The Social Life of Tsotel
Processing Mercury in Contemporary Tibetan Medicine

Barbara Gerke
Humboldt University of Berlin
barbara.gerke@hu-berlin.de

Abstract

No other compound in Tibetan medical pharmacology seems to be as fascinating, controversial, and enigmatic as tsotel (btso thal, lit. ‘cooked ash’), the processed mercury sulphide ash that provides the base material of many of the popular Tibetan ‘precious pills’ (rin chen ril bu). The compound contains—apart from numerous herbs and other ingredients—eight metals and eight rock components. Tsotel practices, which can be traced back to the thirteenth century in Tibet, are considered the pinnacle of Tibetan pharmacology. The commercial value of tsotel gives it a strong economic and social life of its own. This paper analyses the social life of tsotel from an anthropological perspective and sketches key aspects of tsotel’s biography, which in one way or the other are linked to medical, political, and religious perceptions of mercury: tsotel events with their political and institutional agendas; the value of tsotel as a medical, religious, and political commodity; safety and toxicity debates; and tsotel’s religious and political efficacy. I argue that the social life of tsotel is increasingly linked to perceptions of toxicity and safety because of its chief ingredient, mercury, being contested in a globalised arena of tightened international regulations as well as the recent attention given to heavy metal toxicity issues in Asian medicines. Also, several fundamental misconceptions of the substance of mercury itself, its processed form of mercury sulphide, and of the contamination of herbal ingredients with heavy metals will be highlighted. Examples are based on ethnographic fieldwork with Tibetan medical practitioners and pharmacologists in India and Nepal.

Keywords

... one day in the 16th Tibetan Wood Rabbit Year [1975], an official who had arrived from the security office in Lhasa approached Khen Rinpoche and asked him what was most important in Tibetan medicine. He replied immediately that the most important thing in Tibetan medicine is the ‘Great Mercury Purification’. He said, ‘If you have tsotel from the Great Mercury Purification, only then is one able to prepare and make all the varieties of precious pills. Therefore, the real precious pill is actually tsotel. Without it, just saying “precious pills” has no meaning’.

FROM THE BIOGRAPHY OF KHENPO TRORU TSENAM (1926–2004)

The Social Life of an Ash

Amchi Wangchuk, a Tibetan medical practitioner in his mid-seventies, held a flashlight and went on his knees in front of a cupboard in the living room of his small Kathmandu flat. The electricity was out; as per the ‘load shedding’ schedule it would not be back on for another two hours. He opened the cupboard’s doors as I watched him from the sofa, where I sat with the Italian coffee he had just brewed to warm us on this cold winter day. The two shelves were filled with bags and bottles of medicinal ingredients. From the very back he brought forth a yellow plastic container. He got up to draw the curtain, dimming the room from what remained of the late afternoon sun. ‘You cannot expose it to the sunlight’, he said, sitting down on the carpet. In the dim light, he carefully opened the tightly sealed plastic container, took out a bundle, doubly wrapped in dark plastic bags, and placed it on the darker part of the carpet where shadows fell. He allowed me to photograph it. ‘The camera flash won’t matter?’ I inquired thinking of the bright light exposure. He shook his head, ‘That won’t matter’, he said. He carefully placed half a teaspoon on a clean tea saucer on the table in front of me (see Fig. 1). ‘This is tsotel (btso thal)’ he said. ‘Taste it!’

Knowing that a Tibetan physician’s laboratory is on the tongue, I took a tiny bit of the ash with my finger, closed my eyes, and concentrated on the unusual taste in my mouth that reminded me of charcoal with a tinge of metal.

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1 In Tibetan dngul chu btso bkru chen mo, lit. ‘the great cooking and washing of mercury’.
3 Amchi (am chi) or emchi (em chi) is the Mongolian-derived loan word for a practitioner of Tibetan medicine and is widely used across the Himalayas and Tibet. In India, Tibetan physicians often use the title Dr, and I use it here the way they do. Note that Dr in this case does not refer to a biomedical MD degree.
‘This is from a monastery in Kham (eastern Tibet),’ he said. ‘I bought it for 180,000 Nepali Rupees’. I quickly calculated that this was about 1,100 Euro, quite a sum for half a kilo of ash. He said, ‘Tsotel has gold, and gold is expensive. This one is good, because I know the monastery where it was made. But I stopped buying it. Nowadays, you don’t really know; how can I tell whether they really put the gold inside?’ He laughed and shrugged his shoulders. ‘I made tsotel twice, at our Drakar monastery in Kyirong (Skyid grong) in south Tibet, with Do Nga Tenzin Norbu Rinpoche, in 1955 and 1958, before the Chinese invaded our area’, he narrated. ‘Of all the amchis I made tsotel with, I am the only one still alive. It took us 28 days with a group of six or seven amchis. We were able to make two types of precious pills with it’. Spanning his memory across five decades to the present, he said, ‘Now, ingredients are getting too expensive. Mercury used to cost 600 Nepali Rupees a kilo in Kathmandu; now it costs 15,000 Nepali Rupees.’

