lesser). Phases of cooking are always followed by phases of washing the mercury with various types of ingredients dissolved in water.

337 Personal communication, McLeod Ganj, December 7, 2012.

(4) Meeting the enemy, *dratré*

This processing phase takes place in a darkened, clean, and quiet room and involves the trituration of the processed mercury with pre-processed sulfur on a pre-heated stone trough, *do zhong*, for several days. It is considered the most important phase, which women are prohibited from attending. It is technically challenging and therefore accompanied by special rituals.[338] Tenzin Thaye, who made *tsotel* at the Men-Tsee-Khang in 2001, 2008, and 2014, explained:

> On that day, we always invite a lama to begin the trituration. It is difficult and does not always go smoothly, even if you do everything right physically. So we always invite a rinpoche. First, we recite prayers and perform rituals, then the lama will start mixing the sulfur with mercury. After he mixes it for thirty to sixty minutes we distribute a little of the mixture to all the troughs of the other workers. If we give this as a *jinlap* (forms of blessing) to all, it will go well![339]

Dawa Ridrak, who took part in making *tsotel* at the Men-Tsee-Khang in 1994 and published a daily account of the event, describes this day of "meeting the enemy" as follows:

> Day 27: [...] Relying on the hour harmonious to making nectar,[340] again three physicians for the sake of removing obstacles make a smoke offering and a drink offering to the oath-bound protectors and perform elaborate libation offerings.
>
> Then, inside, the doctors jointly [perform] the seven-fold ritual and chant in unison the Guru Yoga of Avalokiteśvara, then have tea, food, and fruits together, offer it to a high-standing person, and establish a boundary *[grub mtshams]*. Prepare the stone troughs, the round [grinding] stones, and heat up the charcoal fire. At the beginning, Toding Rinpoche[341] inaugurates [the event] and bestows the preliminary practice of the self-generation of the Kālacakra [his own tutelary deity practice]. When the two, the queen, refined essence of the earth *chülen* [which is sulfur] and the male deity's essence *daryaken* [*dar ya kan*, which refers to mercury], are put together, [they] turn into a blue-black color.[342]

338 See, for example, Chapter 3 on the Dalai Lama initiating this trituration in 1982.
339 Interview, Dharamsala, May 15, 2015.
340 This is an astrologically calculated auspicious conjunction of a favorable time to make good (nectar) medicines.
341 Toding Rinpoche (Tupten Gyeltsen) was a young monk and assistant during the 1982 *tsotel* event (see Fig. 22, Chapter 3) and later became a physician at the Men-Tsee-Khang and participated in the *tsotel* events of 1994 and 2001.
342 Translated from Dawa Ridrak (2003, 425 / 4–18): *nyin nyi shu rtsa bdun/* [...] *dus tshod bdud rtsi thun mtshams la brten nas sman pa gsum gyis yang thog tu bgegs sel ched bsangs dang gser skyems dam can gsol kha gzab rgyas byas/ de nas nang*

Note that these rituals are not meant to tame mercury but to protect those who tame it and to remove any types of obstacles, *barché*. Here, the smoke and drink offerings in combination with individual deity practices ritually protect the pharmacy space in which the transformation of mercury takes place. The so-called seven-fold ritual is a set of seven or more rituals and a common component of Mahāyāna Buddhist liturgy often performed at the beginning of major ritual practices to accumulate merit (Buswell and Lopez 2014, 776). The ritual sealing of the pharmacy space establishes a boundary that can only be entered by those closely involved with the entire processing. It allows for a concentrated, undisturbed, and ritually protected workspace (see Fig. 42 below for rituals conducted on another day of processing).

The transformation of mercury and sulfur during their "confrontation," *dratré,* is striking, since the light-colored powder turns into a blue-black paste and then into a blackish powder through thorough and repeated trituration. Dr. Choelothar described this transformation: "When *muzi* [sulfur] meets mercury it is like an atom bomb. After *dratré* there is no mobility of mercury left. It has turned into a black powder and cannot move."[343] The final test of successful processing is when the *tsotel* powder swims on the surface of a water glass, as explained above.

Dr. Tenzin Thaye summarized his experience of taming mercury, also drawing a parallel to taming negativities in one's mind (see Introduction):

> You cannot tame the mind instantly, it takes time to tame negativities. Likewise, taming mercury takes many steps. Taming takes time. According to the character of a person he does good or bad things. Mercury has a bad character: it is raw, heavy, rough, and sharp, that is why we say it has a lot of *duk*. To change all these characters takes time, they have to be tamed and transformed into smooth and light, etc. These procedures take time. I never understood why one step follows the other, but when you actually see it, it makes sense. In each step, we see a lot of change in the nature of mercury, so each step is very important.[344]

Maybe now we can envision why this part of the processing is called a confrontation. In practice, it deeply affects the character of the mercury substance, rendering it immovable. In the subjugation myth of Buddhist tantrism, the demon Rudra (representing Śiva, whose semen resembles

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du sman las thun mong nas yan lag bdun pa'i cho ga dang spyan ras gzigs bla ma'i rnal 'byor 'ur 'don dang gsol ja gro 'bras dang bcas pa 'degs 'bul grub mtshams rdo gzhong dang / rdo ril/ sol me tsha po bcos/ thog mar mtho lding rin po che nas dbu 'byed kyi tshul du dus 'khor gyi bdag bskyed bsdus pa sngon 'gro gnang zhing / sa bcud kyi dwangs ma btsun mo dang yab kyi dwangs ma dar ya kan gnyis phan tshun sprad nas mdog mthing nag can du 'gyur bas/.

343 Personal communication, Chontra, May 6, 2016.

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

mercury) was confronted quite violently, killed, and resurrected as a protector of Buddhism (Mayer 1996, 104–128). These elements of demon subjugation reverberate deeply in the *tsodru chenmo* steps of processing.

Mercury is confronted by many powerful substances in long acts of rubbing, churning, and boiling, until its total transformation into an immobile powder that can neither harm, nor revert to its previous negative rough state. The power of the poison is not lost, but tamed in order to be utilized as a potent medicine. The final step of "meeting the enemy" subdues a powerful poison, evoking one of the most enigmatic images in Tibetan culture: the pinning down of demons into Tibetan landscapes and transforming them into powerful sacred places (Gyatso 1987) and protectors of Buddhism. Likewise, the control of mercury happens alongside imbuing it with power and potency; thus amchi consider *tsotel* the best elixir to treat the most difficult diseases and protect health.

The scientists who conducted the *tsotel* study at the Men-Tsee-Khang considered all mercury compounds in their samples (whether *chokla*, *kardül*, *tsadül*, or *tsotel*) as mercury sulfide, which they thought to be safer than any of the other chemical forms of mercury because of its insolubility (see Appendix A). For Tibetan physicians, taming mercury is much more than merely mixing mercury with sulfur: taming the poisonous requires a deeper skilled and sensory engagement with the changing modalities of mercury. From their perspective, during the long and arduous process, heaviness becomes light, roughness becomes smooth, and mobility becomes immobile. The different epistemologies of Sowa Rigpa and modern chemistry do not easily find a meeting ground here,[345] and a simple comparison could easily lead to a binary conclusion that Tibetans merely figured out how to create a safer form of mercury by adding sulfur. However, that would be missing the point of the Tibetan understanding of the entire endeavor of taming and ignore the ways *tsotel*'s therapeutic applications and potency is perceived and understood (see Chapter 7).

The chief physician who oversees and guides the taming of mercury also takes the main responsibility for its safety. After each successful processing of *tsotel*, he consumes about three grams of *tsotel* (considered quite a substantial dose) in front of his colleagues or in a public function to show that he is confident that the taming was successful and that the substance is no longer poisonous (Fig. 41).

While *tsotel* is considered safe, the physicians and workers conducting the processing are aware of their exposure to toxic mercury fumes and have developed several techniques to deal with it. How do they make sense of different notions of risk and mercury toxicity symptoms, prompting different kinds of protection?

345 For promising approaches to prepare the terminology for such a meeting ground see Tidwell and Nettles (2019).

Figure 41: Dr. Jamyang Tashi, head of the Pharmacy Department at the Men-Tsee-Khang, publicly takes three grams of *tsotel* during a ceremony to show that he is confident that the taming process was successful and that the substance is no longer poisonous. Here, the ceremony was part of the golden jubilee fifty years of Men-Tsee-Khang celebrations in 2011.
Photo: Men-Tsee-Khang (Men-Tsee-Khang 2011 / CC-BY-SA 4.0).

Occupational safety

Tibetan physicians know that mercury can be highly poisonous and take precautionary measures when handling it. Sowa Rigpa texts are full of warnings of the potential dangers, which are twofold: firstly during processing and secondly when medicines containing processed mercury are wrongly administered.[346] Here I discuss the first, based on interviews with Tibetan physicians.

During *tsodru chenmo*, everybody involved drinks a lot of *chang*, except monastics who took vows not to drink alcohol. I was given different reasons for this. Some doctors explained that the warm fermented Tibetan barley beer is nutritious and reduces *lung* (one of the three *nyépa*), thus making the body less affected by *duk*. This follows the *Four Treatises*, which explains that the appropriate antidote to treat deliberate mercury poisoning is the ingestion of warming foods. This is linked to the Sowa Rigpa theory that a strong digestive heat or *médrö* can better digest *duk*. The Tibetan

346 Some countermeasures of treating post-therapeutic complications of poisoning *(log gnon)*, caused by the wrong manufacturing or erroneous administration of precious medicines are discussed in Chapter 11 of the Last Tantra in the *Four Treatises* (MTK 2015, 134–135; see also Gerke and Ploberger 2017a).

physician Dr. Yeshe Gelek, who made *tsotel* in Lhokha in southern Tibet in 1991 and later taught at the Men-Tsee-Khang college in Dharamsala, explained:

> Drinking *chang* reduces *lung*. People who have better strength have less effect of poisoning. People who have more *lung* have a stronger tendency to get poisoning. Normally, compounded poisoning *[sbyar dug]* is bound through something warm.[347]

Dr. Penpa Tsering, who made *tsotel* in 1987 at the Men-Tsee-Khang, gave a further reason:

> The poison of *ya* of mercury will stick to our stomach. We normally clean the *ya* of copper vessels with *chang*. The method is the same: if we drink a lot of *chang* it will wash away the *ya* from the stomach.[348]

Dr. Tenzin Thaye explained:

> *Chang* has its own potency. We use it against wound infections. It is mentioned in the *Four Treatises*, in the chapter on treating wounds. It in itself cleans the poison. And also the poison cannot harm you if you take *chang*, it does more than strengthening the body against poison, it can clear it; we call it *duksel [dug sel]*.[349]

Taking alcohol while processing mercury is an example of how long-term experiential knowledge might correspond to recent scientific findings. It has been known since the 1960s that ethanol inhibits the oxidation of mercury vapor (Clarkson and Magos 2006, 618; Martin and Naleway 2004). However, not taking alcohol is one of the vows to which most Buddhist monks and nuns adhere. This causes additional challenges for ordained amchi making *tsotel*, prompting them to look for different types of protection. "Doctors processing mercury should take a lot of *chang*, those who don't, like monks, take lemon, and some sour things," explained Dr. Dawa Dolma, who headed the Men-Tsee-Khang Research and Development Department during the first *tsotel* study.[350] Dr. Tenzin Thaye is a monk and because of his Buddhist precepts would not drink *chang*. He was very concerned about his safety and asked his lama for permission to drink *chang* should he feel uneasy from the exposure to different forms of mercury. In addition, he made his own eye goggles using a pair of glasses adding special tape, used a mask, and ingested a lot of sour lemon juice. He did not experience any adverse effects.

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347 Personal communication, Dharamsala, October 30, 2012.
348 Interview, Sidhpur, June 4, 2016.
349 Personal communication, June 6, 2016.
350 Personal communication, McLeod Ganj, August 25, 2010.

However, some physicians who processed mercury did experience adverse health effects. They described painful gums lasting for a few days. Some experienced diarrhea, and in the worst cases when they were not careful with the fumes, temporary blurred vision. These symptoms were reported largely by monks, who could not drink *chang*. Dr. Yeshe Gelek, who was a monk at the time when he made *tsotel* in Lhokha in 1991 and did not drink *chang*, experienced temporary blurred vision during the boiling of mercury, a symptom frequently reported during occupational mercury exposure (Cavalleri and Gobba 1998). His colleagues, who drank *chang*, did not experience any blurred vision.[351]

Namgyal Tsering writes, "If possible, one must keep a piece of raw goat meat in the mouth; that meat absorbs all the poisons. In the evening when finishing work, you must throw the meat away."[352] As far as I could find out, at the Men-Tsee-Khang this is not put into practice anymore, but those making *tsotel* receive a very nutritious and warm diet to keep their *médrö* (digestive heat) strong. According to Sowa Rigpa theory, any type of *duk* weakens the *médrö*.

Contemporary Tibetan medical texts warn about the effects of the consumption of wrongly processed mercury or exposure to its fumes. As Penpa Tsering writes:

> In severe cases, it can take someone's life. Small exposure can diminish physical strength, it can cause severe discomfort, weaken the digestive heat of the stomach, produce a certain type of an advanced edema condition *[dmu chu]*, and [types of] tumors *[skran nad]*, it can turn the body very skinny and blue in color, loosen up gums and make teeth fall out. It can cause obscure visions and so forth, and lead to many detriments.[353]

Overall, I found that those physicians who consumed a large amount of *chang* and whisky did not experience any direct effects of mercury toxicity. However, those not used to drinking alcohol seem to be more at risk. Those physicians experiencing adverse effects did not doubt the success of the actual taming process, but wanted to employ new techniques to keep themselves safe. One physician who made *tsotel* in the past and could not drink much *chang* told me in a private conversation:

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351 Interview, Dharamsala, October 30.10.2012.

352 Translated from Namgyal Tsering (1997, 13/8–9): *byung na ra sha rlon pa kha nang nyar la sha des dug len pas phyi dro las mtshams 'jog skabs 'dor bar bya/*.

353 Translated from Penpa Tsering (1997, 27/6–9): *che sar 'gro ba'i srog 'dor zhing / chung sar lus kyi stobs 'bri ba dang / zug rngu drag po 'byung ba/ pho ba'i me drod nyams pa/ dmu chu dang skran gyi nad skyed pa/ lus kyi mdog sngo zhing skem par byed pa/ rnyil chad cing so bud pa/ mig 'grib pa sogs kyi nyes pa du ma 'byung ba 'gyur/*.

AMCHI: *While working, it is very poisonous. It will affect the digestion. We cannot eat much, even though we get very good food, but we don't feel like eating. We have stomach pain and pain in the gums, and we do not have much appetite.*

BARBARA GERKE: *Do you think something could be done?*

AMCHI: *Early on, we thought a lot about it.* Ngülchu *poison comes mainly from its fumes. We thought of getting some oxygen masks and oxygen cylinders to breathe clean air while processing. Then there would be no direct contact with* ngülchu *fumes. We were not able to get it. If all workers could wear it, it would protect us. After making* tsotel*, when I watched TV for an hour or read a book, my eyes got red. After many years my symptoms slowly decreased. In our texts it says* ngülchu *is the "king of poison"; after detoxification, it is the "king of medicine," but for workers it can be problematic.*

BARBARA GERKE: *Now there is the technology to protect workers from fumes.*

AMCHI: *It would be very important to use modern technology. The* ya khu dön *could be done with a machine. We bind the stick with robes and have one worker stir it all day long inside the metal container. Now you could do it electrically. In Indian pharmacies they also do it with electricity now; it means less exposure to mercury. We should do research and apply new technologies.*

BARBARA GERKE: *But many doctors say they cannot change their tradition.*

AMCHI: *Methods are changing all around the world. In ancient times people always walked, now they take a plane or car. They don't say you have to walk. It is the same thing. We can modernise. The main thing is we should know the techniques.*

Amchi know that they are exposed to mercury fumes in the beginning of the process, especially during the boiling phases. The liquids that mercury is washed in have to be disposed of in safe places, and the processing should take place in a remote and quiet area, preferably in the open. Dr. Tashi Yangphel Tashigang told me in Delhi: "We have to purify mercury outside, where there is wind to take the fumes away."[354] A Ladakhi amchi told me that when Trogawa Rinpoche made *tsotel* in Ladakh (see Chapter 3), the participating physicians, apart from taking *chang* and keeping a piece of raw meat in their mouths, applied a special ointment made by Trogawa Rinpoche, called *kamadeva*, to any skin exposed to fumes.[355] Dr. Ngawang Thinle, Trogawa Rinpoche's student during the 1990s, remembered that they also used this ointment while making *kardül* at Chagpori Tibetan

354 Interview, Delhi, August 25, 2012.
355 Personal communication during the Kathmandu workshop, December 2011.

Medical Institute in Darjeeling. It was made from oil and a reddish type of plant. It "looked like rouge" and made them joke with each other. They also closed their nostrils with cotton soaked in nutmeg *(dza ti)*, which was known to protect the channels.[356] These examples show that Tibetan physicians have thought about issues of risk and exposure to mercury toxicity and have applied their traditional knowledge and their own expertise to protect themselves. Occupational risk protection, such as the use of gloves and masks, varies depending on availability and who is supervising the processing event. For instance, Dr. Tenzin Thaye said that during the boiling process they are supposed to wear eye-goggles and masks because of the fumes and the tremendous smell.