4 In December 2011, 15,000 Nepali Rupees were about 130 Euro.
5 I followed this trail to the Old Delhi Khari Baoli market, where liquid mercury is sold after import from mines in Turkey or Spain via brokers in Dubai. Kamal Sales Corporation, personal communication, Old Delhi, 23.12.2011.
mercury processing, like *drangdül* (*grang ′dul*, lit. ‘cold taming’). It only takes three to four days, not like *tsotel*, where you need many people and a lot of time. Now I don’t use mercury at all.

Our conversations continued over the following days. His cupboard and his mind were a storehouse from a long life of practical experience in making medicines and treating patients. He showed me more ingredients that were used in mercury processing; a few metals (iron, lead) he had kept in stock. *Tarbu* (*star bu*), the sour liquid extract of the seabuckthorn (*Hippophae rhamnoïdes L.*), without which mercury cannot be processed, he kept in a tightly sealed container. Then, he showed me the book he consulted to make *drangdül* (see Fig. 2).6

Before I left Kathmandu, Amchi Wangchuk gave me a small package of *tsotel*. I gratefully accepted the precious sample, which has inspired me ever since to understand more about the social life of an ash that is considered the pinnacle of Tibetan pharmacology. In the absence of comprehensive studies on *tsotel*,7 this paper attempts to give a succinct overview of *tsotel* practices through the anthropological lens of looking at the social life of this ash.

I later learnt that making *drangdül* involved rubbing liquid mercury (Hg) or *ngülchu* (*dngul chu*) with ginger powder, long and black pepper in a goatskin bag for eight hours to remove the ‘oxide’ or ‘tarnish’ (*g.ya*). Then mercury is boiled for several hours in various types of animal urine, washed frequently with water, then boiled for several hours with *tarbu*, and again rinsed many times with water. This process is meant to cleanse the mercury from oxides and adulterants. Then, mustard oil is heated in an iron pan and mercury is boiled in this oil together with very thin sheets of ‘tin’ (*gsha′dkar*) for several hours. Finally the mixture is triturated in a stone mortar with pre-processed yellow ‘sulphur’ or *muzi* (*mu zi*) into a fine powder of a blackish deep blue colour until no silvery brightness remains.8 This form of processed mercury, called *drangdül*, is used in various medicines, such as *Dashel* 37, *Gawa* 16, *Sengdeng* 25, *Ngulchu* 18, and others.9

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7 There have been two clinical studies in India (Sallon et al. 2006, unpublished, and several Chinese scientific analyses of *tsotel* (see separate bibliography at the end of this paper). In this issue, Czaja and Simioli present original material on the history and origins of *tsotel* and Sonam Dolma on the three poisons of mercury. Anthropologists have mentioned *tsotel* or precious pills in several contexts; their work is discussed in the course of this paper.
8 Summarised from Thubten Tsering (ed.) 1990, p. 360.
While simpler forms of mercury processing are described in earlier Tibetan medical texts, the beginnings of more complex mercury practices date to the thirteenth century AD. They are said to have been brought to Tibet by Orgyenpa Rinchenpel (O rgyan pa Rin chen dpal, 1229/30–1309). They were then transmitted through various schools and practised largely in central and eastern Tibet. Tsotel is never consumed as a medicine by itself. Instead, it forms the base material for various multi-compound precious pills, which also include

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10 For example, Men-Tsee-Khang (transl.) 2011, pp. 125–33.
11 See Czaja, this issue.
12 See Aschoff and Tashigang 2009. For anthropological references to precious pills, see Craig and Adams 2008; Craig 2011; Hofer 2008; Kloos 2012; Prost 2008; Samuel 1999. At the Men-Tsee-Khang in Dharamsala, the precious pills containing tsotel are: Rinchen Drangjor Rilnag Chenmo, Rinchen Ratna Samphel, Rinchen Tsajor Chenmo, Rinchen
precious stones among their elaborate mineral, herbal, and blessed ingredients and are difficult and time-consuming to make. Adding tsotel to precious pills enhances their ‘potency’—the main meaning of the complex Tibetan term nüpa (nus pa)—empowering them, and thus contributing to their status as the strongest and most important medicines in the Tibetan pharmacopoeia, which Troru Tsenam’s opening quote summarises succinctly. There have been no detailed studies to date on which of the precious pills produced in Asia contain tsotel and which do not. The leaflets accompanying their various packaging do not contain an extensive list of ingredients, which are largely considered secret.13 Tsotel is often labelled ‘the king of essences’ (bcud kyi rgyal po),14 a term now also used in the lists of ingredients of precious pills to avoid contested terms, and in particular, mercury.15

Sometimes, tiny amounts of tsotel are added to a batch of medicine or to medicines individually prepared for VIP patients, either as additional nüpa or if the medicine has not shown the desired effect. This is known as khatsar (kha tshar) and refers to a common Tibetan pharmacological practice of adding a substance that holds nüpa to almost any medicine in addition to its known ingredients.16 For example, in December 2012, when 1000 kg of ‘accomplished medicine’ called mendrup (sman sgrub) were prepared during a long ritual process at the Triten Norbutse (Khri btan Nor bu rtse) monastery in

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13 For example, the tri-lingual (Tibetan, Chinese, English) leaflet of Ratna Samphel, manufactured by the Tibet Traditional Pharmaceutical Factory, TAR, mentions the names of only three ingredients: ‘pearl’ (mu tig), ‘types of Zi-stone’ (gzi’i rigs)—on the leaflet translated as ‘subagate’ (possibly referring to a sub-type of agate quartz)—and ‘Kashmiri saffron’ (kha che gur gum). Presented by Jürgen Aschoff during the Mercury Symposium in Berlin, 4 May 2012.

14 Jampa Trinlé and Bod rang skyong ljongs sman rtsis khang (eds) 2006, pp. 687–8.

15 The Men-Tsee-Khang website only lists a few ingredients of each precious pill; it does not mention mercury, but lists it as ‘tsotel, king of the essence’. See, for example, URL: <http://www.men-tsee-khang.org/medicine/rinchen-pills/ratna.htm> on Ratna Samphel, last accessed 13 October 2013. Aschoff published several, largely undated, leaflets from factories in India, Nepal, and Tibet. An undated leaflet on Rinchen Mangjor from the Lhoka Tibetan Pharmaceutical Factory in Tsetang mentions ‘purified mercury’ as an ingredient, as well as an approval number of the Drug Administration Department of the Tibetan Health Bureau (Aschoff and Tashigang 2009, p. 83).

16 Dr Ngawang Soepa, interview, Dharamsala, 06.12.2012.
Kathmandu,\textsuperscript{17} Amchi Nyima, a physician of Tibetan medicine from Mustang who was in charge of the ingredients, added around 100 grams of \textit{tsotel} (which had been made during a Bonpo \textit{tsotel} event in Kham, eastern Tibet, in 2008)\textsuperscript{18} as a \textit{khatsar} to the \textit{mendrup}.\textsuperscript{19} 

The social life of \textit{tsotel} takes place within the diverse and heterogeneous settings of the Tibetan ‘Science of Healing’, or Sowa Rigpa (\textit{gso ba rig pa}), i.e., in its multiple practices and contexts across the Tibetan medical world in India, Nepal, Bhutan, the PRC, and beyond.\textsuperscript{20} In India and Nepal, \textit{tsotel} is mainly manufactured by Tibetan medical institutions, a few private clinics, and monastic establishments under the guidance of skilled pharmacologists, often highly trained in both Tibetan Buddhism and medicine. In China, it has become an important part of the industry’s commodification of Tibetan medicine.\textsuperscript{21} For Sowa Rigpa practitioners like Amchi Wangchuk or Amchi Nyima, who work outside the institutional and financial support of large pharmacies, \textit{tsotel} becomes a commodity they have to purchase or be gifted, based on trust that it contains what they are told it does. Some limit their practice to medicines that can be made with the simpler mercury processing methods; others completely stop using mercury in any form to comply with foreign export rules.\textsuperscript{22} As I will show, for institutions that are able to procure the ingredients and go through the long and expensive manufacturing process, \textit{tsotel} becomes a symbol of status and prestige. This also applies to individual amchis who have accomplished this practice.

Ethnographic fieldwork at this stage has been carried out with Men-Tsee-Khang-trained\textsuperscript{23} doctors and private pharmacists in Dharamsala (HP), teachers and students at the Tibetan medical department of the Central University

\textsuperscript{17} The \textit{mendrup} ritual is described at length in the MPhil thesis by Sehnalova 2013. 
\textsuperscript{18} The event is described later in this paper. 
\textsuperscript{19} Amchi Nyima, personal communication, Eighth ICTAM conference, South Korea, 13.09.2013. 
\textsuperscript{20} These diverse medical contexts of Sowa Rigpa have been studied by anthropologists and published in edited volumes by Adams, Schrempf, and Craig (eds) 2010; Craig, Cuomu, Garrett, and Schrempf (eds) 2010; Fjeld and Hofer (eds) 2010–11; Pordié (ed.) 2008; Schrempf (ed.) 2007. For anthropological monographs on Sowa Rigpa see, for example, Craig 2012; Gerke 2012; Hofer 2012; Prost 2008; Saxer 2013. 
\textsuperscript{21} Saxer 2012, 2013. 
\textsuperscript{22} An example here is the privately working pharmacist, Amchi T. Y. Tashigang in Delhi, who produces Tibetan medicines largely for export and stopped using mercury decades ago. Amchi Tashigang, interview, Delhi, 25.08.2012. 
\textsuperscript{23} The Men-Tsee-Khang in Dharamsala, India, was founded in 1961 and houses a medical and astrology college, a pharmacy, a museum, various translation and research departments, and established numerous branch-clinics. See Kloos 2008 on its history.
of Tibetan Studies (CUTS)\textsuperscript{24} in Sarnath (UP), amchis trained at Chakpori,\textsuperscript{25} and lineage-based practitioners of Tibetan medicine in Kathmandu, Nepal. Manifestations of the practice in Tibetan areas in China are presented based on existing literature, but their ethnographic study is not part of this project.