This photograph (Fig. 42) of the sixth *tsotel* event at the Men-Tsee-Khang in Dharamsala in 2011 shows several methods of risk management during the taming process. First, risk is managed ritually: the four monks in the background perform protector rituals to dispel obstacles from the taming process. The Men-Tsee-Khang resident monk (*sku snyer*, second from left), who carries out these protector rituals daily at the institute's official shrine room, is performing them inside the pharmacy during the making of *tsotel*.[357]

Second, physicians and their assistants keep the level of water above the mercury mixture to reduce potential evaporation during the washing process. However, we see that only some workers wore masks, and all worked with bare hands. When I asked why they did not use gloves, Dr. Jamyang Tashi, who supervised the event, responded that the gloves were not good quality and might be affected by the processing and they did not want any rubber to enter the medicine.[358] Dr. Tenzin Thaye explained that especially towards the end, when mercury is processed, they touch it with their hands:

> First mercury is liquid and will flow off our hands. After the first step, it will stick to the hands and is less mobile. After cooking and mixing it with sulfur, all types of *duk* are gone and it has no poison, so we touch it and mix it with our hands. We could use gloves, but we feel uncomfortable wearing plastic all day long. We are certain that mercury at this stage of the taming process is not poisonous, so we prefer to use our bare hands.[359]

Physicians experience mercury's transformation across the stages of processing through direct sensory engagement with the element, which changes its consistency from one step to the next; these changes can be felt and seen. The more mercury is tamed, the less poisonous it appears to those processing it. We have seen that this translates into various

356 Ngawang Thinle, personal communication, Kathmandu, December 20, 2011.
357 Tenzin Thaye, personal communication, McLeod Ganj, December 7, 2014.
358 Personal communication, Dharamsala, May 14, 2015.
359 Personal communication, McLeod Ganj, December 7, 2014.

Figure 42: Washing pre-processed mercury during the making of *tsotel* at the Men-Tsee-Khang in 2011. The water that carries the *ya* is absorbed with cotton and removed. The monks in the background perform protector rituals to dispel obstacles from the taming process. The caldron used to boil mercury can be seen in the back to the right. Photo: Men-Tsee-Khang (Men-Tsee-Khang 2011 / CC-BY-SA 4.0).

protective measures. Decisions on whether to wear gloves or not are also based on personal comfort and experience of practical hands-on mixing methods.

Overall, the physicians making *tsotel* know that they are taming a potentially dangerous substance. In the words of Dr. Namgyal Tsering, who wrote a brief account on *tsotel*:

> Nowadays mercury is considered hazardous, which is very true. If one does not know the art of taming *ngülchu* well and does it with doubts, then there is definitely no benefit and it is not only very harmful but can also endanger life. Therefore, one must be careful and attentive [during processing]; this is very important.[360]

The ethnographic examples reveal varying views on the safety of processed or tamed mercury among Tibetan practitioners themselves, which

360 Translated from Namgyal Tsering (1997, 12 / 1–4): *deng 'dzam gling 'di na dngul chu zhes pa nyen tshabs cher brtsi ba bden mod/ dngul chu 'dul thabs ma shes par 'ol tshod byas na phan pa med pa lta cig nod che zhing srog kyang rgol bas phyi 'byung 'di la rig pa gzab dgos pa gal cher som/*.

defy a single answer to the complex question of how Tibetans have been handling mercury. While they all have in common a deep respect for mercury's poisonousness, power, and potency, they handle it very differently, depending on their backgrounds, training, and beliefs.

By and large, I found that amchi handle mercury very cautiously. They respect its poison, admire its potency, and are generally aware of its toxic fumes, but my impression was that in India they are largely unaware of its long-term cumulative effects from low exposure. Despite individual experiences of short-term symptoms of mercury poisoning, institutional changes such as installing fume hoods and wearing specialized mercury masks are still awaited.

More recently, some institutes have introduced safety measures. When I visited the Ayurveda Rasa Shastra Department at BHU in Varanasi in 2015, a fume hood was just being installed to collect the mercury fumes that were previously directed into the environment through an open window and could easily be considered environmental pollution or an occupational risk during an official inspection. This decision coincided with their application to the ministry of AYUSH for an exemption of Ayurvedic medicines from the UNEP mercury ban.

When I mentioned the fume hood to Dr. Jamyang Tashi, head of the Pharmacy Department at the Men-Tsee-Khang, a few weeks later, his first reaction was, "But we cannot change our traditional methods of making *tsotel*."[361] It took some time and translations into Tibetan by a younger Tibetan physician with a science background to explain that traditional processing methods could continue, but that a fume hood, used during certain stages of the processing, would protect not only the workers from mercury fumes but also the environment. I also mentioned mercury fume protection masks. A year later, after the Second International Conference on Tibetan Medicine at the Men-Tsee-Khang (see Chapter 7), during which mercury was a key theme, I mentioned these safety options again, this time to the Men-Tsee-Khang director as well as to the conference organizer and head of the Research and Development Department, Dr. Rigzin Sangmo.[362] With a science background and her involvement in the two toxicity studies, Dr. Rigzin Sangmo understood the significance and supported the application of such precautions, referring to them as modernized traditional Tibetan medicine, in which the environment and workers' health would be protected without giving up traditional processing techniques. We continued to discuss these issues over the years and it seems that, as of completing this book, there have been detailed discussions at the Men-Tsee-Khang on implementing some of these safety measures, specifically fume hoods, mercury fume protection masks, and the collection and safe storage of mercury residues accumulated during processing.

361 Personal communication, Dharamsala, May 14, 2015.
362 Personal communication, Dharamsala, April 29, 2016.

Changing risk and safety assessments

In summary, we have seen how Buddhist ideas of taming affect Tibetan medical sensibilities regarding the safety of tamed poisons. Once a poisonous substance is fully "tamed" it is considered "safe," similar to a subjugated demon who has been tamed to safeguard Buddhism. Safety proofs in contemporary Sowa Rigpa are also proofs of trust; as we have seen in this chapter with Dr. Jamyang Tashi consuming three grams of *tsotel* publicly in 2011 to take responsibility for the successful taming, these also demonstrate authority and the continuation of lineage.

I conclude from the material presented here that religious and cosmological ideas are fundamentally important to medical perceptions of safety, especially when religious and medical domains have coexisted and interacted with each other in societies over long periods of time. However, the example of the processing of roasted *chokla* for pill coating, and the perceived risks Tibetan physicians associate with its use, shows different and more pragmatic safety assessments. Similar to Cordner's strategic science translation (Cordner 2015b, 2016), which depends on how toxic risks are interpreted and communicated by different stakeholders, among Sowa Rigpa practitioners the risk assessment of using *chokla* has been influenced by several issues: (1) the risk of mercury-containing medicines being confiscated and analyzed for heavy metals at international borders; (2) the rising price of cinnabar on the Indian market, making it uneconomical to coat pills with *chokla*; (3) the lack of studies that would prove *chokla* to be either useful or harmful; (4) individual physicians' somatic experiences of discomfort while processing *chokla*, which are assessed in contrast to the observed therapeutic benefits Tibetan physicians see in their patients taking medicines with processed *chokla*.

Toxicity concerns and how they are articulated by different stakeholders form part of the pharmaceutical nexus that is embedded in socially constructed risk assessments. The material presented above shows that changes in ideas of risk assessment could in fact change a medical practice, or even lead to its discontinuance. Several Sowa Rigpa manufacturers in India, including the Men-Tsee-Khang, have stopped the use of *chokla* for the red-color coating of certain pills, and several private pharmacies, which also export medicines, do not use mercury-based substances at all.

Tsotel holds a very different position than *chokla* and is valued as both the pinnacle of Sowa Rigpa *menjor* and a sacred practice, having been transmitted from Vajrayoginī to Orgyen Rinchenpel and through authoritative lineages to this day. We have seen that making *tsotel* is a lot more complex than making *chokla*, and that *tsotel*'s underlying rationale of safe taming has a tantric aspect to it. Will changes in the risk and safety assessments of *tsotel*'s sourcing and manufacturing lead to the discontinuation of its practices? With mercury safety debates gone global, local practices of mercury-containing medicines in Asia are forced to respond to the scrutiny, metrics, and rationale of international and state governing bodies.

How the Tibetan medical community in exile became a player in this field, how they carried out and presented the two mercury toxicity studies (Sallon et al. 2006, 2017) at the Men-Tsee-Khang, and what role they gave to science and the impending UNEP mercury ban—is explored in the next chapter.

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.

Published in: Gerke, Barbara, 2021. *Taming the Poisonous. Mercury, Toxicity, and Safety in Tibetan Medical Practice.* Heidelberg Studies on Transculturality 7. Heidelberg: Heidelberg University Publishing. DOI: https://doi.org/10.17885/heiup.746

> 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 multicompound 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 *diyejia*, 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 reports[369] 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 *tselkar*, 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 India[386] (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 Sampel 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 Sampel, 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]

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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 Bangaluru, 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.

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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.

Chapter 8

Conclusions

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

Published in: Gerke, Barbara, 2021. *Taming the Poisonous. Mercury, Toxicity, and Safety in Tibetan Medical Practice.* Heidelberg Studies on Transculturality 7. Heidelberg: Heidelberg University Publishing. DOI: https://doi.org/10.17885/heiup.746

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 (β-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 preprocessed 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.[400] 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).

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 transcultural 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, *médrö*.[401]

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 *menjor* 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

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 *saṃskāras* 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*.[402]

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 *Kālacakratantra* 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

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 multicompounds, 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

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.

Appendices

Appendix A: Relevant Chemical Mercury Compounds, their Absorption, and Toxicity

Summarized from Bernhoft (2012), Clarkson and Magos (2006), Kamath et al. (2012), Liu et al. (2008), Miguel et al. (2014), National Research Council (2000), Park and Zheng (2012), Rooney (2014), and Ye et al. (2016).

Published in: Gerke, Barbara, 2021. *Taming the Poisonous. Mercury, Toxicity, and Safety in Tibetan Medical Practice.* Heidelberg Studies on Transculturality 7. Heidelberg: Heidelberg University Publishing. DOI: https://doi.org/10.17885/heiup.746

Form of Mercury	Absorption by the Body	Distribution in Organs	Excretion from the Body	Known Toxicity
I. Elemental / metallic mercury (Hg)				
As *liquid* (Hg) (partially vaporizes at room temperature)	Poor gut absorption, less than 0.01%	Brain, kidneys	Largely excreted as mercuric ions (Hg^{++}) through feces	Toxicity depends on the condition of the mucous membranes and the level of gut absorption.
As *vapor* (Hg^0)	Readily and extensively absorbed (80%) in the respiratory tract	Oxidizes in the body, combines with proteins, settles, for example, in lungs, brain, and kidneys Can enter brain through olfactory pathways	As Hg^0 exhaled in breath, excreted in sweat, and saliva, and as mercuric ions (Hg^{++}) in feces and urine	Inhalation might cause cough; inhalation exposure (e.g. through heating cinnabar) provides direct pathway to brain; also fat soluble, thus rapidly distributed throughout the body; crosses blood-brain and placental barriers and thus causes neurotoxicity and impact fetal development; can remain in the brain twenty years or more; low-level exposure causes nonspecific symptoms such as gastrointestinal disturbance, fatigue, anorexia, weight loss, irritability; chronic exposure has an accumulative effect and can lead to atherosclerosis, myocardial infarction, hypertension, stroke, depression, anxiety, excessive anger, decreased immunity; above 100 µg / L: neurological symptoms: tremors, memory loss, delayed reflex, increasing shyness, depression, insomnia, personality change, respiratory distress, excess salivation; above 800 µg / L: fatal.

Form of Mercury	Absorption by the Body	Distribution in Organs	Excretion from the Body	Known Toxicity
II. Organic mercury compounds (bonded to a structure containing carbon)[1]				
1. *Methylmercury* (CH_3Hg^+) high concentration found naturally or through contamination in fish; causes Minamata disease	Easy absorption through the gut (≥95%); through the respiratory tract (≈80%); also through skin; gut bacteria can convert methylmercury into less toxic inorganic mercury	Spreads throughout all tissues within thirty hours, readily crosses the blood-brain barrier to enter the brain, also enters the kidneys and liver, placenta, fetal brain, peripheral nerves, bone marrow	90% excreted to the feces via bile, less than 10% through urine, ≈20% in breast milk	Highly toxic; forms in the environment when inorganic mercury reacts with bacteria; potentially affects any cellular function; parts are demethylated to inorganic mercury in brain; damages the central nervous system and brain (paresthesia, ataxia, dysarthria, and loss of vision) and fetal brain development; can lead to death.
2. *Ethylmercury* ($C_2H_5Hg^+$)	Similar to methylmercury, but once absorbed rapidly changes to inorganic mercury	Spreads throughout all tissues similar to methylmercury	Largely excreted via feces, similar to methylmercury, but it is excreted faster than methylmercury	Mechanisms of toxicity are unknown; presumably damages the central nervous system, similar to methylmercury; rapidly releases inorganic mercury and damages kidneys; has different metabolism from methylmercury.
3. *Dimethylmercury* $(CH_3)_2Hg$, or C_2H_6Hg liquid, lipid-soluble	When inhaled absorbed through the respiratory tract (≈80%); through the gut (≥95%); absorbed also via the skin	Can easily be absorbed through latex gloves and skin	When ingested around 90% is excreted through feces and less than 10% through urine	Metabolizes to methylmercury in the body by crossing the blood–brain barrier; may cause dyspnea, nausea, and vomiting; long-term exposure can lead to tremors, psychological disturbances, salivation, fatigue and insomnia, diarrhea, blurred vision, tremors, paralysis, and memory loss. Absorbing small amounts proved fatal in several cases.

1 Note: Urine concentration levels do not reflect organic mercury concentration levels of the body because of high feces excretion.

Form of Mercury	Absorption by the Body	Distribution in Organs	Excretion from the Body	Known Toxicity
III. Inorganic mercury compounds (not bonded to carbon)				
	Generally solid and non-volatile at room temperature	Largely in kidneys	Urine, feces "A small portion of absorbed inorganic mercury can be reduced in tissues and exhaled as mercury vapor" (Liu 2008, 813).	Toxicity depends on their solubility. Mercury salts are quite corrosive and thus damaging to the intestinal tract and kidneys; can cause skin discoloration; they are not lipid soluble and do not cross blood-brain barrier. Elemental mercury, ethylmercury, and methylmercury are metabolized into inorganic mercury in the brain; can bond with selenium in cells and become inert/non-toxic. However, inorganic mercury is not methylated into methylmercury in tissues "to any significant extent" (Clarkson and Magos 2006, 628).
1. *Mercurous salts* (Hg_2^{++}, Hg^{+}) e.g. mercurous chloride (Hg_2Cl_2, calomel)	Largely through the respiratory tract; through skin (3–4%); through the gut (2–10%)	Kidneys	Urine, feces	Poor water solubility; absorption is slower than that of mercuric chloride; does not readily cross blood-brain or placenta barrier. Calomel (was used as teething powder in children) can cause pink disease, sweating, irritability, and fatigue.
2. *Mercuric salts* (Hg^{++}) e.g. mercuric chloride ($HgCl_2$, "corrosive sublimate"); e.g. mercury(II) oxide (HgO)	Through the gut; absorption increases with prolonged exposure (7–15%); through inhalation of $HgCl_2$ aerosols; through skin (2–3%)	Largely in kidneys, also in liver, spleen, placental, fetal tissues	85% is excreted in feces; also through urine, sweat, tears, saliva, breast milk; also exhaled as Hg^0 vapor	Abdominal pain, bloody diarrhea, shock, renal failure. Corrosiveness causes internal ulceration. Eating 1–4 grams is fatal for adults (used in suicide). Found in some skin-lightening cream; hardly crosses blood-brain barrier, but can get into the brain through methylation; used in the past as preservative, in photography, to treat syphilis, and disinfect wounds.