In Tibetan pharmacology, substances are never used singly or in their ‘natural’ state. Pharmacological manufacturing, in Tibetan known as \textit{menjor} (\textit{sman sbyor}), requires the active interference of pharmacologists, whose practices are always embedded in and influenced by social events. As will become clear, the making of \textit{tsotel} is also a religious event, and Buddhist rituals are performed in the pharmacy during its preparation. Apart from mercury sulphide and numerous herbs and minerals, \textit{tsotel} contains the ash of ‘eight metals’ (\textit{lcags brgyad})\textsuperscript{26} as well as ‘eight rock components’ (\textit{khams brgyad}; lit. ‘eight elements’) that function as binding agents.\textsuperscript{27} The processing of mercury and its toxicological concepts are described in pharmacology texts,\textsuperscript{28} and have been summarised in this issue by Sonam Dolma.

\textbf{‘The Social Lives of Medicines’ as an Anthropological Approach}

In this article, I attempt to sketch, following Whyte, van der Geest, and Hardon,\textsuperscript{29} the social life of \textit{tsotel} among Tibetan medical practitioners in India and Nepal. Among medical anthropologists, the ‘social lives of medicines’ has

\textsuperscript{24} The Central University of Tibetan Studies (CUTS) in Sarnath near Varanasi (UP) comes under the Indian Department of Higher Education and opened a Department of Tibetan Medicine in 1993.

\textsuperscript{25} Chakpori Tibetan Medical Institute (CTMI) was founded by Samphel Norbu Trogawa Rinpoche in Darjeeling in 1992.

\textsuperscript{26} The eight metals are ‘copper’ (\textit{zangs}), ‘gold’ (\textit{gser}), ‘silver’ (\textit{dngul}), ‘iron’ (\textit{lcags}), ‘brass’ (\textit{\‘khar ba}), ‘brass’ (\textit{ra gan}), ‘tin’ (\textit{gsha’dkar}), and ‘lead’ (\textit{\‘zha nye}).

\textsuperscript{27} My current identifications of these are: (1) ‘sour-water stone’ (\textit{chu skyur rdo or rdo chu}), which is described as a solidified deposit formed at springs having a sour taste (Gyatso 1991, p. 48), also identified as a type of actinolite (Clark 1995, p. 135); (2) ‘red mica’ (\textit{thang tsher dmar po}); (3) ‘gold ore’ (\textit{gser rdo}); (4) ‘orpiment’ (\textit{ba bla}), an arsenic trisulphide, \textit{As\textsubscript{2}S\textsubscript{3}}; (5) ‘magnetite’ (\textit{khab len}), a magnetic iron ore, \textit{Fe\textsubscript{3}O\textsubscript{4}}; (6) ‘pyrite’ (\textit{pha wang long bu, also pha bang long bu}), which is an iron sulphide, \textit{FeS\textsubscript{2}} (Pasang Yontan 1998, p. 139), also identified as ‘galena’, which is lead sulphide, \textit{PbS} (THL 2010); (7) ‘realgar’ (\textit{idong ros}), an arsenic sulphide, \textit{AsS}; and (8) ‘silver ore’ (\textit{dngul rdo}). At least three of them contain sulphur.


\textsuperscript{29} Whyte, van der Geest, and Hardon 2002.
been a focus of research since the 1980s when Whyte and van der Geest published their first works on ‘pharmaceutical anthropology’\(^3\) and the ‘charms of medicines’\(^4\), describing the interconnectivities of various pathways that pharmaceuticals take and through which they gain a social life of their own. They were inspired by Appadurai’s edited volume \textit{The Social Life of Things} and his argument that ‘commodities like persons have social lives’\(^5\). Whyte, van der Geest, and Hardon analysed the social lives of medicines, looking at \textit{materia medica} that are rubbed, taken, injected, consumed, sold, and engaged with as social and cultural phenomena. They argue that the way medicines move between people shape their relationships with them, each other, and their illness events. The authors largely focus on the impact of globalisation on pharmaceuticals, so to speak their ‘commodity careers’,\(^6\) and distance themselves from ethnopharmacological studies that analyse the biochemical reactions of indigenous drugs. More recently, the global dimensions of pharmaceuticals have received attention in terms of ‘anthropology and the pharmaceutical nexus’, linking economics, politics, and ethics into a large ‘nexus’ of pharmaceuticals on a global scale.\(^7\) However, the focus is largely on biomedicine and how it is perceived, traded, used, etc., on a global level. Its application to Asia is also dominated by studies on the use of biomedicine, apart from a few valuable exceptions.\(^8\)