Form of Mercury	Absorption by the Body	Distribution in Organs	Excretion from the Body	Known Toxicity
3. *Mercury(II) Sulfide* (HgS) such as in the form of cinnabar (of which more than 96% is α-HgS); HgS exists in two phases (α and β)	Solubility is only 2.9 X 10^{-26} g / 100ml water; thus gut absorption is poor, less than 0.2%; is not metabolized to methylmercury in the gut	Of total renal accumulation 10% is distributed in the brain and 5–50% in the liver	Urine, feces	Most inert form of mercury compounds; 1,000 times less tissue accumulation than methylmercury; renal toxicity might occur only after long-term use or with high dosage intake (1g / kg); HgS can cause toxicity when transformed by heating through fume inhalation (e.g. roasting *chokla*): Hg^0 vapor and sulfur dioxide (SO_2) fume inhalation can cause cough, breathing problems, skin and eye irritation.
3a. *red cinnabar, vermilion* (α-HgS) e.g. *rasasindūra* in Ayurveda	Only very slightly soluble	Kidneys	Urine, feces	Largely non-toxic since barely soluble in water; α-HgS can turn into β-HgS through heating and back to α-HgS after cooling; red α-HgS is stable at lower temperature.
3b. *black metacinnabar* (β-HgS) e.g. major component of *tsotel* in Sowa Rigpa, *kajjalī* in Ayurveda	Only very slightly soluble	Kidneys	Urine, feces	Largely non-toxic since barely soluble in water; black β-HgS is stable at higher temperature.

Appendix B: *Tsotel* Manufacture Events at the Men-Tsee-Khang in Dharamsala (1982–2014)

Unless otherwise indicated this data is based on a table in Tibetan kindly provided by the Men-Tsee-Khang (MTK 2014). Names of physicians who only appear in this table, but not in the book, have not been included in the glossary. The Wylie transliteration of their names has thus been included in this table.

No	Date	Amount made	Leading physician	Tibetan physicians taking part in the event	Notes
1	April 28, 1982 March 28 to May 15, 1982 (MTK 1982, 2)	60 kg	Lamenpa Tenzin Chödrak	Lamenpa Jamyang Tashi [of Tsona], Tendzin Namgyel, Jampa Sönam (Byams pa bsod nams) alias Lhawang la (Lha dbang lags), Yeshi Sonam (Ye shes bsod nams), Pema Dorjee, Tsewang Tamdin, Namgyal Tsering, Lobsang Chöpel Phagri, Pasang Yonten (see also Dawa Ridrak 2003, 411/14–24). Tupten Gyeltsen [Toding Rinpoche] took part as an assistant.[1]	Nine physicians and around eleven staff members took part. It took four years of preparations to gather about one hundred necessary ingredients and to make the pots and implements (MTK 1982, 2). They used dung and coal fires to boil the mercury. Physicians received the transmission of Kongtrul Yönten Gyatso's *tsotel* text (1986) from Lamenpa Tenzin Chödrak. The event was partially sponsored by the Fourteenth Dalai Lama and carried out at his residence. *Tsotel* was consecrated during a *mendrup* ritual with the Fourteenth Dalai Lama present on April 28, 1982 (Kloos 2012, 198). With the *tsotel* they manufactured Rinchen Drangjor, Rinchen Ratna Sampel, Rinchen Mangjor Chenmo, and Rinchen Tsodru Dashel (MTK 1982, 2). Following the Dalai Lama's wishes, Yeshi Dhonden and Ama Lobsang Dolma Khangkar were invited to support the precious pill preparations, but could not attend (Sonam Rinchen 2009, 56/18–57/5).
2	July 16, 1987	63.840 kg	Dr. Tendzin Namgyel, head of Pharmacy Depart-ment	Namgyal Tsering, Penpa Tsering, Tenzin Deche (Bstan 'dzin bde byed) (see also Dawa Ridrak 2003, 411/25–28).	Three physicians and eight staff members worked for one month (MTK 2011a, 5). The gas stove was introduced to better regulate the heat when boiling mercury (Kloos 2010, 86).

1 Dr. Choelothar, personal communication, Dharamsala, December 7, 2012.

No	Date	Amount made	Leading physician	Tibetan physicians taking part in the event	Notes
3	1994 (Dawa Ridrak 2003, 411/29; MTK 2014) May 21, 1993 (Choelothar 2000, 106/10)	110 kg	Lamenpa Tenzin Chödrak	Lhawang-la (Lha dbang lags), Chöying Püntsok (Chos dbyings phun tshogs), Tupten Gyeltsen [Toding Rinpoche], Jamyang Tashi, Dawa Ridrak, Namgyel Tendzin (Rnam rgyal bstan 'dzin), Ngawang Déchen (Ngag dbang bde chen), Choelothar, Pasang Püntsok (Pa sangs phun tshogs), Nyima Gyeltsen (Nyi ma rgyal mtshan), Könchok Döndrup (Dkon mchog don grub), Kelzang Wanggyel (Skal bzang dbang rgyal), Tséring Dorjé (Tshe ring rdo rje), Shédrup Tséring Wanggyel (Bshad sgrub tshe ring dbang rgyal) (see also Choelothar 2000, 106/12–107/3; Dawa Ridrak 2003, 411/29–412/7).	Fourteen physicians and thirteen staff members worked for three months (MTK 2011a, 5). Eleven of the participating physicians were from the eighth batch that graduated in 1994.[2]
4	April 5, 2001	105.4 kg	Dr. Namgyal Tsering, head of Pharmacy Depart-ment	Jamyang Tashi, Tenzin Thaye, Pasang Püntsok (Pa sangs phun tshogs), Kelsang Wanggyel (Skal bzang dbang rgyal), Dawa Ridrak (see also Dawa Ridrak 2003, 412/8–17).	Five physicians and twenty staff members completed making *tsotel* in more than one month (MTK 2011a, 5).

2 Dr. Choelothar, personal communication, Dharamsala, December 7, 2012.

No	Date	Amount made	Leading physician	Tibetan physicians taking part in the event	Notes
5	April 17, 2008	115.873 kg	Dr. Jamyang Tashi, head of Pharmacy Department	Toding Rinpoche [Tupten Gyeltsen], Tenzin Thaye, Lobsang Soepa (Blo bzang bzod pa), Ngawang Soepa, Jikmé Gendün ('Jig med dge 'dun).	Five physicians and twenty staff members completed the manufacture of *tsotel* in forty-four days (MTK 2011a, 5).
6	September 12, 2011 (15th day of 7th Tibetan month) to October 26, 2011 (MTK 2011a, 6)	125.975 kg	Dr. Jamyang Tashi, head of Pharmacy Department	Ngawang Soepa, Lobsang Soepa (Blo bzang bzod pa), Tashi Tendzin (Bkra shis bstan 'dzin), Jikmé Gendün ('Jig med dge 'dun), Penpa (Spen pa).	Five physicians and twenty-three staff members completed the processing in forty-five days (MTK 2011a, 6). Dr. Jamyang Tashi consumed three grams of *tsotel* during a ceremony "to prove that the formulation is detoxified and has the effective potency" (MTK 2011a, 6).
7	November 12, 2014	138 kg	Dr. Jamyang Tashi, head of Pharmacy Department	Tenzin Thaye, Tashi Tendzin (Bkra shis bstan 'dzin), Chöden (Chos ldan), Penpa (Spen pa), Ngawang Gélek (Ngag dbang dge legs), Karma Tendzin (Karma bstan 'dzin), Tséwang Rindzin (Tshe dbang rig 'dzin), Ngawang Chödrak (Ngag dbang chos grags), Jampa Norbu (Byams pa nor bu), Ngawang Tséring (Ngag dbang tshe ring).	Ten physicians and twenty-seven staff members worked together.

Appendix C: Small-Scale *Tsotel* Events (1953–2008)

This table summarizes the small-scale *tsotel* manufacture events by private physicians and institutions (except the Men-Tsee-Khang), which are mentioned in this book and often not recorded in medical histories. The sequence follows the way in which they were introduced in Chapters 3 and 5. Names of physicians and places that only appear in this table but not in the book have not been included in the glossary. The Wylie transliteration of their names have thus been added to this table.

Date	Place	Amount of *tsotel* made	Physicians taking part in the event	Notes (sources referenced in Chapters 3 and 5)
Penden Gyeltsen (?–1962) and Lamenpa Tenzin Chödrak (1924–2001)				
1953	Phagri Richung Potok, southwest of Lhasa	15 kg	Penden Gyeltsen and Lamenpa Tenzin Chödrak with eight medical students of the Richung Potok Riteng Mentsikhang.	Sponsored by Tulku Dozher Tupten Lamzang, who kept most of the *tsotel*. Lamenpa Khyenrap Norbu received two kilograms of *tsotel*. Lamenpa Tenzin Chödrak received the "seeing transmission" at this event.
Tapkhé Püntsok, the Great Medicine Provider of Lhasa Mentsikhang				
1973 and 1974	Kongpo	?	Tapkhé Püntsok and others.	Tapkhé Püntsok first prepared the eight metals and eight minerals in Kongpo and later made *tsotel* at Yutok Shar (G.yu thog shar) in Lhasa. I only found this mentioned in Dawa Ridrak (2003, 411/11–13). Tapkhé Püntsok trained Tendzin Namgyel, who later took part in the *tsotel* events in Dharamsala in 1982 and 1987.

Date	Place	Amount of *tsotel* made	Physicians taking part in the event	Notes (sources referenced in Chapters 3 and 5)
Lamenpa Tenzin Chödrak (1924–2001) and Troru Tsénam (1926–2004)				
1977	In the upper valley called Drushitang (Gru shis thang), near the Powo Tramo labor camp, Kham	Approx. 19 kg	Lamenpa Tenzin Chödrak, Troru Tsénam, Tupten Shakya from Mentsikhang (Sman rtsi khang gi thub bstan sha'kya), Rindzin Wanggyel from Khyungpo (Khyung po ba rig 'dzin dbang rgyal), Yéshé Dorjé from Tölung (Stod lung ba ye shes rdo rje), Jamyang Lhündrup from Lhokha, and also the teacher Tségyel (Rgan tshe rgyal) and Tamkha Ngawang Gyatso (Tham kha ngag dbang rgya mtsho, 1930–2004),[1] who came especially from Degé (Lappendum Lozang Lodrö 2006, 175/18–176/3). Tsultrim Sangyé, better known as Amchi Gege, and Karma Chöpel also took part.	They followed the *tsotel* manual by Degé Drungyig Gurupel (1986). Lamenpa Tenzin Chödrak passed on the "seeing-transmission." The precious pills Rinchen Drangjor, Rinchen Mangjor, Ratna Sampel, Yunying 25, Jumar 25, Rinchen Wangril 25, and others were prepared.
Gen Rinpoche Rakdo Lobsang Tenzin (born 1956) and Khempo Troru Tsénam (1926–2004)				
1983/ 1984	Lhasa	Approx. 2 kg	Khempo Troru Tsénam, Rakdo Rinpoche, Lama Khempo Öser from Degé, his female student Do Dasel Wangmo, and Troru Tsénam's nephew Sönam Chimé.	Khempo Öser possibly sponsored parts of the event since he took most of the *tsotel* back to Degé. Jampa Trinlé at the Mentsikhang generously provided the equipment and ingredients. Troru Tsénam passed on the lineage and "seeing transmission."

1 On Tamkha Ngawang Gyatso's life and his *tsotel* manufacturing see Yéshé Gönpo and Trangping (2005). Thanks to Tashi Tsering Josayma for sharing this reference.

Date	Place	Amount of *tsotel* made	Physicians taking part in the event	Notes (sources referenced in Chapters 3 and 5)
Three times between 1998 and 2008	CIHTS, Sarnath	1st: 6 kg 2nd: 5 kg 3rd: 5 kg	Rakdo Rinpoche, Dorje Damdul, assisting physicians and teachers, and CIHTS medical students.	As part of the Sowa Rigpa BTMS (Bachelor of Tibetan Medicine and Surgery) curriculum, *tsotel* was made to train medical students. Dorje Damdul observed part of the *tsotel* process at the Men-Tsee-Khang in 1987 while on a pharmacy internship. Zamyou Penpa Tsering participated as a student during the 2008 event at CIHTS. He is now departmental librarian in-charge cum Guest Faculty at CIHTS. At CIHTS they make the precious pills Rinchen Dangtso, Rinchen Mukkhyung Gugül, and Rinchen Ratna Gugül. The first was formulated by Khempo Troru Tsénam and the second and third by Rakdo Rinpoche.
Yeshi Dhonden (1927–2019)				
1985	McLeod Ganj, Dharamsala	?	Yeshi Dhonden, Lobsang Tenzin (main *menjorpa*), Chöphel Kalsang (assistant), and a few more amchi who have since passed away, in total around seven.	Yeshi Dhonden was trained in Lhasa by Lamenpa Khyenrap Norbu. He also made *tsotel* in Lhokha, south of Lhasa, with Penden Gyeltsen and others.

Date	Place	Amount of *tsotel* made	Physicians taking part in the event	Notes (sources referenced in Chapters 3 and 5)
Amchi Tashi Yangpel Tashigang (born 1938) and Amchi Kunsang Kunphen (1924–2006)				
1985	Delhi	?	Amchi Tashigang, Amchi Kunsang Kunphen, and their assistants.	Amchi Tashigang received theoretical training from Karma Chöpel in Lhasa, who took part in making *tsotel* at Powo Tramo in 1977. He received practical *tsotel* transmissions from Amchi Kunsang Kunphen, who was trained by the medicine compounder Topgyel of Lhasa Mentsikhang. Previously, Amchi Kunsang made *tsotel* and precious pills, both at Nyalam and in Kathmandu. Nowadays, *tsotel* is made at Nyalam and precious pills at Kunphen clinic in Kathmandu.
Sampel Norbu Trogawa Rinpoche (1931–2005) and Nangrongshar Gen Rikdzin Lhündrup (1889–1986?)				
1954	At Trogawa House in Lhasa	"About the size of two high thermos flasks" (Stephens and Tsarong 1992, 12).	Nangrongshar Gen Rikdzin Lhündrup (teacher), Trogawa Rinpoche, three doctors from Chakpori Medical College, Lobsang Tsultrim, his student Lobsang Jampa (Blo bzang byams pa), Künga Rapgyel from Drepung ('Bras spungs kun dga' rap rgyal), Jampa Gyeltsen from Gyantsé (Rgyal rtse byams pa rgyal mtshan), Könchok-la (Dkon mchog lags), and Trogawa's attendant Purpa Gyurmé (Phur pa 'gyur med) (Stephens and Tsarong 1992, 12).	Sponsored by Trogawa Rinpoche's father. Nangrongshar Gen Rikdzin Lhündrup passed on the lineage and "seeing transmission"; he was present during the 1921 *tsotel* event in Lhasa and taught by Trékhang Jampa Tupwang.

Date	Place	Amount of *tsotel* made	Physicians taking part in the event	Notes (sources referenced in Chapters 3 and 5)
1994	Nee, Ladakh	1.1 kg	Trogawa Rinpoche, Amchi Lama Rigzin, Amchi Lama Wangchuk, Kairy Amchi Tsering Paljor, Amchi Katak, Amchi Karma, Amchi Padma Tsetar, Amchi Nawang Tsering, and Amchi Nawang Tarchin.	Sponsored by Amchi Lama Rigzin. Trogawa Rinpoche passed on the lineage to the amchi in Ladakh. They prepared the precious pill Rinchen Tsodru Dashel.
2002	Nee, Ladakh	Approx. 7 kg	Trogawa Rinpoche, Amchi Lama Rigzin, Amchi Lama Wangchuk, Amchi Katak, Amchi Karma, Amchi Padma Tsetar, and Amchi Ngawang Tsering. Amchi Karma and Kairy Amchi Tsering Paljor came for some parts of the process. Rinpoche's nephew, Teinlay Palsang Trogawa, was present.	Sponsored by Dzongsar Jamyang Khyentsé Rinpoche, who got most of the *tsotel*. The amchi in Nee received one hundred grams of *tsotel*, which they still preserve. They did not prepare precious pills but they did prepare the formula Dashel Dütsima, adding some of the *tsotel* and following Trogawa Rinpoche's secret transmission. Two of Trogawa Rinpoche's CTMI graduates, Tenzin Phelgye and Lhakpa Ngödrup, were also trained.
Amchi Wangchuk Lama (born 1942) and Kagyü Tendzin Norbu Rinpoche (1899–1959)				
1955	Drakkar Taso Monastery, Kyirong, southwest-ern Tibet	2–3 kg	Kagyü Tendzin Norbu Rinpoche, six to seven amchi including Amchi Wangchuk, who is the only surviving member of this group.	Sponsored and taught by Kagyü Tendzin Norbu Rinpoche. They prepared two types of precious pills, Rinchen Tsodru Dashel and Ngülchu Rinchen 18.