Medical anthropologists have built on these ideas and have begun studying medicinal ingredients, mostly plants, as cultural artefacts, and considered their social lives as an integral part of their material culture.\(^9\) This was also done in an attempt to bridge the gap between the social aspects of medicines and their ‘physiological efficacy’, a topic largely neglected by medical anthropologists.\(^10\) The ‘physiological efficacy’ of \textit{tsotel} seems to be inevitably linked to issues of toxicity and safety because of its metal contents, which have not been emphasised in pharmaceutical anthropology until recently.\(^11\) Metals are still understudied medicinal substances in Asian medicines. In the case of \textit{tsotel}, its metal

\begin{itemize}
  \item \(^3\) Whyte and van der Geest 1988.
  \item \(^4\) Van der Geest and Whyte 1989.
  \item \(^5\) Appadurai (ed.) 1986, p. 3.
  \item \(^6\) Whyte, van der Geest, and Hardon 2002, p. 3.
  \item \(^7\) Petryna, Lakoff, and Kleinman (eds) 2006, pp. 20–2.
  \item \(^8\) For example, Banerjee 2009; Bode 2008; Pordié and Gaudillière in press 2014; Saxer 2013.
  \item \(^9\) See Hsu and Harris (eds) 2010.
  \item \(^10\) Hsu 2010, p. 23.
  \item \(^11\) Gerke in press 2014.
\end{itemize}
ingredients are not only a part of its chemical make-up but also its social life, reflected in its complex processing practices, which determine its economic, political, and therapeutic values. I consider tsotel a cultural artefact that is not only shaped by but also shapes the pharmacological, religious, political, and economic dimension of its use as well as its manufacturing processes. In this paper, I argue that the social life of tsotel is increasingly linked to perceptions of toxicity and safety because of its chief ingredient, mercury, being contested on a globalised arena of tightening international regulations and the recent attention given to heavy metal toxicity in Asian medicines. Through this development, the life of tsotel is affected, questioned, scientifically investigated, exposed to intellectual property issues, and, in China, pushed into niches of GMP government regulations. Its future existence might even be influenced by a recent exemption in the global UN mercury ban, which allows the continued use of mercury in ‘religious and traditional activities’.

In this paper, I am not attempting a full-circle description of the social life of tsotel, nor a complete ‘cultural biography’, the way Kopytoff used the term to describe different phases in the life of things during which they are classified and reclassified as commodities. Rather, I want to use some of these ideas, which are increasingly influencing the ways in which medical anthropologists approach medicinal substances, to think about this enigmatic ash. Recently, anthropologists have begun sketching ‘biographies of medicines’. For example, Sienna Craig ethnographically describes the biography of the Tibetan ‘birth-pill’ Zhije 11 (Zhi byed 11), highlighting perspectives of the making of this medicine, the different ways in which it has been perceived, and its use by Tibetan women during pregnancy and childbirth. She analyses its efficacy within specific ‘social ecologies’ and its transformation into a ‘study drug’ given in capsule form for a randomised control trial. Her ‘biography of a medicine’ exemplifies a useful anthropological tool to present the multifaceted realities surrounding one medicine in transition from a simple Tibetan prescription drug to a trial drug, validated by biomedicine. Examples like Craig’s highlight the social transitions among contemporary Asian medicines, specifically

39 Zhao et al. analysed four tsotel samples from different pharmacies in the PRC, all of which had a ‘significant difference in physiochemical properties’ due to variations in processing methods (Zhao et al. 2013, p. 7).
40 See Banerjee, this issue.
42 Kopytoff 1986.
among those drugs that are being tested biomedically for their efficacy, safety, or toxicity. Considering the numerous biochemical studies, including animal tests on tsotel in the PRC,\textsuperscript{44} tsotel is currently undergoing such a transition.

Each of the following four sub-sections traces one key aspect of tsotel’s biography, which in one way or the other are linked to medical and religious perceptions of mercury: (1) tsotel manufacturing events, including political or institutional agendas; (2) its value as a medical, religious, and political commodity, (3) its uncomfortable position challenging Tibetan physicians and institutions to prove its safety; and (4) its ritualised manufacturing processes adding religious and political efficacy to tsotel.

\textit{Tsotel Events}

Making tsotel creates a variety of social relations, because it requires funds, expertise, and manpower. Tsotel events have often brought together the ruling elite, doctors, monasteries, and even common people, since they all benefit from and are involved in the process of its making and consumption. This kind of collaboration is needed to provide the funds for gold, precious stones, and other rare and costly ingredients, as well as the expertise to perform the necessary rituals during the process and to consecrate the final product.

There are several sources that tell us how in Tibet’s past, high government officials and religious figures initiated and sponsored tsotel events on special occasions.\textsuperscript{45} This assemblage consists of the physician who knows the processing method, the government official or high religious figure who requests the event, generally provides the expensive materials, and gets treated with the manufactured precious pills, and monastics providing the ritual expertise. This assemblage is considered very auspicious for the entire environment, and the public often donates food during and organises a feast after the event. For example, in 1838, the Fifteenth Karmapa made his tsotel-containing black pills (ril nag)\textsuperscript{46} during the New Year celebrations, and Kongtrül Yönten Gyatso (Kong sprul Yon tan rgya mtsho, 1813–99/1900) and the physician Karma Tsepel (Karma tshe dpal) prepared the tsotel for them; they continuously recited Medicine Buddha mantras during the preparation.\textsuperscript{47} Kongtrül was also once summoned to Lhasa by the governor of Nyarong on the request of the Twelfth Dalai Lama to purify mercury and make precious pills, which he did not want