Date	Place	Amount of *tsotel* made	Physicians taking part in the event	Notes (sources referenced in Chapters 3 and 5)
Do Dasel Wangmo (b. 1928) and Khempo Troru Tsénam (1926–2004)				
1983/ 1984	Lhasa	Approx. 2 kg	Khempo Troru Tsénam, Do Dasel Wangmo, her Lama Khempo Öser from Degé, Rakdo Rinpoche, and Troru Tsénam's nephew Sönam Chimé.	Khempo Öser possibly sponsored parts of the event since he took most of the *tsotel* back to Degé. Jampa Trinlé at the Mentsikhang generously provided the equipment and ingredients. Troru Tsénam passed on the lineage and "seeing transmission."
Ani Ngawang from Nyémo (c. 1930–2006) and Kyémé Rinpoche				
?	Chiu Tekcholing nunnery in Nyémo, west of Lhasa	?	Ani Ngawang, her lama, Nyimé Dorjé (alias Kyémé Rinpoche) from eastern Tibet, and others.	They prepared a *tsotel*-containing eye medication at her nunnery; students of Ani Ngawang and her teacher, Kyémé Rinpoche, apparently continued making *tsotel* at the Chiu Tekcholing nunnery in Nyémo.
Ama Lobsang Dolma Khangkar (1935–1989)				
Some-time after 1985 and before 1989	McLeod Ganj, Dharamsala	Approx. 300 grams	Ama Lobsang with Norbu Chöpel and her staff.	Norbu Chöpel's description of the event matched the method of making *kardül*, so we cannot be sure whether she made *tsotel*. Ama Lobsang manufactured Rinchen Ratna Sampel, Mangjor Chenmo, and Yunying 25 (which is made without *tsotel*). Later, she bought *tsotel* from Phagri, southern Tibet.

Appendix D: The *Collected Works on Mercury Formulations*

This appendix refers to Chapter 4 and my discussions with Tashi Tsering Josayma of the Amnye Machen Institute in McLeod Ganj on the process of assembling Tibetan works on mercury practices for the *Collected Works on Mercury Formulations* (Tashi Tsering, ed. 1986). He published these twelve texts while he was the head of the Tibetan Publication Department at the Library of Tibetan Works and Archives (LTWA). This appendix provides the titles, authors, and additional information, not previously published, on where he sourced these texts.

TEXTS 1–7 WERE PRINTED OFFSET FROM THE COLLECTION OF THE LTWA:

1. *Ril nag gsang ston gsal byed 'chi med nor bu* (1/1–20/4), by Zurkhar Nyamnyi Dorjé (1439–1475).
2. *Tshangs pa'i nor bu ril nag kun 'dus rkang gnyis bde ster dkar chag dag snang spro byed* (20/4–23/2), author unknown.
3. *Bi Sha rta zi ma'i sbyor ba khyad 'phags pa'i zab gnad gdans pa* (23/2–26/5), most probably by Dromrik Nenjor Yéshé (fl. seventeenth century)
4. *Rin chen ril bu gtong lugs khyad bcos mkhas pa'i phyag len* (26/5–29/6), author unknown.
5. *Dngul chu btso bkru chen mo za 'ching gi lag len gsar mdzod sbas pa'i lde mig* (29/6–49/3), most probably by Dromrik Nenjor Yéshé (fl. seventeenth century)
6. *Dngul chu btso bkru chen mo'i cha rkyen rin po che tsha 'dul chen mo* (49/3–57/1), author unknown.
7. *Rin chen dngul chu'i sbyor ba'i rtogs pa brjod pa'i gtaM/ ngo mtshar 'chi med grub pa'i rna rgyan* (59/1–121/2), by Mipam Namgyel Gyatso (1846–1912). This is an extremely rare text. It was never woodblock carved or published before 1986. Mipam's account describes how Kongtrül Yönten Gyatso conducted *ngülchu tsodru chenmo* at the behest of the governor of Nyakrong, Pünrapa Tsering Penden, in 1872 in Ganden Künkhyap Chödong of Nyakrong, Kham.

TEXTS 8–10 ARE FROM THE PRIVATE COLLECTION OF AMCHI LOBSANG TASHI FROM DROMO:

8. *'Bam bcos 'chi med tshe bum zhes bya ba gsang ba'i bcos yang zab bla na med pa* (123/1–144/1), by Karma Yéshé Pelzang.
9. *Rin chen dngul chu btso bkru zla shel ril bu'i sbyor ba drang srong rgyun shes kyi lugs khol du phyungs pa* (145/1–151/4), by Lamenpa Orgyen Tendzin Gyatso.
10. *Rin po che'i sbyor ba'i gtso bo bdud rtsi bcud rgyal dngul chu btso bkru che mo'i lag len snying por dril ba phan bde'i gter mdzod* (153/1–301/4), by Lamenpa Orgyen Tendzin Gyatso. Short title: *Phan bde'i gter mdzod.*

TEXT 11 IS FROM THE PRIVATE COLLECTION OF LAMENPA TENZIN CHÖDRAK (1924–2001):

11. *Srid gsum gtsug rgyan si tu chos kyi 'byung gnas kyi zhal lung dngul chu btso chen dang rin chen ril bu'i sbyor sde zla ba bdud rtsi'i thig le ces bya ba bidza ha ram* (303/1–391/2), by Degé Drungyig Gurupel.

TEXT 12 IS FROM THE PRIVATE COLLECTION OF THE LATE AMCHI JAMYANG TASHI OF TSONA (1918–1986):

12. *Bdud rtsi bcud kyi rgyal po dngul chu btso bkru chen mo'i sbyor bas grub pa'i bcud len tu bsgyur ba'i lag len rnam par gsal ba 'tsho byed mkhas pa'i snying bcud* (393/1–441/6), by Jamgön Kongtrul Lodrö Tayé (1813–1899/1900), also known as Kongtrul Yönten Gyatso, here mentioned by his other title Karma Ngawang Yönten Gyatso. Lamenpa Tenzin Chödrak received the oral transmission from Lamenpa Khyenrap Norbu of this text, and the Men-Tsee-Khang in Dharamsala relies on it as their main text when making *tsotel*.[403]

403 Czaja (2013,101) lists the second part of this text (422/7–441/6), which is on the processing of the eight metals and eight elements, separately as *Sman sbyor che chung rnams la nye bar mkho ba'i lcags brgyad dang khams brgyad kyi dug 'don thal sman gyi cho ga 'tsho mdzad mkhas pa'i khyad nor*.

Glossaries of Tibetan and Sanskrit Terms

1 Who is Who? Glossary of Tibetan Names

Note: In numerous cases the phonetic spellings reflect the local spellings used by the people themselves.

THL Phonetic Transcription (Germano and Tournadre 2003)	**Wylie Transliteration** (Wylie 1959)	**Who is this person?**
Ama Lobsang Dolma Khangkar (1935–1989) briefly: Ama Lobsang	A ma blo bzang sgrol ma khang dkar, A ma blo bzang	A female physician of the Khangkar family in Kyirong, southwestern Tibet, who established and directed her independent clinic in McLeod Ganj. Her two daughters trained as Tibetan physicians. She processed mercury herself. See Fig. 32.
Amchi Gege (1940–2011)	Am chi dge dge	See Tsultrim Sangyé.
Amchi Karma	Am chi kar ma	Ladakhi amchi who took part in the *tsotel* events in Nee, Ladakh, in 1994 and came for some parts of the process in 2002.
Amchi Katak	Am chi ka dag	Ladakhi amchi who took part in the *tsotel* events in Nee, Ladakh, in 1994 and 2002.
Amchi Kunchog Tseten	Am chi dkon mchog tshe brtan	Contemporary Tibetan medical practitioner from Amdo; holds degrees in Tibetan and Chinese medicine; practices in New York.
Amchi Kunsang Kunphen (1924–2006)	Am chi kun bzang kun phan	See Kunsang Kunphen.
Amchi Lama Rigzin	Am chi bla ma rig ʻdzin	Ladakhi amchi, president of the Urgyen Sorig Tsokspa based at Nee, Ladakh, prepared *tsotel* with Trogawa Rinpoche in Nee in 1994 and 2002; co-sponsored the *tsotel* event in 1994.
Amchi Lama Wangchuk	Am chi bla ma dbang phyug	Ladakhi amchi who took part in the *tsotel* events in Nee, Ladakh, in 1994 and 2002.

Published in: Gerke, Barbara, 2021. *Taming the Poisonous. Mercury, Toxicity, and Safety in Tibetan Medical Practice.* Heidelberg Studies on Transculturality 7. Heidelberg: Heidelberg University Publishing. DOI: https://doi.org/10.17885/heiup.746

THL Phonetic Transcription (Germano and Tournadre 2003)	**Wylie Transliteration** (Wylie 1959)	**Who is this person?**
Amchi Nawang Tarchin	Am chi ngag dbang mthar phyin	See Nawang Tarchin (Note: Nawang is the phonetic spelling of Ngawang used in Ladakh).
Amchi Nawang Tsering	Am chi ngag dbang tshe ring	Ladakhi amchi, disciple of Amchi Lama Rigzin, main *menjorpa* of the Urgyen Sorig Tsokspa based at Nee, Ladakh. He took part in the *tsotel* events in Nee, Ladakh, in 1994 and 2002.
Amchi Nyima Sampel (1969–)	Am chi nyi ma bsam 'phel	Contemporary amchi from a Bonpo family tradition from Jharkot, Mustang, who was trained by Amchi Gege in Kathmandu.
Amchi Padma Tsetar	Am chi pad+ma tshe thar	Ladakhi amchi from eastern Ladakh, trained by Amchi Lama Rigzin, who took part in the *tsotel* events in Nee, Ladakh, in 1994 and 2002.
Amchi Tsültrim	Am chi tshul khrims	He was appointed part-time physician at the Powo Tramo clinic after curing a high military officer in the 1970s; probably identical with Tsultrim Sangyé.
Amchi Wangchuk Lama (1942–)	Am chi dbang phyug bla ma	A senior Tibetan physician who settled in exile in Nepal. He made *tsotel* with his lama in 1955 at the Drakkar Taso Monastery in his home region of Kyirong in southwestern Tibet.
Ani Ngawang (ca. 1930–2006)	A ni ngag dbang	A Tibetan nun from Nyémo (Snye mo) trained in Tibetan medicine, disciple of Kyémé Rinpoche from eastern Tibet. See Fig. 31.
Barawa Gyeltsen Pelzang (1310–1391)	'Ba' ra ba rgyal mtshan dpal bzang	Founded the Barawa Kagyü school, a sub-school of the Drukpa Kagyü, in central Tibet. His *Collected Writings* include two small works on *ngülchu* by the first Drigungpa Jikten Sumgön (1143–1217).
Bhalipa	'Ba' li pa or: B+ha li pa	See Sanskrit: Vyālipa. An Indian Mahāsiddha and author of two works on mercury elixirs that were translated into Tibetan.

THL Phonetic Transcription (Germano and Tournadre 2003)	**Wylie Transliteration** (Wylie 1959)	**Who is this person?**
Choelothar	Chos lo thar	Contemporary Tibetan physician who took part in the MTK *tsotel* event of 1994; currently vice president of the Chauntra Sowa-Rigpa Study & Research society. He wrote a book on the history of MTK (Choelothar 2000).
Chöphel Kalsang	Chos 'phel skal bzang	Contemporary, privately working amchi, trained by Dr. Yeshi Dhonden in McLeod Ganj; established his own Sorig Tibetan Herbal Clinic near Dharamsala.
Darmo Menrampa Lobsang Chödrak (1638–1710)	Dar mo sman rams pa blo bzang chos grags	The chief physician of the Fifth Dalai Lama; supervised the *tsotel* event of 1678.
Dawa	Zla ba	Contemporary Tibetan physician, director of the MTK at the time of the second *tsotel* toxicity study in 2009.
Dawa Dolma	Zla ba sgrol ma	Contemporary, MTK-trained Tibetan physician. She was head of the MTK Research and Development Department during the first clinical study on *tsotel* in 2002.
Dawa Ridrak (1963–)	Zla ba ri brag	Tibetan physician who graduated from the MTK in 1991; worked at the MTK pharmacy for ten years and also directed the Herbal Product Research Department; lives in New York. He took part in MTK *tsotel* events of 1994 and 2001; included a detailed description of the 1994 event in his *menjor* work (Dawa Ridrak 2003).
Degé Drungyig Gurupel (fl. 18th century) briefly: Gurupel	Sde dge'i drung yig gu ru 'phel, Gu ru 'phel	Tibetan physician and medical author from Degé in Kham, nephew of Situ Chökyi Jungné; wrote a *tsotel* manual (text 11 in the *Collected Works on Mercury Formulations*, Appendix D).
Demo Rinpoche Ngawang Lobsang Trinlé Rapgyé (1855–1899)	De mo rin po che ngag dbang blo bzang 'phrin las rab rgyas	Regent of Tibet (1886–1895), who provided part of the mercury for the *tsotel* event of 1893 under the Thirteenth Dalai Lama.

THL Phonetic Transcription (Germano and Tournadre 2003)	**Wylie Transliteration** (Wylie 1959)	**Who is this person?**
Désі Sangyé Gyatso (1653–1705)	Sde srid sangs rgyas rgya mtsho	Regent of the Fifth Dalai Lama; author of the *Blue Beryl* commentary on the *Four Treatises* among many other works.
Deumar Tendzin Püntsok (b. 1672) also: Deumar Geshe Tendzin Püntsok briefly: Deumar	De'u dmar bstan 'dzin phun tshogs, De'u dmar dge bshes bstan 'dzin phun tshogs, De'u dmar	Famous physician from eastern Tibet and author of many medical and other texts.
Dhondup Tsering	Don grub tshe ring	MTK medical student in 1997 (ninth batch); she was trained in Ayurvedic mercury processing at BHU, Varanasi.
Do Dasel Wangmo (1928–)	Mdo zla gsal dbang mo	Tibetan physician from a well-positioned Nyingma family in Kham; she participated in making *tsotel* in Lhasa in 1983–1984. Student of Lama Khempo Öser. See Fig. 30.
Do Khyentse Yeshe Dorjé (1800–1866)	Mdo mkhyen brtse ye shes rdo rje	A famous master of the Nyingma School of Tibetan Buddhism, great-grandfather of Do Dasel Wangmo.
Do Tsédzin Wangmo (1914–1953)	Mdo tshe 'dzin dbang mo	The mother of Do Dasel Wangmo, who studied medicine with Troru Jampel (Khro ru 'jam dpal, n.d.), a disciple of Ju Mipam.
Domo Geshe Rinpoche Ngawang Kalsang (1866–1936)	Dro mo dge shes rin po che ngag dbang bskal bzang	Gelukpa lama who was famous for his blessing pills. He was the teacher of Anagarika Govinda.
Dorje Damdul	Rdo rje dgra 'dul	Contemporary MTK-trained Tibetan physician, associate professor at the Sowa Rigpa Department at CIHTS in Sarnath, where he taught the making of *tsotel* three times together with Rakdo Rinpoche.
Dozur Tsering Wangyal (died 1975)	Mdo zur tshe ring dbang rgyal	The first husband of Ama Lobsang Dolma Khangkar.
Drangti Penden Gyeltsen (fl. 14th century)	Brang ti dpal ldan rgyal mtshan	Tibetan physician of the Drangti clan who authored a work on Orgyenpa's mercury practice.

THL Phonetic Transcription (Germano and Tournadre 2003)	**Wylie Transliteration** (Wylie 1959)	**Who is this person?**
Drigung Chödrak	’Bri gung chos grags	See Drigung Rigzin Chökyi Drakpa.
Drigung Rigzin Chökyi Drakpa (1595–1659), briefly: Drigung Chödrak	’Bri gung rig ’dzin chos kyi grags pa, ’Bri gung chos grags	A trained physician and the twenty-third throne holder of the Drigung Kagyü, one of the sub-lineages of the Kagyü school of Tibetan Buddhism, who wrote eleven short works on precious pills and mercury processing in his *Drigung Collection of Sowa Rigpa*.
Drigungpa Jikten Sumgön (1143–1217)	’Bri gung pa ’jig rten gsum mgon	A Drigung lama who wrote two short works on mercury processing.
Dromrik Nenjor Yéshé (fl. 17th century)	‘Brom rigs rnal ‘byor ye shes	Most probably authored texts 3 and 5 in the *Collected Works on Mercury Formulations* (Appendix D).
Drowa Zangmo (fl. 13th century)	’Gro ba bzang mo	The female consort of Götsangpa, teacher of Orgyenpa. They met in India in 1217.
Dzongsar Jamyang Khyentsé Rinpoche (1961–)	Rdzong gsar ’jam dbyangs mkhyen brtse rin po che	A Nyingma lama from Bhutan who sponsored the *tsotel* event of Trogawa Rinpoche in Nee in 2002.
Dzongsar Khyentsé Chökyi Lodrö (1893–1959)	Rdzong gsar mkhyen brtse chos kyi blo gros	A great Rimé master of the early twentieth century, trained at Katok Monastery in Kham; Trogawa Rinpoche’s root guru.
Epa Sonam Rinchen	E pa bsod nams rin chen	Contemporary MTK-trained physician and astrologer, author of Lamenpa Tenzin Chödrak’s biography.
Ganden Tripa Ngawang Tsültrim (1721–1791)	Dga’ ldan khri pa ngag dbang tshul khrims	Spiritual leader of the Gelukpa school. He supervised the religious and administrative aspects of the *tsotel* event of 1783 under the Eighth Dalai Lama.
Gen Gojo Wangdu	Dgen go ’jo dbang ’dus	Senior Tibetan physician and teacher from Gojo (eastern Tibet) who is a retired professor from Tibet University for Tibetan Medicine in Lhasa. He was one of the participants of the 2011 Kathmandu workshop “Producing Efficacious Medicine.”