\textsuperscript{44} Guoying 2012; Li et al. 2009, 2010.
\textsuperscript{45} See Czaja, this issue.
\textsuperscript{46} See Gyatso 1991.
\textsuperscript{47} See Czaja, this issue; Jamgön Kongtrul Lodrö Thayé 2003, pp. 166ff.
to do. The plan fell through when the Twelfth Dalai Lama suddenly passed away in 1875.48

One motivation for sponsoring tsotel events has been to receive the highly valued precious pills. In the eighteenth century, Situ Panchen (Si tu paṇ chen, 1700–74) prepared tsotel and precious pills when he was in his 60s and was sponsored by the King of Derge (Sde dge) in return for treating the king with valued medicines.49 Even today, high-level Tibetan Buddhist teachers sponsor tsotel events. The Fourteenth Dalai Lama himself co-sponsored the first making of tsotel by Men-Tsee-Khang physicians in exile at his residence in India in 1982 under the guidance of the late Tenzin Chödrak (Bstan ‘dzin chos grags, 1924–2001) by providing gold and precious ingredients.50 Dzongsar Jamyang Khyentsé Rinpoche (Rdzong gsar ‘Jam dbyangs mkhyen brtse, born 1961) sponsored the making of tsotel by Samphel Norbu Trogawa Rinpoche (Bsam ’phel nor bu khro dga’ bo, 1932–2005) in Ladakh in 2002.51 They had a close alliance, because Jamyang Khyentsé’s previous reincarnation, Dzongsar Khyentse Chökyi Lodrò (Rdzong gsar Mkhyen brtse chos kyi blo gros, 1893–1959), was Trogawa’s root guru. When Trogawa made tsotel in Ladakh, he also added precious ingredients from his root guru as a papgyün (phabs rgyun)52 to embed the lineage into the medicines.53

The community and natural surroundings are also part of the nexus of a tsotel event, since it is believed that the purification of mercury also extends into the environment and is beneficial for its people and agricultural activities. Kongtrül Rinpoche made tsotel at Rigyel Fortress in Nyarong in 1872, on request of the Governor.54 One of the reasons was to purify the land after a long-term war and stabilise political relations between local rulers.55 Dr Yeshe Gelek, a college teacher at the Men-Tsee-Khang in Dharamsala, was a student when tsotel was first made in August 1991 at the Lokha Tibetan Pharmaceutical Factory, south of Lhasa, under the guidance of Karma Chöpel (Karma chos ‘phel) and Jamyang Lhündrup (‘Jam dbyangs lhun grub). One lama from Mindroling

48 See Czaja, this issue; Jamgön Kongtrul Lodrò Thayé 2003, p. 179.
49 Garrett 2013, p. 280.
50 Dr Choelothar, Toronto, e-mail communication, 31.10.2013.
52 Papgyün literally means ‘continuum yeast’ and is a valued substance that is used to imbue future batches of medicines with special potency from a particular lineage of doctors or spiritual masters, similar to sourdough that can be used as a starter for the next bread.
53 Blaikie 2013, p. 10.
54 Jamgön Kongtrul Lodrò Thayé 2003, p. 166.
55 Tashi Tsering, personal communication, Dharamsala, 03.12.2012.
came to perform the rituals inside the pharmacy. It took them two months with a group of seven. They made around 10–15 kg of *tsotel* and three types of precious pills (Rinchen Drangjor, Mangjor, and Dashel). Yeshe Gelek recalled:

> Everything was so successful. There is a belief that if you do the Great Mercury Purification successfully it brings good crops and auspiciousness for the entire area. The local people prepared a feast afterwards, and made offerings. That year they had a very good crop. People were very happy.56

At the Men-Tsee-Khang in Dharamsala, during the last Great Mercury Purification in October 2011, staff and doctors living on the compound made daily offerings at the pharmacy gate. The successful completion was announced at an official ceremony during which the chief pharmacist ritually consumed three grams of *tsotel*, which was considered a proof of its safety but also its efficacy; in the words of the official Men-Tsee-Khang newsletter: ‘to prove that the formulation is detoxified and has the effective potency’.57

Every *tsotel* event gives young physicians the opportunity to be trained and receive the lineage of this practice. Recently, a group of Bonpo physicians established their tradition of making *tsotel*. The event took place in August 2008 in the region of Dechen in eastern Tibet, under the guidance of the then 78 year-old Bonpo Lama and medical practitioner Yundrung Tenpa Nyima (G.yung drung Bstan pa nyi ma) and Kelzang Norbu Rinpoche (Skal bzang nor bu), who narrated the story to me.58 During the event, which took 28 days and trained 35 Bonpo physicians from Khyungpo (Khyung po), two thousand precious pills labelled ‘Tribu Trishi’s Great Pearl Multi-Compound Pill’ (Dpyad bu’i mu tig mang sbyor chen mo) with 86 ingredients were made. The event had two major outcomes that are interesting in the context of the social life of *tsotel*. First, it established the prestige of the Bon tradition of *tsotel* practice and their ability to make their own precious pill, training 35 amchis. Second, after a sample was sent to the Lhasa Mentsikhang, from which approval was received to continue the practice, and the local county official also issued an ‘introduction certificate’ (*ngo sprod lag ’khyer*), some form of institutional recognition had been achieved to ensure the continuation of the practice.

56 Interview, Dharamsala, 30.10.2012.
57 Men-Tsee-Khang 2011, pp. 4–6.
58 Kelzang Norbu Rinpoche, personal communication, Eighth ICTAM conference, South Korea, 13.09.2013. Millard (unpublished paper) also describes this event.
With these examples, I want to highlight the social and political complexities that have surrounded tsotel practices over quite a long period of time. The manufacturing event itself can be seen as a ‘pharmaceutical nexus’ that is created, relies upon, and happens along the lines of an intricate social network of religious, pharmaceutical, and economic actors, adding layers of ideas to tsotel’s value and efficacy. Saxer has recently elaborately unravelled this nexus for the development of the Tibetan medical industry in the PRC, relying on the notion of assemblages to peel off the individual layers that form such a nexus. The next section explores his work, which provides excellent examples to discuss tsotel and its value as a religious, medical, and even political commodity.

Tsotel as a Medical, Religious, and Political Commodity
From what we know to date, tsotel is made across Tibetan areas of the PRC in numerous GMP factories despite only one factory having ever patented it. Saxer visited some of these factories and explains how tsotel has found a niche in-between the regulations stipulated by (1) the Chinese Pharmacopoeia, (2) the Drug Administration Law, and (3) Good Manufacturing Practices (GMP). As for the first, the Chinese Pharmacopoeia has strict stipulations on heavy metal contamination of traditional medicine, and has reduced the permissible amount of mercury and arsenic used in Chinese medicine recipes twice in recent years. The monographs of the few precious pills included in the Pharmacopoeia do not list tsotel as an ingredient; this is possible because some precious pills are listed as ‘national heritage drugs’ and their recipes are considered secret. In 2006, tsotel was included as an ingredient for the precious pill Rinchen Drangjor (‘Renqen Changjor’) in the UNESCO-inspired ‘Intangible Cultural Heritage List’ for traditional medicine and pharmacopoeia in China (see Fig. 3).

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59 Van der Geest 2006.
60 Saxer 2013.
63 Pharmacopoeia Committee 2005, quoted in Wu et al. 2011, p. 839.
64 Saxer 2013, pp. 73–4.
As for the second set of regulations, the Drug Administration Law of 2001 reinforced a new national system of drug registration.66 The law clusters Tibetan herbs, minerals (and metals?), and animal products together with Traditional Chinese Medicine (TCM) raw materials under the category ‘Chinese crude drugs’, which do not require drug registration.67 As for the third, GMP regulations, Saxer states quoting the People’s Daily that since 2008, the production of so-called ‘prepared slices’68 of Chinese crude drugs—which tsotel technically speaking is—falls under GMP rules.69 Saxer concludes:

\[ \textit{tsothal}^{70} \] is on all counts in conflict with the proposed methods for fighting mercury contamination in traditional medicines, a fact that does not, however, hinder tsothal-based formulas driving the industry’s success.71

Saxer’s data make obvious that pharmacological regulations in the PRC have been rather fractured, uneven, and porous and have to date not interfered with the production of tsotel. Between 2003 and 2013, about 19 journal articles and one Master’s thesis presenting scientific tsotel studies were published in China, largely in Chinese.72 Certain scientific proofs, especially on the safety and efficacy of a product, are requirements for drug registration at the provincial level.73

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66 Saxer 2013, pp. 50–3.
68 Saxer defines the term ‘prepared slices’ as a cut, cleaned, or processed ingredient used as intermediates in TCM. Saxer 2013, p. 74.
69 Ibid.
70 Tsothal is a different way to phoneticise btso thal. Chinese publications use zuotai or zuota.
71 Saxer 2013, p. 74.
72 See separate bibliography.
level\textsuperscript{73} and might have driven the sudden rise in such studies; their contents need to be critically evaluated. Currently, there are plans for a larger clinical study on tsotel at the Qinghai Provincial Tibetan Medical Hospital in Xining.\textsuperscript{74}

In November 2013, the hospital initiated a small-scale study in which nurses and doctors took three tsotel-containing medicines for 18 days. Their blood samples as well as liver and kidney toxicity were measured.\textsuperscript{75} The production of tsotel in the PRC and the related studies can certainly be seen as part of the developing ‘pharmaceutical nexus’ around tsotel and precious pills as safe commodities, linked to the large-scale globalised commodification of Asian medicines.\textsuperscript{76}

Despite the apparent freedom to produce tsotel and precious pills in the PRC, pharmacists seem to be careful when it comes to encounters with foreigners. In 2004, the anthropologist Sienna Craig met Lhakpa, a senior-level manager of the Tibetan Traditional Pharmaceutical Factory of the TAR, who told her that mercury was not used anymore in their precious pills. She writes that ‘in the GMP setting these pills will be made according to modified recipes that do not use alchemically transformed heavy metals’.\textsuperscript{77} The explanation given to her by Lhakpa is revealing in several ways. He said:

\begin{quote}
Within our medical system we have methods to remove poisons. But it is difficult to convince people who do not know our medicine that ingredients like mercury are safe, so we are making some medicines differently now.\textsuperscript{78}
\end{quote}