THL Phonetic Transcription (Germano and Tournadre 2003)	**Wylie Transliteration** (Wylie 1959)	**Who is this person?**
Gen Rinpoche Rakdo Lobsang Tenzin (1956–) also: Rakdo Rinpoche	Dgen rin po che rag rdo blo bzang bstan 'dzin, Rag rdo rin po che	A Tibetan scholar and physician who was trained by Khempo Troru Tsénam in Lhasa. He has been teaching at the CIHTS Sowa Rigpa Department since 1993 and became full professor there in 1998. He taught the making of *tsotel* three times between 1998 and 2008 together with Dr. Dorje Damdul.
Götsangpa Gönpo Dorjé (1189–1258) also: Gyalwa Götsangpa	Rgod tshang pa mgon po rdo rje, Rgyal ba rgod tshang pa	A great master of the Drukpa Kagyü lineage, teacher of Orgyenpa.
Gowa Tashi Tsering (died ca. 1968)	'Go ba bkra shis tshe ring	Name of the last amchi of the medical family lineage from Ngari of Tashi Tsering Josayma.
Gurupel	Gu ru 'phel	See Degé Drungyig Gurupel.
Gyalwang Rinpoche	Rgyal dbang rin po che	"Royal Precious One," an epithet of the Dalai Lama.
Gyayé Lobsang Nyima (1933–)	Rgya ye blo bzang nyi ma	Contemporary senior amchi and head doctor of the Qinghai Provincial Tibetan Medical Hospital, who invited Khempo Troru Tsénam to teach *tsotel* in Amdo. He has made *tsotel* more than thirty times in his lifetime.
Jamgön Kongtrul Lodrö Thayé (1813–1899/1900), also known as: Kongtrul Yönten Gyatso or: Karma Ngawang Yönten Gyatso	'Jam mgon kong sprul blo gros mtha' yas, Kong sprul yon tan rgya mtsho, Karma ngag sbang yon tan rgya mtsho	A great Buddhist master, physician, and writer from eastern Tibet who was a specialist in *tsodru chenmo*; wrote many medical and Buddhist texts. The Men-Tsee-Khang in Dharamsala follows his *tsotel* manual (text 12 in the *Collected Works on Mercury Formulations*, Appendix D).
Jampa Trinlé (1928–2011)	Byams pa 'phrin las	Tibetan physician, scholar, writer, and director of Lhasa Mentsikhang. He was a student of Lamenpa Khyenrap Norbu.
Jampel Gyatso (1758–1804)	'Jam dpal rgya mtsho	The Eighth Dalai Lama, under whom *tsotel* was made in 1783 and/or 1795 (?).

THL Phonetic Transcription (Germano and Tournadre 2003)	**Wylie Transliteration** (Wylie 1959)	**Who is this person?**
Jamyang Chökyi Lodrö (1893–1959)	'Jam dbyangs chos kyi blo gros	A famous Nyingma lama who made *tsotel* in eastern Tibet in 1933. He is also known as Dzongsar Khyentsé Chökyi Lodrö.
Jamyang Dolma	'Jam dbyangs sgrol ma	Contemporary MTK-trained physician; she was the head of the Research and Development Department at the MTK in Dharamsala in 2013.
Jamyang Lhündrup (1938/39–)	'Jam dbyangs lhun grub	Tibetan physician who made *tsotel* at the Lhokha Mentsikhang in southern Tibet in 1991 and wrote about it.
Jamyang Tashi	'Jam dbyangs bkra shis	Current head of the MTK Pharmacy Department; received the *tsotel* transmission from Lamenpa Tenzin Chödrak in 1994 and from Dr. Namgyal Tsering in 2001; supervised the MTK *tsotel* events in 2008, 2011, and 2014. See Fig. 21 and 41.
Jamyang Tashi of Tsona (1918–1986)	Mtsho sna 'jam dbyangs bkra shis	See Lamenpa Jamyang Tashi.
Jetsunma Do Dasel Wangmo (1928–)	Rje btsun ma mdo zla gsal dbang mo	See Do Dasel Wangmo.
Jikmé Pema Wangchen (1963–)	'Jigs med pad+ma dbang chen	The Twelfth Gyalwang Drukpa Rinpoche, current head of the Drukpa Kagyü lineage of Tibetan Buddhism.
Ju Mipam	'Ju mi pham	See Mipam Namgyel Gyatso.
Kagyü Rinpoche Tendzin Norbu (1899–1959)	Dkar brgyud rin po che bstan 'dzin nor bu	Nyingma master of the Drakkar Taso Monastery in Kyirong in southwestern Tibet who taught and sponsored the making of *tsotel* in 1955.
Kairy Amchi Tsering Paljor (1931–2007)	Rgya re am chi tshe ring dpal 'byor	Ladakhi amchi from Kairy (in Upper Indus valley) who first invited Trogawa Rinpoche to Nee. He took part in making *tsotel* in Nee in 1997 and came for part of the *tsotel* process in 2002.
Karma Chöpel	Karma chos 'phel	Tibetan physician who took part in making *tsotel* at Powo Tramo in 1977 and later also in Lhokha; one of the teachers of Tashi Yangpel Tashigang.

THL Phonetic Transcription (Germano and Tournadre 2003)	**Wylie Transliteration** (Wylie 1959)	**Who is this person?**
Karma Ngélek Tendzin (b. around 1700)	Karma nges legs bstan ’dzin	Physician and author from eastern Tibet, student of Situ Paṇchen.
Karma Tsépel (fl. 19th century)	Karma tshe dpal	Physician of Pelpung Monastery in eastern Tibet.
Karma Yéshé Pelzang	Karma ye shes dpal bzang	Authored text 8 in the *Collected Works on Mercury Formulations* (Appendix D).
Kelsang Dhonden	Bskal bzang don ldan	Contemporary MTK-trained physician and nephew of Dr. Yeshi Dhonden. He was also taught by his uncle and established his own pharmacy and clinic near Dharamsala.
Kelzang Gyatso (1708–1757)	Bskal bzang rgya mtsho	The Seventh Dalai Lama, who wanted to make *tsotel* in 1754 but passed away prematurely.
Kesip Atsang	Ke srib a tshang	A Tibetan physician who made *tsotel* with Jamyang Chökyi Lodrö in 1933.
Khempo Öser	Mkhan po ’od gser	Twentieth-century physician and Buddhist master from Kham who made *tsotel* in Lhasa with Troru Tsénam in 1983–1984. Teacher of Do Dasel Wangmo.
Khempo Troru Tsénam (1926–2004)	Mkhan po khro ru tshe rnam	Eastern Tibetan physician and Buddhist scholar of Katok Monastery. He made *tsotel* together with Lamenpa Tenzin Chödrak and others in Powo Tramo in Kongpo in 1977. He was instrumental in teaching *tsodru chenmo* to Tibetan physicians in the PRC after the 1980s; published widely.
Khyenrap Norbu (1883–1962)	Mkhyen rab nor bu	See Lamenpa Khyenrap Norbu.
Könchok Dropen Wangpo (b. 1631)	Dkon mchog ’gro phan dbang po	A Drigung physician and composer of medical commentaries; disciple of Drigung Rigzin Chökyi Drakpa (1595–1659).
Kongtrul Yönten Gyatso (1813–1899/1900)	Kong sprul yon tan rgya mtsho	See Jamgön Kongtrul Lodrö Thayé.
Künga Püntsok	Kun dga’ phun tshogs	A private medical student of Lamenpa Khyenrap Norbu.

THL Phonetic Transcription (Germano and Tournadre 2003)	**Wylie Transliteration** (Wylie 1959)	**Who is this person?**
Kunsang Kunphen (1924–2006)	Kun bzang kun phan	Tibetan physician from Nyalam, who studied under Lamenpa Khyenrap Norbu and received the *tsotel* training from the medicine compounder Topgyel of Lhasa Mentsikhang; established himself in Kathmandu in 1973 with the support of the Nepali king. He made *tsotel* with Tashi Yangpel Tashigang in 1985. His clinic still produces *tsotel* at the Nyalam Medicine Factory in the TAR and makes precious pills in Kathmandu.
Kyapjé Trijang Rinpoche Lobsang Yeshe Tenzin Gyatso (1901–1981)	Skyabs rje khri byang rin po che blo bzang ye shes bstan 'dzin rgya mtsho	Gelukpa lama and one of the main teachers of the Fourteenth Dalai Lama.
Kyémé Rinpoche	Skye med rin po che	Physician and lama from eastern Tibet; teacher of Ani Ngawang.
Lamenpa Jamyang Tashi (1918–1986) also: Jamyang Tashi of Tsona	Bla sman pa 'jam dbyangs bkra shis, Mtsho sna 'jam dbyangs bkra shis	Studied at the Mentsikhang in Lhasa, became head of the MTK Pharmacy Department in Dharamsala in 1963 and the personal physician of the Fourteenth Dalai Lama in 1976. Took part in the MTK *tsotel* event of 1982. See Fig. 18.
Lamenpa Jamyang Zhenpen (fl. 18th century)	Bla sman pa 'jam dbyangs gzhan phan	The personal physician of the Eighth Dalai Lama, who guided the *tsotel* event of 1783.
Lamenpa Khyenrap Norbu (1883–1962)	Bla sman pa mkhyen rab nor bu	A student of Trékhang Jampa Tupwang, head of Chakpori Medical College until 1924, director of Lhasa Mentsikhang, and personal physician of the Thirteenth Dalai Lama.
Lamenpa Orgyen Tendzin Gyatso (fl. 19th century)	Bla sman pa o rgyan bstan 'dzin rgya mtsho	Tibetan physician from Tsurpu Monastery, who worked at Chakpori Medical College in Lhasa and authored a rare text on *tsotel* and one on Rinchen Tsodru Dashel (texts 9 and 10 in the *Collected Works on Mercury Formulations*, Appendix D). He made *tsotel* in Lhasa in 1893 under the Thirteenth Dalai Lama and served as his vice-personal physician. He was later exiled to Bhutan.

THL Phonetic Transcription (Germano and Tournadre 2003)	**Wylie Transliteration** (Wylie 1959)	**Who is this person?**
Lamenpa Tenzin Chödrak (1924–2001)	Bla sman pa bstan ’dzin chos grags	Student of Lamenpa Khyenrap Norbu, and later the personal physician of the Fourteenth Dalai Lama. He made *tsotel* in 1953 and 1977 and passed on the lineage to the MTK in Dharamsala. See Fig. 18 and 22.
Lhakpa Ngödrup	Lhak pa ngö drup	CTMI graduate who took part in the 2002 *tsotel* event in Nee, Ladakh.
Lhatsün Rinchen Gyatso (fl. 14th century)	Lha btsun rin chen rgya mtsho	Tibetan medical author from Drongtsé (’Brong rtse); included Orgyenpa’s mercury texts in his works.
Lingmen Trashi Bum (b. 1726)	Gling sman bkra shis ’bum	Medical practitioner and author from eastern Tibet.
Lobsang Chöpel Phagri	Blo bzang chos ’phel phag ri	Twentieth-century Tibetan physician from Phagri; senior MTK teacher in the 1980s; participated in making *tsotel* in 1982. See Fig. 20.
Lobsang Samten Taklha	Blo bzang bsam gtan stag lha	Director of the Dharamsala MTK from 1980 to 1985; brother of the Fourteenth Dalai Lama; husband of Namgyal Lhamo Taklha.
Lobsang Tashi	Blo bzang bkra shis	Senior amchi from Dromo (Dro mo) who presented three texts on mercury processing to the *Collected Works on Mercury Formulations* published by Tashi Tsering (1986), Appendix D.
Lobsang Tenzin	Blo bzang bstan ’dzin	Chief *menjorpa* of the private physician Yeshi Dhonden in McLeod Ganj.
Lobsang Tsultrim (1921–2004?)	Blo bzang tshul mkhrim	Studied at Chakpori Medical College in Lhasa; made *tsotel* with Trogawa Rinpoche in Lhasa in 1954.
Lodrö Gyatso (1722–1774)	Blo gros rgya mtsho	The Twelfth Degé King, who was trained in and practiced medicine and sponsored Situ Paṇchen’s *tsotel* event.
Mipam Namgyel Gyatso (1846–1912) briefly: Ju Mipam	Mi pham rnam rgyal rgya mtsho, ’Ju mi pham	Famous polymath, student of Kongtrul Yönten Gyatso in eastern Tibet, was present during the 1872 *tsotel* event and wrote about it (text 7 in the *Collected Works on Mercury Formulations*, Appendix D).

THL Phonetic Transcription (Germano and Tournadre 2003)	**Wylie Transliteration** (Wylie 1959)	**Who is this person?**
Namgyal Lhamo Taklha (1942–)	Rnam rgyal lha mo stag lha	Granddaughter of Tsarong Dasang Damdul *(Tsha rong zla bzang dgra 'dul)*. From 1980 to 1985, Mrs. Taklha was the translator and secretary to the Director of the Tibetan Medical and Astrological Institute (TMAI, now Men-Tsee-Khang, MTK).
Namgyal Qusar	Rnam rgyal khyu gsar	Contemporary MTK-trained Tibetan physician who founded the Qusar Tibetan Healing Center near Dharamsala, where he also prepares his own medicines; he practices, teaches, and publishes on Sowa Rigpa.
Namgyal Tsering	Rnam rgyal tshe ring	Senior Tibetan physician who made *tsotel* three times in Dharamsala (in 1982, 1987, and as the leading MTK *menjorpa* in 2001). He was deputy director at the MTK for about ten years; now lives in New York. He wrote an article on *tsadül* and *drangdül* (1997). See Fig. 20.
Namkha Lha	Nam mkha' lha	A physician from Nyanang who received the mercury transmissions of the Orgyenpa tradition. Mentioned by Désі Sangyé Gyatso.
Nangrongshar Gen Rikdzin Lhündrup (1889–1986?) or: Nangrongshar Rikdzin Lhündrup Penjor, also: Nyakrongshar or: Nyakrongshag	Nang rong shar dgen rigs 'dzin lhun grub, or: Nang rong shar rigs 'dzin lhun grub dpal 'byor, also: Nyag rong shar, or: Nyag rong shag	A Tibetan aristocratic physician of the Chakpori lineage who ran a private school and clinic in Lhasa and was Trogawa Rinpoche's main medical teacher. He was present during the 1921 *tsotel* event under Trékhang Jampa Tupwang in Lhasa and taught *tsodru chenmo* at Trogawa House in Lhasa in 1954.
Nawang Tarchin	Ngag dbang mthar phyin	Monk and amchi from Ladakh, who made *tsotel* with Trogawa Rinpoche in Nee, Ladakh. He is a graduate from CTMI Darjeeling.
Ngawang Lobsang Gyatso (1617–1682)	Ngag dbang blo bzang rgya mtsho	The Fifth Dalai Lama, who initiated the making of *tsotel* twice, in 1669 and in 1678.

THL Phonetic Transcription (Germano and Tournadre 2003)	**Wylie Transliteration** (Wylie 1959)	**Who is this person?**
Ngawang Soepa	Nag dbang bzod pa	Contemporary MTK physician, took part in making *tsotel* in 2008 and 2011.
Ngawang Thinle	Ngag dbang ’phrin las	Graduate of the first batch at CTMI, Darjeeling.
Norbu Chöpel	Nor bu chos ’phel	The second husband of Ama Lobsang Dolma Khangkar and personal attendant to Kyapjé Trijang Rinpoche. Wrote an account of Ama Lobsang in Tibetan.
Nyimé Dorjé	Gnyis med rdo rje	Probably the medical teacher and lama from eastern Tibet known as Kyémé Rinpoche.
Orgyen Tendzin Gyatso (fl. 19th century)	O rgyan bstan ’dzin rgya mtsho	See Lamenpa Orgyen Tenzin Gyatso.
Orgyenpa Rinchenpel (1229/30–1309) or: Orgyen Rinchenpel	U rgyan (also O rgyan) pa rin chen dpal, U rgyan rin chen dpal	Kagyü master who received the *tsodru chenmo* transmission from Vajrayoginī in Oḍḍiyāna and brought it to Tibet; he is considered the father of the *tsotel* practice.
Pasang Gyelmo Khangkar (1956–)	Pa sangs rgyal mo khang dkar	One of the two daughters of Ama Lobsang Dolma Khangkar, MTK-trained physician who runs the Dekyi Khangkar Memorial Clinic in McLeod Ganj.
Pasang Yonten Arya (1955–)	Pa sangs yon tan ar+ya	Senior MTK-trained Tibetan physician; studied with Barshi Püntsok Wanggyel, Jamyang Tashi, and Ama Lobsang; took part in the 1982 *tsotel* event; principal of the TMAI (now MTK) college (1984–1989). Lives and works in Italy; wrote several books on Tibetan medicine.
Pema Dorjee (1950–2015)	Pad+ma rdo rje	Senior MTK-trained physician who took part in the 1982 *tsotel* event. Studied with Barshi Püntsok Wanggyel and Yeshi Dhonden. First chairman of CCTM (2004–2007); visiting physician to the Fourteenth Dalai Lama (2001–2002); wrote several books on Tibetan medicine.

THL Phonetic Transcription (Germano and Tournadre 2003)	**Wylie Transliteration** (Wylie 1959)	**Who is this person?**
Penden Gyeltsen (birth date unknown, died in 1962)	Dpal ldan rgyal mtshan	Tibetan physician who taught medicine at a medical school near Phagri and made *tsotel* there in 1953, when he taught Lamenpa Tenzin Chödrak.
Penpa Tsering	Spen pa tshe ring	Contemporary MTK-trained physician who established his own pharmacy in the Dharamsala area; wrote an article on *tsotel*; took part in the MTK *tsotel* event of 1987.
Pöntsang Namkha Lha	Dpon tshang nam mkha' lha	A Tibetan ruler who requested the Fifth Dalai Lama to make *tsotel* in 1669.
Pünrapa Tsering Penden	Phun rab pa tshe ring dpal ldan	The governor of Nyakrong (Nyag rong spyi khyab), who requested Kongtrul Yönten Gyatso to make *tsotel* in 1872. He also received the order by the Twelfth Dalai Lama to bring physicians from Kham to Lhasa in 1875 to make *tsotel*.
Qubilai Khan (1215–1294)	Mongolian name	Mongolian ruler who was the grandson of Genghis Khan. Orgyen Rinchenpel met him around 1293.
Rakdo Rinpoche	Rag rdo rin po che	See Gen Rinpoche Rakdo Lobsang Tenzin.
Rangjung Dorjé (1284–1339)	Rang byung rdo rje	The Third Karmapa who is said to have received the *tsodru chenmo* lineage from Orgyenpa.
Rangjung Rikpé Dorjé (1924–1981)	Rang byung rig pa'i rdo rje	The Sixteenth Karmapa.
Rigzin Sangmo	Rig 'dzin bzang mo	Contemporary MTK physician, currently head of the Research and Development Department; she was on the team of the second MTK *tsotel* study.
Rikpé Lodrö	Rig pa'i blo gros	Name of an Indian saint, an emanation of Avalokiteśvara.
Rinchen Zangpo (958–1055)	Rin chen bzang po	Famous translator of Sanskrit Buddhist and medical texts into Tibetan.

THL Phonetic Transcription (Germano and Tournadre 2003)	**Wylie Transliteration** (Wylie 1959)	**Who is this person?**
Sampel Norbu Trogawa Rinpoche (1932–2005)	Bsam 'phel nor bu khro dga' bo rin po che	Buddhist Nyingma master and Tibetan physician, trained in Lhasa by Nangrongshar Gen Rikdzin Lhündrup; founded the Chagpori Tibetan Medical Institute (CTMI) in Darjeeling in 1992; made *tsotel* in Lhasa and Nee, Ladakh. See Fig. 26.
Sangyé Gyatso (1653–1705)	Sangs rgyas rgya mtsho	See Désі Sangyé Gyatso.
Shawéri Wangchuk	Sha ba'i ri dbang phyug	Tibetan Name of an Indian Yogi.
Sherab Tenzin	Shes rab bstan 'dzin	Graduate of the first batch of CTMI in Darjeeling; he established his own Pure Vision Sorig clinic and pharmacy in Nepal.
Situ Chökyi Jungné (1699 / 1700–1774) also: Situ Paṇchen	Si tu chos kyi 'byung gnas, Si tu paN chen	The eighth Tai Situ Rinpoche, who was a polymath and also a medical expert and promoted the making of *tsotel* in Degé, eastern Tibet.
Sönam Chimé	Bsod nams 'chi med	Troru Tsénam's nephew, who participated in making *tsotel* in Lhasa in 1983 / 1984.
Sönam Özer (fl. 13th century)	Bsod nams 'od zer	Author of a biography *(rnam thar)* of Orgyen Rinchenpel.
Sonam Rinchen	Bsod nams rin chen	See Epa Sonam Rinchen.
Tapkhé Püntsok	Thabs mkhas phun tshogs	A twentieth-century senior physician at the Mentsikhang in Lhasa. He held the title "Great Medicine Provider" *(sman gnyer chen mo)*, which refers to his duty of supervising the raw materials kept in stock. He made *tsotel* in 1973 / 74.
Tashi Tsering Josayma (1960–)	Bkra shis tshe ring jo sras ma	Tibetan tibetologist, writer, and historian; director of the Amnye Machen Institute, McLeod Ganj; assembled and published the *Collected Works on Mercury Formulations* in 1986. See Fig. 29.
Tashi Tsering Phuri	Bkra shis tshe ring spu ri	Current director of the MTK in Dharamsala since 2012; was also MTK director from 1994–1997.

THL Phonetic Transcription (Germano and Tournadre 2003)	**Wylie Transliteration** (Wylie 1959)	**Who is this person?**
Tashi Yangchen	Bkra shis dbyangs chen	MTK-trained physician; she studied Ayurvedic mercury processing at BHU in 1997.
Tashi Yangpel Tashigang (1938–)	Bkra shis g.yang 'phel bkra shis sgang	Amchi from a family lineage in Nimo, Ladakh, also studied in Tibet, worked with Gene Smith, and established his own clinic and pharmacy in Delhi. He published more than 250 rare works on Tibetan medicine. He made *tsotel* with Amchi Kunsang Kunphen in 1985 and received the theoretical training from Amchi Karma Chöpel in Lhasa. See Fig. 24.
Teinlay Palsang Trogawa (1976–)	'Phrin las dpal gsang khro dga' bo	Nephew of Trogawa Rinpoche and trained by him; elected as the current director of CTMI in Darjeeling.
Tekchok Dorjé (1798–1868)	Theg mchog rdo rje	The Fourteenth Karmapa, who made black pills for Kongtrul Yönten Gyatso to include in his precious pills.
Tendzin Namgyel (died 1991)	Bstan 'dzin rnam rgyal	Tibetan physician trained by Tapkhé Püntsok in Lhasa; was the head of the MTK pharmacy in Dharamsala (1981–1991); made *tsotel* with Tapkhé Püntsok in 1973/1974, with Lamenpa Tenzin Chödrak in 1982, and as the leading physician in 1987. See Fig. 18.
Tenzin Chödrak (1924–2001)	Bstan 'dzin chos grags	See Lamenpa Tenzin Chödrak.
Tenzin Gyatso (1935–)	Bstan 'dzin rgya mtsho	The Fourteenth Dalai Lama, who initiated and supported the *tsotel* event of 1982.
Tenzin Namdul	Bstan 'dzin rnam grol	Contemporary MTK-trained physician, holding a doctoral degree in anthropology from Emory University, USA. He took part in the first *tsotel* study at the MTK in Dharamsala.
Tenzin Phelgye	Bstan 'dzin 'phel rgyas	CTMI-trained physician, who received the *tsotel* lineage from Trogawa Rinpoche in Ladakh in 2002 and currently directs the CTMI pharmacy.

THL Phonetic Transcription (Germano and Tournadre 2003)	**Wylie Transliteration** (Wylie 1959)	**Who is this person?**
Tenzin Thaye	Bstan 'dzin mtha' yas	MTK-trained senior physician, who currently is one of the visiting physicians of the Fourteenth Dalai Lama; took part in the MTK *tsotel* events of 2001 and 2014. See Fig. 21.
Toding Rinpoche also known as: Tupten Gyeltsen	Mtho lding rin po che, Thub bstan rgyal mtshan	He was a young monk and assistant during the 1982 *tsotel* event and later became a physician at the MTK and participated in the *tsotel* events of 1994 and 2001. See Fig. 22.
Topgyel (fl. 20th century)	Thob rgyal	The *menjorpa* [medicine compounder] of Lhasa Mentsikhang, who trained Amchi Kunsang Kunphen.
Trékhang Jampa Tupwang (ca. 1863–1922)	Bkras khang byams pa thub dbang	A monk, physician, and aristocrat, who became the personal physician of the Thirteenth Dalai Lama in 1897 and head of the Lhasa Mentsikhang, founded in 1916. He supervised the *tsotel* events of 1919 and 1921.
Trétong	Bkras mthong	Name of a Tibetan aristocratic family.
Trétong Gyurmé Gyatso (1890–1938)	Bkras mthong 'gyur med rgya mtsho	Member of the aristocratic Trétong family, who held important positions back in Kham. The family gifted *tsotel* to Dr. Yeshi Dhonden in the 1980s.
Tri Nominhan (fl. 18th century)	Khri no min han	Senior teacher of the Eighth Dalai Lama, who supervised the religious and administrative aspects of the *tsotel* event of 1783.
Trinlé Gyatso (1856–1875)	'Phrin las rgya mtsho	The Twelfth Dalai Lama, who wanted to make *tsotel* in 1875, but passed away that year.
Troru Tsénam (1926–2004)	Khro ru tshe rnam	See Khempo Troru Tsénam.
Tségyel (fl. 20th century)	Tshe rgyal	Tibetan regiment commander, who was appointed health director at the Powo Tramo labor camp in 1974. He was instrumental in organising the 1977 *tsotel* event.
Tsering Lhamo	Tshe ring lha mo	MTK medical student in 1997 (ninth batch); she was trained in Ayurvedic mercury processing at BHU that year.

THL Phonetic Transcription (Germano and Tournadre 2003)	**Wylie Transliteration** (Wylie 1959)	**Who is this person?**
Tsering Norbu	Tshe ring nor bu	Contemporary Lhasa-trained Tibetan physician; head of the Materia Medica Department at the MTK in Dharamsala; authored several books on Tibetan medicine.
Tsering Thakchoe Drungtso	Tshe ring thag gcod drung 'tsho	Contemporary MTK-trained physician; served on the board of CCTM and established his own clinic in McLeod Ganj; authored several books on Tibetan medicine.
Tsewang Tamdin	Tshe dbang rta mgrin	Senior MTK-trained physician, who was MTK director from 2010–2012; visiting physician to the Fourteenth Dalai Lama; Chief Medical Officer and Chairman of the High Level Medical and Astrological Council and a member of CCTM. He took part in the first MTK *tsotel* event of 1982.
Tsultrim Gyeltsen (fl. 19th / 20th century)	Tshul khrim rgyal mtshan	Tibetan physician from Chakpori Medical College, who took part in the 1921 *tsotel* event in Lhasa.
Tsultrim Sangyé (1940–2011) better known as Amchi Gege	Tshul khrims sangs rgyas, Am chi dge dge	Former head of the Bonpo School of the Four Medical Sciences of the Early Tradition in Dhorpatan, near Kathmandu. He took part in the *tsotel* event of 1977 at Powo Tramo.
Tulku Dozher Tupten Lamzang (fl. 20th century)	Bla sprul rdo gzher thub bstan lam bzang	A local lama at Phagri, southern Tibet, who sponsored the *tsotel* event of 1953.
Tupten Gyatso (1876–1933)	Thub bstan rgya mtsho	The Thirteenth Dalai Lama, who promoted Tibetan medicine in Lhasa and organized three *tsotel* events, in 1893, 1919, and 1921.
Tupten Gyeltsen	Thub bstan rgyal mtshan	See Toding Rinpoche.
Tupten Tséring (fl. 20th century)	Thub bstan tshe ring	The last principal of the Chakpori Medical College in Lhasa before its destruction by the People's Liberation Army in 1959. He later worked at the Mentsikhang in Lhasa. He also wrote about *drangdül* and *tsadül* processing.
Wangchuk	Dbang phyug	Tibetan name for Śiva.

THL Phonetic Transcription (Germano and Tournadre 2003)	**Wylie Transliteration** (Wylie 1959)	**Who is this person?**
Yeshe Dorjé (fl. 20th century)	Ye shes rdo rje	One of the Tibetan amchi at Powo Tramo who was searching for a surviving *tsotel* specialist.
Yeshe Gelek	Ye shes dge legs	Contemporary Tibetan physician; made *tsotel* in Lhokha in southern Tibet in 1991 under Karma Chöpel and Jamyang Lhündrup; later taught at the MTK college in Dharamsala.
Yeshi Dhonden (1927–2019)	Ye shes don ldan	Famous Tibetan physician and monk, trained in Lhasa by Lamenpa Khyenrap Norbu; made *tsotel* in Lhokha, south of Lhasa, with Penden Gyeltsen and others; established his private clinic in McLeod Ganj in 1979, after working at the MTK in Dharamsala for eighteen years (1961–1979); personal physician of the Fourteenth Dalai Lama (1960–1980); made his own *tsotel* in 1985. See Fig. 23.
Yutok Yönten Gönpo (fl. 12th century)	G.yu thog yon tan mgon po	Famous Tibetan physician and religious figure attributed with the compilation of the *Four Treatises* and the transmission of the Yutok Heart Essence.
Zamyou Penpa Tsering	Dzam g.yu spen pa tshe ring	Contemporary Tibetan physician, guest lecturer at the Department of Sowa Rigpa, CIHTS, Sarnath; made *tsotel* as a student in 2008 at CIHTS.
Zhungkyé	Gzhung skyes	Name of an Indian hermit and mercury specialist.
Zurkhar Lodrö Gyelpo (1509–1579)	Zur mkhar blo gros rgyal po	Famous Tibetan physician and representative of the Zur medical tradition; wrote several medical works.
Zurkhar Nyamnyi Dorjé (1439–1475)	Zur mkhar mnyam nyid rdo rje	Famous Tibetan physician and representative of the Zur medical tradition; propagated the black pill mercury formulas and wrote several medical works; authored text 1 in the *Collected Works on Mercury Formulations* (Appendix D).

2 Glossary of Recurrent Tibetan Terms (Including Place Names)

Phonetic Transcription	**Wylie Transliteration**	**English Translation or Definition**
amchi	*am chi*	Mongolian-derived word for a Tibetan medical practitioner, widely used across the Himalayas and in other regions where Sowa Rigpa is practiced.
Barawa Kagyü	‘Ba’ ra ba dkar brgyud	A sub-school of the Drukpa Kagyü school of Tibetan Buddhism.
barché	*bar chad*	Obstacle, misfortune.
béken	*bad kan*	One of the three Sowa Rigpa *nyépa* dynamics, predominated by the elements earth and water.
bikpé duk	*’bigs pa’i dug*	The “poison of penetration,” one of the poisons of mercury.
Bodong E	Bo dong E	A Buddhist monastery founded in 1049, west of Shigatse.
Bonpo School of the Four Medical Sciences of the Early Tradition	Sngar srol gso rig ’bum bzhi’i slob gra	Name of the Bonpo medical school in Dhorpatan, near Kathmandu, established by Amchi Gege (Tsultrim Sangyé).
chak gyé	*lcags brgyad*	“Eight metals,” see *ching jé chak gyé*.
Chakpori	Lcags po ri	“Iron Hill,” the short name of the monastic medical college in Lhasa, established in 1696; the full Tibetan name of the college is Lcags po ri rig byed ’gro phan gling.
chang	*chang*	Tibetan fermented barley beer.
Changra	Lcang ra	See Ramoché Changra.
Cherjé	Cher rje	Name of a Tibetan medical school that developed during the twelfth century in southern Tibet.
chiba duk	*lci ba’i dug*	The “poison of heaviness,” one of the poisons of mercury.

Phonetic Transcription	Wylie Transliteration	English Translation or Definition
ching jé chak gyé	*'ching byed lcags brgyad*	The "eight binding metals," which are refined to bind mercury during the manufacture of *tsotel*: copper *(zangs)*, gold *(gser)*, silver *(dngul)*, iron *(lcags)*, bronze *('khar ba)*, brass *(ra gan)*, tin *(gsha' dkar)*, and lead *(zha nye)*.
chö	*chos*	Buddhist teachings, Sanskrit *dharma*.
choga	*cho ga*	Common term for ritual, offering, worship; also a skilled procedure that has to be done, such as in Sowa Rigpa *menjor* practice, where it can refer to the processing of substances.
chokla	*cog la*	Cinnabar, also in roasted form, which is used as an ingredient and to coat pills.
choklama	*cog la ma*	See *chokla*.
chöné	*mchod gnas*	A party that is worthy of patronage (e.g. lamas and monasteries, or a *tsotel* event) and sponsorship by a patron or *yöndak*; one element of the *chöyön* relationship.
chöyön	*mchod yon*	Priest-patron-relationship. *Chöyön* describes a relational dynamic between one party who is worthy of patronage, *chöné* (e.g. lamas and monasteries, or a *tsotel* event), and a patron or donor, *yöndak* (e.g. local or foreign ruler), who gains merit through sponsorship.
chü	*bcud*	Polysemous term; depending on context it can be translated as taste, essence, elixir, sap, moisture, potency, extraction, nutriment, vital essence, quintessence, distilled essence, or a drink.
chu shak	*cu'u gshag*	A phoneticised version of the Chinese term for cinnabar, *zhūshā* 朱砂, meaning red sand; also a synonym for vermilion.

Phonetic Transcription	**Wylie Transliteration**	**English Translation or Definition**
chülen	*bcud len*	Imbibing the essence or *chü*. *Chülen* is also translated as essence extraction, referring to its manufacturing. It can also mean elixir, tonic or a metal-containing rejuvenating compound. See also Sanskrit *rasāyana*.
chuser	*chu ser*	"Yellow fluid," referring to a complex metabolism involving numerous bodily fluids (e.g. lymph, blood, intra- and extracellular fluids). In Sowa Rigpa it is considered the waste product of blood, which is refined in the gall bladder and eventually channeled throughout the body. It is red and light yellowish in color and is primarily linked to skin and joints.
dachu	*da chu*	A synonym for *ngülchu* and artificial cinnabar, a type of earth mineral medicine *(sa rdo'i sman)*; has various meanings and identifications (see Chapter 2). See also *tselkar*.
dangma ma zhuwa	*dwangs ma ma zhu ba*	Undigested nutritional essence. *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.
Dartsedo	Dar rtse mdo	A place in Kham, eastern Tibet.
daryaken	*dar ya kan*	Synonym for mercury, also the name of a theriac elixir.
Dekyi Khangkar	Bde skyid khang dkar	"White Mansion of Joy," the name of the Lobsang Dolma Khangkar Memorial Clinic in McLeod Ganj, Dharamsala, India.
Dhumatala	Dhu ma tha la	The capital of Oḍḍiyāna and probably the ancient site of Butkara near modern Mingora in today's Pakistan.
do zhong	*rdo gzhong*	Stone trough used to triturate mercury with sulfur; the trough is often pre-heated.
Drakkar Rikhö	Brag dkar ri khod	Name of a nunnery in Kardzé in Kham, where nuns prepared the precious pill Géma Tsodru Dashel.

Phonetic Transcription	Wylie Transliteration	English Translation or Definition
Drakkar Taso	Brag dkar rta so	A monastery in Kyirong, south-western Tibet, which had a *tsotel* tradition.
drangdül	*grang 'dul*	The "cold taming," name of a short mercury processing method and its resulting compound.
Drangti	Brang ti	Name of a Tibetan clan and lineage of medical practice going back to the thirteenth century.
dratré	*dgra sprad*	"Meeting the enemy," abbreviation for "transforming the natural form [of mercury through] confrontation" *(dgra dang sprad nas rang gzugs su bsgyur ba)*; the name of the last stage of manufacturing *tsotel* when preprocessed mercury and preprocessed sulfur are triturated.
Drigung Kagyüpa	'Bri gung bka' brgyud pa	One of the schools of Tibetan Buddhism with a strong medical tradition.
drip	*grib*	Forms of pollution and defilement, frequently involving women, that can only be treated ritually.
Drukpa Kagyü	'Brug pa bka' brgyud	A major branch within the Kagyü school of Tibetan Buddhism.
drup	*sgrub*	Accomplish, perfect, attain, complete.
druptap	*sgrub thabs*	"Method for attainment," central practices in Buddhist Tantra that involve the evocation of deities and their entourage; see also Sanskrit *sādhana*.
duk	*dug*	Poison, anything considered harmful or difficult to digest.
dukdön	*dug 'don*	"Taking out the poison," the collective term for a wide range of *menjor* detoxification practices.
duksel	*dug sel*	To clear a poison.
düljong	*'dul sbyong*	A technical term for prepossessing substances in Sowa Rigpa, combining the meaning of taming, or *dülwa,* with purifying, or *jongwa*.

Phonetic Transcription	**Wylie Transliteration**	**English Translation or Definition**
dülwa	*'dul ba*	"Taming," a key principle in Sowa Rigpa *menjor*; also a notion in Buddhist subjugation myths and monastic discipline.
Ganden Künkhyap Chödong	Dga' ldan kun khyab chos rdong	A place in Nyakrong, Khams, where Kongtrul Yönten Gyatso made *tsotel* in 1872.
gapiposum	*lga pi pho gsum*	Abbreviated term for "the three hot ones" *(tsha ba gsum)*: ginger *(lga skya)*, long pepper *(pi pi ling)*, and black pepper *(pho ba ris)*.
Gelukpa	Dge lugs pa	A person belonging to the Geluk school, one of the main Tibetan Buddhist schools.
göpé duk	*rgod pa'i dug*	The "poison of wildness," one of the poisons of mercury.
Gyantsé	Rgyal rtse	Name of a town in southern Tibet, now a county in the TAR.
gyatsel	*rgya mtshal*	The term for Chinese or foreign vermilion.
jartsi	*sbyar rtsi*	A glue-like or gummy substance, referring to the characteristic of *tsi duk*, one of the poisons of mercury.
jin	*byin*	Splendor, blessing.
jinda	*sbyin bdag*	Sponsor, donor, benefactor.
jinlap	*byin rlabs*	Forms of blessing, bestowing *byin*.
jongwa	*sbyong ba*	To purify, clean, remove, wash.
juwa	*'ju ba*	To digest; it can also acquire the more technical meanings of to melt or to dissolve in Sowa Rigpa *menjor* contexts.
ka tsen	*bka' btsan*	"Strict orders," here meaning something very difficult to accomplish, something out of the ordinary that not everyone can do, such as making *tsotel*.
Kagyü	Bka' brgyud	The "oral lineage" school, one of the main Tibetan Buddhist schools.

Phonetic Transcription	Wylie Transliteration	English Translation or Definition
kar	*dkar*	Abbreviation for *shakar*, meaning tin; a metal used in some forms of Sowa Rigpa mercury processing.
kardül	*dkar 'dul*	"Taming [with] tin," name of a specific mercury processing method and its resulting compound.
Kardzé	Dkar mdzes	Part of the historical region of Kham; today's Garzê Tibetan Autonomous Prefecture.
Karma Kagyü	Karma bka' brgyud	The largest sub-school of the Kagyü school of Tibetan Buddhism.
Katok	KaH thog or: Kaḥ thog	A Nyingma monastery founded in 1159 in eastern Tibet, today's Sichuan province.
kham gyé	*khams brgyad*	"Eight minerals," see *zajé kham gyé*.
khatsar	*kha tshar*	An "add-on" substance; it can be an (un)processed substance but also a blessed ingredient adding *nüpa* to other compounds.
khempo	*mkhan po*	Abbot of a monastery, but also someone well-versed in a subject.
khuwa	*khu ba*	Regenerative fluid, semen, also a synonym for mercury, since mercury symbolizes Śiva's semen.
Kongpo	Kong po	A place in eastern Tibet, southeast of Lhasa, in today's Nyingchi Prefecture.
Kyirong	Skyid grong	A place in southwestern Tibet, today in the TAR; close to the Nepal border.
laklen	*lag len*	Detailed practical instructions, mostly passed on orally.
lama	*bla ma*	Spiritual teacher and ritual master.
Lamenpa	Lha sman pa	"Divine physician," honorific title for the personal physicians of the Dalai Lamas. More recently they are called personal or visiting physicians.
Lhalu gardens	Lha klu dga' tshal	The gardens behind the Potala palace in Lhasa where *tsotel* was made in 1783 under the Eighth Dalai Lama.

Phonetic Transcription	**Wylie Transliteration**	**English Translation or Definition**
Lhasa	Lha sa	Historical capital of Tibet, now of the TAR.
Lhokha	Lho kha	District in southern Tibet. At Lhokha Mentsikhang Yeshi Dhonden, Penden Gyeltsen, Jamyang Lhündrup, Yeshe Gelek, and others made *tsotel* at different times.
lojong	*blo sbyong*	Mind training, self-cultivation.
Lubug Lingka Grove	Klu sbug gling ka	A grove near Chakpori Hill near Lhasa where *tsotel* was made under the Fifth Dalai Lama.
lung	*lung*	Oral transmissions, which involves reading out loud the texts that are to be studied.
lung	*rlung*	The element wind; also one of the three Sowa Rigpa *nyépa* dynamics, predominated by the element wind.
médrö	*me drod*	Digestive heat.
men	*sman*	Medicine; something that is beneficial.
men ngak	*man ngag*	Secret oral instructions, passed on orally to selected students.
menta	*sman rta*	The “medicine chariot” or medicine horse that carries a potent substance to its destined place in the body.
mendrup	*sman sgrub*	Empowered medicine, also the name of the ritual to consecrate medicine.
menjor	*sman sbyor*	Medicine compounding, making medicines.
menjor rikpa	*sman sbyor rig pa*	A large field of Sowa Rigpa knowledge comprising the study of *materia medica* (pharmacognosy), as well as the compounding of medicine, or *menjor*, in which *dukdön* and *düljong* are included.
menjorkhang	*sman sbyor khang*	“House of medicine compounding,” a Tibetan pharmacy.

Phonetic Transcription	Wylie Transliteration	English Translation or Definition
menjorpa	*sman sbyor pa*	"Medicine compounder," a Sowa Rigpa title for an amchi accomplished in *menjor* (making medicines).
menpa kachupa	*sman pa dka' bcu pa*	Foundational Sowa Rigpa medical degree.
menrampa	*sman rams pa*	Advanced Sowa Rigpa medical degree.
Men-Tsee-Khang	Sman rtsis khang	"Medicine Astrology House," the name of the largest medical institution in Tibetan exile, formerly Tibetan Medical and Astrological Institute (TMAI) in Dharamsala, India, founded in 1961.
Mentsikhang	Sman rtsis khang	"Medicine Astrology House," the name of the Tibetan medical institute in Lhasa, established in 1916.
muzi	*mu zi*	Sulfur.
ngag	*sngags*	Mantra.
ngak dül	*sngags 'dul*	The method of taming mercury through mantras.
Ngamring	Ngam ring	Name of a district in western Tibet, today located in the TAR.
Ngari	Mnga' ris	Place in western Tibet, today located in the TAR.
ngülchu	*dngul chu*	"Silver fluid," elemental mercury.
ngülchü duk sum	*dngul chu'i dug gsum*	The three poisons of mercury.
ngülchu tsodru chenmo or: *tsodru chenmo*	*dngul chu btso bkru chen mo, btso bkru chen mo*	The "Great Mercury Refinement," the technical name for the complex taming process of making *tsotel*.
Norbulingkha Palace	Nor bu gling ka pho brang	The summer residence of the Dalai Lamas in Lhasa.
nüpa	*nus pa*	An umbrella term that covers complex notions of potency in Sowa Rigpa, referring to a substance's capacity to have an effect.

Phonetic Transcription	**Wylie Transliteration**	**English Translation or Definition**
Nyakrong	Nyag rong	Region in eastern Tibet, today in Sichuan province.
Nyalam or: Nyanang	Gnya' lam, Gnya' nang	A town about forty kilometers from the Nepal border, previously in Tsang, today the county seat of Nyalam county in Shigatse Prefecture; location of Amchi Kunsang Kunphen's medicine factory; also the place where texts on mercury processing were found during the time of the Fifth Dalai Lama.
nyépa	*nyes pa*	The technical term for the three psycho-physiological principles in Sowa Rigpa, *lung*, *tripa*, and *béken*.
Nyingma	Rnying ma	The oldest of the main Tibetan Buddhist schools.
Oḍḍiyāna	O rgyan yul	Mythical land presumably located in the Upper Swat Valley in present-day northern Pakistan, the place from where Orgyen Rinchenpel brought the *tsotel* practice to Tibet.
papta or: *papgyün*	*phab rta,* *phab rgyun* also *phabs rgyun*	A fermenting agent; refers to small amounts of a compound that are added to future batches as a way of transmitting lineage and potency across many batches of medicines.
Pelpung	Dpal spungs	Name of a Karma Kagyü monastery in eastern Tibet, seat of the Situ lineage.
Phagri or: Phagri Richung Potok	Phag ri, Phag ri ri chung po tog	A place southwest of Lhasa, where Penden Gyeltsen and Lamenpa Tenzin Chödrak made *tsotel* in 1953. Today located in Yadong County in the TAR.
Powo Tramo	Spo bo kra mog	Chinese labor camp in Kongpo, where Lamenpa Tenzin Chödrak and Khempo Troru Tsénam made *tsotel* in 1977. The camp is still located in the town of Tramo in Powo, Kham, today administered under Nyingtri (Nying khri) prefecture, Kongpo, TAR.
rabjung	*rab byung*	Sixty-year cycle of the Tibetan calendar, beginning in 1027 CE.

Phonetic Transcription	**Wylie Transliteration**	**English Translation or Definition**
Ramoché Changra	Ra mo che lcang ra	The aristocratic Changra House in the Ramoché area of Lhasa.
Richung Potok Riteng (Mentsikhang)	Ri chung po tog ri steng sman rtsis khang	Name of the medical school near Phagri, southwest of Lhasa, where Penden Gyeltsen taught.
rinchen rilbu	*rin chen ril bu*	"Precious pills," referring to multi-compound Tibetan formulas containing herbs, minerals, and precious stones, also called jewel pills. Many precious pills contain *tsotel*.
Rinpoche	Rin po che	"Precious one," additional title for a leading Buddhist teacher and high lama.
sem dülwa	*sems 'dul ba*	Taming the mind.
shakar	*bsha' dkar*	The metal tin, used in some forms of mercury processing.
Shatra	Bshad sgra	A long-standing wealthy landowning family in Lhasa.
sönam	*bsod nams*	Merit.
Sowa Rigpa	Gso ba rig pa	"Science of healing," Tibetan medicine.
tarbu	*star bu*	Seabuckthorn berries.
Téring	Phreng ring	Name of a Chinese prison in Tibet.
Töd Drukpa Kagyü	Stod 'brug pa bka' brgyud	The upper division of the Drukpa Kagyü school, which was founded by Orgyenpa's teacher Götsangpa Gönpo Dorjé.
tongwé gyü	*mthong ba'i rgyud*	Short for "hands-on instruction through seeing transmission" *(mthong ba rgyud pa'i phyag bzhes)*. The "seeing transmission" involves the actual observation of a medical practice.
tri	*mkhrid*	Oral explanations of a practice.
tripa	*mkhris pa*	One of the three Sowa Rigpa *nyépa* dynamics, predominated by the element fire.

Phonetic Transcription	**Wylie Transliteration**	**English Translation or Definition**
tsadül	*tsha 'dul*	The "hot taming," name of a short mercury processing method and its resulting compound.
tsel	*mtshal*	Cinnabar, mercury sulfide (HgS), largely in powdered form, also an honorific term for blood.
tsel tel	*mtshal thal*	Cinnabar ash.
tselkar	*mtshal dkar*	A cinnabar-based ingredient for some medicines; also a color made from vermilion *(mtshal)* and white chalk *(dkar = ka rag)* used in *thanka (thang ka)* painting; also a synonym for *dachu*.
tsi duk	*rtsi'i dug*	The "poison of adherence," one of the poisons of mercury.
tsodru	*btso bkru*	"Cooking and washing," the name of the third stage of making *tsotel*.
tsodru chenmo	*btso bkru chen mo*	See *ngülchu tsodru chenmo*.
tsotel	*btso thal*	"Cooked ash / powder," the name of a complex organometallic mercury sulfide compound with eight metals, eight minerals, and many other ingredients used during processing or mixed into it; the final product of the *tsodru chenmo* process. The compound is eventually added to certain formulas, largely precious pills, to enhance their *nüpa*.
Tsurpu	Mtshur phu	Traditionally the monastic seat of the Karmapas in Tibet, north of Lhasa, today in the TAR.
wang	*dbang*	Spiritual empowerments.
Wangchuk	Dbang phyug	"The all powerful one," Tibetan name for Śiva or Īśvara.
ya	*g.ya'*	Oxidized particles or rust / tarnish / stains or other adulterants on unprocessed metallic mercury and other metals.
ya chi	*g.ya' phyis*	"Removing the rust / oxide," name of the first stage of making *tsotel*.

Phonetic Transcription	Wylie Transliteration	English Translation or Definition
ya duk	*g.ya'i dug*	The "poison of rust / oxide," one of the poisons of mercury.
ya khu dön	*g.ya' khu 'don*	"Expelling the rust / oxide liquid," name of the second stage of making *tsotel*.
yoba duk	*g.yo ba'i dug*	The "poison of mobility," one of the poisons of mercury.
yöndak	*yon bdag*	A patron or donor (e.g. local or foreign ruler) who gains merit through supporting a party that is worthy of patronage or *chöné*; one element of the *chöyön* relationship.
Yutok Nyingtik	G.yu thog snying thig	"Yutok Heart Essence," a cycle of Buddhist and yogic contemplative practices in circulation since the twelfth century and especially aimed at the spiritual development of amchi.
zajé gyé	*za byed brgyad*	See *zajé kham gyé*.
zajé kham gyé	*za byed khams brgyad*	The "eight devouring minerals": sour-water stone *(chu skyur rdo* or *rdo chu)*, lepidolite, also called red mica *(lhang tsher dmar po)*, gold ore *(gser rdo)*, orpiment *(ba bla)*, magnetite *(khab len)*, pyrite *(pha wang long bu*, also *pha bang long bu)*, realgar *(ldong ros)*, and silver ore *(dngul rdo)*. See chapter 6 for various identifications.
zha nyé	*zha nye*	Lead.
Zhapten Lhakhang	Zhabs brtan lha khang	Name of a shrine room near the Norbulingkha Palace in Lhasa.

3 Glossary of Tibetan Formula Names

These formula names are mentioned in the book and typically contain different forms of processed mercury sulfide, depending on the lineage of the *menjor* specialist making them. Many of them are now reformulated without mercury, depending on the pharmacy. Note that most Tibetan medical formulas are herb and mineral based and do not contain any forms of mercury as an ingredient.

Phonetic Transcription	**Wylie Transliteration**	**English Translation or Definition**
Chakril Chenmo	Lcags ril chen mo	"Great Iron Pill," Tibetan formula that usually does not contain any processed mercury.
Dashel 37	Zla shel so bdun	Tibetan formula that typically contains *drangdül*, *kardül*, or *tsadül*.
Dashel Dütsima	Zla shel bdud rtsi ma	Tibetan formula that usually does not contain any processed mercury; but some lineage holders add *tsotel* as a *khatsar* to this formula.
Drangjor Rilnak Chenmo	Grang sbyor ril nag chen mo	"The Great Cold Black Compound," also called Rinchen Drangjor, the most complex Tibetan precious pill; contains *tsotel*.
Dugjom Mangjor	Dug 'joms mang sbyor	Tibetan formula that typically contains *tsotel*.
Dugjom Rinchen Wangril	Dug 'joms rin chen dbang ril	Tibetan precious pill that typically contains *tsotel*.
Dugjom Wangril	Dug 'joms dbang ril	Tibetan formula that typically contains *tsotel*.
Gawa 16	Dga' ba bcu drug	Tibetan formula that typically contains *drangdül*, *kardül*, or *tsadül*. The pill is usually coated with roasted *chokla*.
Géma Tsodru Dashel	Dge ma btso bkru zla shel	"The Virtuous Nun's Tsodru Dashel," a special form of the precious pill Rinchen Tsodru Dashel made by nuns at the Drakkar Rikhö nunnery in Kardzé, Kham.
Goyu Dépak abbreviation of: Goyu Dewé Paksam	Go yu bde dpag, Go yu bde ba'i dpag bsam	Tibetan formula that typically contains *drangdül*, *kardül*, or *tsadül*.

Phonetic Transcription	Wylie Transliteration	English Translation or Definition
Gurgum 13	Gur gum bcu gsum	A Tibetan liver formula which might contain processed *chokla* as an ingredient.
Gurkhyung	Gur khyung	Tibetan formula; the pill is usually coated with roasted *chokla*.
Gurkhyung Chakdor	Gur khyung phyag rdor	Tibetan formula that typically contains *drangdül*, *kardül*, or *tsadül*.
Jangchö 37	Byang chos so bdun	Tibetan formula that typically contains *drangdül*, *kardül*, or *tsadül*.
Jumar 25	Byu dmar nyer lnga	"Coral 25," Tibetan precious pill without *tsotel*; the pill is usually coated with roasted *chokla*. Some formularies list cinnabar as an ingredient in the form of *tselkar*.
Khyunga Nila	Khyung lnga ni la	Tibetan formula that typically contains *drangdül*, *kardül*, or *tsadül*.
Mutik 25	Mu tig nyer lnga	"Pearl 25," name of a Tibetan precious pill; the pill is usually coated with roasted *chokla*.
Ngülchu 18	Dngul chu bco brgyad	"Mercury 18," Tibetan formula that typically contains *kardül* or *tsadül*.
Nyenpo 18	Gnyen po bco brgyad	Tibetan formula that typically contains *drangdül*, *kardül*, or *tsadül*.
Ratna Sampel	Rat na bsam 'phel	See Rinchen Ratna Sampel.
Rinchen Dangtso	Rin chen dang mtsho	A precious pill formula developed by Khempo Troru Tsénam, prepared at CIHTS; contains *tsotel*.
Rinchen Da-ö	Rin chen zla 'od	"Precious Moonlight," Tibetan formula that typically contains *tsotel*.
Rinchen Drangjor	Rin chen grang sbyor	Short name of the *tsotel*-containing formula Drangjor Rilnak Chenmo. In the *Four Treatises* also the name of an early mercury compounding method.
Rinchen Mangjor or Rinchen Mangjor Chenmo	Rin chen mang sbyor, Rin chen mang sbyor chen mo	"Precious Great Multi-Compound," a Tibetan precious pill that typically contains *tsotel*.
Rinchen Mukkhyung Gugül	Rin chen smug khyung gu gul	A precious pill formula developed by Gen Rinpoche Rakdo Lobsang Tenzin at CIHTS; contains *tsotel*.

Phonetic Transcription	**Wylie Transliteration**	**English Translation or Definition**
Rinchen Ratna Gugül	Rin chen rat na gu gul	A precious pill formula developed by Gen Rinpoche Rakdo Lobsang Tenzin at CIHTS; contains *tsotel*.
Rinchen Ratna Sampel	Rin chen rat na bsam 'phel	"Precious Wish-fulfilling Jewel," also called Mutik 70 ("Pearl 70"), name of a precious pill that contains *tsotel*.
Rinchen Tsajor	Rin chen tsha sbyor	"Precious Hot Compound," Tibetan precious pill that typically contains *tsotel*. In the *Four Treatises* also the name of an early mercury compounding method.
Rinchen Tsodru Dashel or: Rinchen Tsodru Chenmo	Rin chen btso bkru zla shel, Rin chen btso bkru chen mo	"Precious Great Refined Moon Crystal," Tibetan precious pill that typically contains *tsotel*.
Samnor	Bsam nor	Short name of the Tibetan semi-precious pill "Wish-fulfilling Gem" or Sampel Norbu (Bsam 'phel nor bu); the pill is usually coated with roasted *chokla*.
Sarkhyung	Sar khyung	Tibetan formula that typically contains *drangdül*, *kardül*, or *tsadül*.
Sengdeng 25	Seng ldeng nyer lnga	Tibetan formula that typically contains *drangdül*, *kardül*, or *tsadül*.
Tarima	Rta ri ma	Tibetan precious pill that typically contains *tsotel*.
Wangril 25	Sbang ril nyer lnga	"Powerful Pill 25," Tibetan precious pill that typically contains *tsotel*. Also called Rinchen Wangril 25.
Yukar	Yung dkar	Tibetan formula that typically contains *drangdül*, *kardül*, or *tsadül*.
Yukhyung Karnen	G.yu khyung dkar bsnan	Tibetan formula that typically contains *drangdül*, *kardül*, or *tsadül*.
Yunying 25	G.yu rnying nyer lnga	"Old Turquoise 25," Tibetan precious pill that might contain processed cinnabar *(mtshal btul ma)* as an ingredient, but no *tsotel*.

4 Glossary of Sanskrit Names and Terms

Transliteration	English Translation or Definition
Abhayākara or: Abhayākaragupta	Indian teacher who introduced a method to extract mercury from cinnabar, realgar, magnetite, and the plant *sne'u* to Tibet.
Abhidharmakośabhāṣya	*Commentary on the Treasury of the Abhidharma* by Vasubandhu (fl. fourth to fifth century CE).
Aṣṭāṅgahṛdayasaṃhitā	The Ayurvedic compendium *The Essence of Medicine*. In Tibetan: *Yan lag brgyad pa'i snying po bsdus pa*.
Avalokiteśvara	Buddha of Compassion.
Candranandana (fl. 8th century CE)	Kashmiri physician, author of the *Padārthacandrikā*.
Carakasaṃhitā	"Caraka's Compendium," a foundational Ayurvedic work of the second century CE.
Cikitsāsthāna	A section in the *Carakasaṃhitā*.
ḍākinī	A complex feminine symbol, usually referring to a female deity.
dhātuvāda	"The doctrine of metals and minerals." All processes that turn mercury into an elixir are called *dhātuvāda*. This includes the manipulation of minerals and metals (Dagmar Wujastyk, personal communication, Vienna, March 2016). There are varying Tibetan translations, e.g. "one able to create wealth" *(nor bsgyur mkhan)*, or "nectar that transmutes into gold" *(gser 'gyur rtsi)*.
Guru yoga	Meditative practice with focus on one's main teacher.
Haṭha yoga	Yoga practice involving physical postures and breathing exercises.
Īśvara	An epithet of Śiva. See Tibetan Wangchuk.
Jyōtikīrtinātha	An unknown Indian proponent of mercury practices in Tibet mentioned by Deumar Tendzin Püntsok; in Tibetan: Dzoki kirti nata (Dzo ki kir ti na tha).
kajjalī	Ayurvedic compound made by triturating mercury with sulfur without heating it; it is black in color and largely consists of metacinnabar (β-HgS). See Appendix A.

Transliteration	English Translation or Definition
Kālacakratantra	"Tantra of the Wheel of Time," an Indian tantric text, which entered Tibet in the eleventh century; in Tibetan: *Dus kyi 'khor lo*.
Kālini	Name of a woman who has all signs of the perfect female assistant to an Indian alchemist.
Kāmadeva	An unknown Indian proponent of mercury practices in Tibet mentioned by Deumar Tendzin Püntsok as Ka ma de ba.
Kṛṣṇa Pakśa	The latter half of the lunar month.
kuṭīpraveśika	A special rejuvenation therapy mentioned in early Ayurvedic texts; *kuṭī* means hut, *kuṭīpraveśika* describes the therapy in the hut.
Mahāsiddha	A great yogi.
Mahāyāna	"Great vehicle," one of the two major branches of Buddhism.
Maheśvara	The god Śiva.
māraṇa	"Killing," one of the alchemical *saṃskāras* to calcine mercury or any other metal into a fine ash or oxide.
Nāgārjuna	Indian Buddhist philosopher and alchemist, in Tibetan known as Ludrup (Klu sgrub), probably referring to two or more persons. It is not possible to date the alchemist with any accuracy. Nāgārjuna's mercury lineage apparently did not spread widely in Tibet.
Nāth Siddha	Practitioner of Haṭha yoga.
Padārthacandrikā	*Moonbeam of Word Meaning*, the commentary on the *Aṣṭāṅgahṛdayasaṃhitā*, composed by Candranandana and translated into Tibetan by Rinchen Zangpo; in Tibetan: *Tshig gi don gyi zla zer*.
pārada	Mercury.
Parvatī	The female consort of Śiva.
pūjā	Common term for ritual, offering.
rasa	One of the synonyms of mercury; it can mean many other things as well, such as the sap or juice of plants.
rasadhātu	The alchemical catalyst mercury.

Transliteration	English Translation or Definition
rasakarpūra	Sublimate of mercury, varyingly identified as calomel (Hg_2Cl_2, mercurous chloride) and as mercuric chloride ($HgCl_2$, corrosive sublimate).
Rasa Shastra	Name of a special department at BHU in Varanasi dealing with Ayurvedic mercury processing.
rasaśāstra	"The body of knowledge concerned with the methods for producing and using mercurials and its associated literature" (Wujastyk 2019, 82). Also a term for Ayurvedic rejuvenating supplements.
Rasaratnasamuccaya	Indian Sanskrit work on alchemy.
Rasārṇava	Indian Sanskrit work on alchemy.
Rasaśāstroddhṛti	*Compendium on the Transmutation into Gold (Gser 'gyur gyi bstan bcos bsdus pa)*, a work on mercury in the Tibetan Buddhist Canon, attributed to Bhalipa / Vyālipa. The Sanskrit original is lost.
Rasasiddhiśāstra	*Treatise on Perfecting Mercury (Dngul chu grub pa'i bstan bcos)*, a work on mercury in the Tibetan Buddhist Canon, attributed to Bhalipa / Vyālipa. The Sanskrit original is lost.
rasasindūra	Ayurvedic compound made by triturating mercury with sulfur; it is largely red cinnabar (α-HgS); see Appendix A.
rasāyana	Has multiple meanings: 1) longevity practices, 2) a kind of tonic, 3) the final stages in alchemical operations in which the alchemical elixir is imbibed by the practitioner. Mostly translated as *chülen (bcud len)* in Tibetan.
sādhana	"Method for attainment," central practices in Buddhist Tantra that involve the evocation of deities and their entourage. See Tibetan *druptap*.
saṃskāras	Plural of *saṃskāra*. A term used in Sanskrit alchemical literature for the eighteen steps to process substances.
siddhi	Spiritual accomplishment. See Tibetan *ngödup*.
Śiva	Also Maheśvara, "the Auspicious One," one of the chief Hindu deities. See Tibetan Wangchuk.
ślokas	Plural of *śloka*, referring to verses in a Sanskrit text.
śodhana	A term that refers to the first eight steps of processing mercury in Sanskrit medical literature.

Transliteration	English Translation or Definition
Suśrutasaṃhitā	"Suśruta's Compendium," a foundational Ayurvedic text.
Suttas or *sūtras*	Buddhist canonical texts.
Vāgbhaṭa (fl. 7th century)	North-Indian compiler and redactor of the *Aṣṭāṅgahṛdayasaṃhitā*, in Tibetan known as Penden Paköl (Dpal ldan pha dkol).
Vajrapāṇi	A Bodhisattva who tamed Śiva (Maheśvara) into the wrathful deity Heruka.
Vajrayāna	"The secret mantra vehicle," a tantric form of Tibetan Buddhism.
Vajrayoginī	Name of a female deity, the deity who passed on the *tsodru chenmo* technique and lineage to Orgyenpa.
Vanaratna (1384–1468)	Bengali scholar who brought methods of mercury processing to Tibet.
Vasubandhu (fl. 4th to 5th century CE)	Buddhist Philosopher, author of *Abhidharmakośabhāṣya*.
Vimalaprabhā	"Stainless Light," a commentary on the *Kālacakratantra* composed in the eleventh century, in Tibetan: *Dri med 'od*. The authorship is attributed to King Puṇḍarīka (Rigs ldan pad+ma dkar po).
vinaya	Monastic discipline. See Tibetan *dülwa*.
Vyālipa	The Indian alchemist and one of the eighty-four Mahāsiddhas who discovered the missing ingredient from a woman to complete his mercury refinement; revered by Tibetan physicians as one of the most accomplished Indian masters of mercury formulations. Two alchemical texts in the Buddhist canon are attributed to him. See Tibetan Bhalipa.
yoginī	Female tantric practitioner or a female deity.

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Published in: Gerke, Barbara, 2021. *Taming the Poisonous. Mercury, Toxicity, and Safety in Tibetan Medical Practice.* Heidelberg Studies on Transculturality 7. Heidelberg: Heidelberg University Publishing. DOI: https://doi.org/10.17885/heiup.746

7

HEIDELBERG STUDIES ON TRANSCULTURALITY

This rich ethnographic and socio-historical account uncovers how toxicity and safety are expressed transculturally in a globalizing world. For the first time, it unpacks the "pharmaceutical nexus" of mercury in Tibetan medicine (Sowa Rigpa) where, since the thirteenth century, it has mainly been used in the form of *tsotel*. *Tsotel*, an organometallic mercury sulfide compound, is added in small amounts to specific medicines to enhance the potency of other ingredients. In concordance with tantric Buddhist ideas, Tibetan medical practitioners confront and tame poisonous substances, and instead of avoiding or expelling them, transform them into potent medicines and elixirs.

Recently, the UN Environment Programme's global ban on mercury, the Minamata Convention, has sparked debates on the use of mercury in Asian medicines. As Asian medical traditions increasingly intersect with biomedical science and technology, what is at stake when Tibetan medical practitioners in India and Nepal, researchers, and regulators negotiate mercury's toxicity and safety? Who determines what is "toxic" and what is "safe," and how? What does this mean for the future of traditional Asian medical and pharmaceutical practices?

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ISBN 978-3-96822-042-0
9 783968 220420