On reflection, and in discussion with Craig, we concluded that the statement was likely to be untrue and influenced by the presence of the potential foreign direct investor from Europe who was present during the discussion; moreover, the factory was awaiting its GMP certification. The statement that mercury was no longer used in precious pills must have been made ‘so as to continue the expected sensibility that somehow they understood that mercury was “bad” and that their medicines were being made to standards that would be

\begin{thebibliography}{9}
\bibitem{73} Saxer 2013, pp. 52–3.
\bibitem{74} Tawni Tidwell, personal communication, 20.10.2013.
\bibitem{75} Tawni Tidwell, e-mail communication, 18.11.2013. Results are awaited.
\bibitem{76} See, for example, Alter (ed.) 2005 and Bode 2008 on issues of globalised commodifications of Asian medicine.
\bibitem{77} Craig 2011, p. 342.
\bibitem{78} Ibid.
\end{thebibliography}
acceptable internationally’.79 Considering the overall situation in the PRC, it is unlikely that the factory would actually make precious pills without tsotel, but more ethnographic research would be needed to verify this. Saxer’s and Craig’s descriptions sum up the double standard that has parallels to the status tsotel has acquired in the industrial context in the PRC, being elevated to a secret ingredient of a national heritage drug that withstands all existing regulations in a multimillion dollar business.

This business is also influenced by intellectual property debates as well as so-called ‘protection certificates’, which when granted to one factory gives them the sole right to produce a specific precious pill for a few years, denying this right to all other pharmacies. This resulted in only two factories (the TAR Tibetan Medicine Factory at the Mentsikhang in Lhasa, which held the tsotel patent, and Arura in Xining, which had the ‘protection certificate’) being legally allowed to produce the two precious pills Ratna Samphel and Rinchen Mangjor between December 2005 and September 2011.80 This led to legal disputes between pharmacies and a situation in which ‘state protection’ of knowledge has circumvented traditional practices.81

The difficulties and expenses involved in manufacturing precious pills determine their price: they are the most costly Tibetan medicines available.82 In the past, they were largely accessible to the aristocracy, physicians, and monastic leaders, and not easily to common people.83 Hofer reports for the Tibetan Autonomous Region (TAR) that the recent increase in commercial production has turned precious pills into expensive over-the-counter (OTC) products in cities, while in rural areas they are too expensive for both amchis and their

79 Sienna Craig, e-mail communication, 23.07.2013.
80 Saxer 2013, pp. 216–17.
81 Ibid.
82 Prices of precious pills vary considerably. Aschoff and Tashigang 2009, p. 45, mention a range from US$ 0.5 to US$ 5. Internet prices are as high as US$ 10–12 per precious pill which, to comply with FDA regulations, are sold as ‘talismans’. See, for example, URL: <http://www.jcrowsmarketplace.com/tibetanpreciouspillsandherbalformulations.aspx>, last accessed 11 October 2013. Comparatively, prices at the Men-Tsee-Khang in Dharamsala are affordable, ranging from INR 11 for Jumar 25 to INR 36 for Rinchen Drangjor (Euro € 0.13 to 0.45) per piece.
83 Tubten Khétsun mentions in his Memories of Life in Lhasa that as a prisoner he had to destroy large amounts of precious pills in the house of the Shatra family and fell sick secretly eating three of them. His co-prisoner told him about the power of these valuable pills, which they ‘could scarcely have gotten hold of as free men’. Khétsun 2008, pp. 80–1.
patients. In Xining and in the shops of the Arura Tibetan Medical Group all over China, precious pills are also sold over-the-counter.

The life of tsotel in Indian exile has been quite different. Under the harsh conditions of exile, it was initially very difficult for Tibetans to make tsotel in India. Before 1982, the Men-Tsee-Khang in Dharamsala made few precious pills (Yunying 25, Jumar 25, Rinchen Mangjor), and all of them without tsotel. In 1982, twenty years after their opening and after the arrival of the senior Tibetan physician Tenzin Chödrak, who had suffered long imprisonment under the Chinese government in Tibet, they were able to make tsotel for the first time, and have made increasingly larger amounts five times since, most recently in 2011. The Tibetan medical faculty at CUTS in Sarnath only prepares small amounts of tsotel for training purposes with university funds and without any commercial incentives.

It is very difficult for private clinics to make tsotel, which adds to its value and prestige. The famous private physician Dr Yeshi Donden was able to make tsotel only once with his own funds in a group of about seven amchis in 1985 at his pharmacy in McLeod Ganj. Other private clinics either buy tsotel and precious pills from outside, or buy tsotel and then make their own precious pills, or do not use them at all. Gifting tsotel to a private physician in exile who is then able to make precious pills has been very valued. For example, members of the aristocratic Trétong (Bkras mthong) family donated tsotel to Yeshi Donden’s clinic in Mc Leod Ganj. Trétong Gyurmé Gyatso (‘Gyur med rgya mtsho, 1890–1938) held important positions in Kham, where he might have had access to tsotel that the family later took to India.

Tsotel and Safety
Lhakpa’s quote above is exemplary of what most Tibetan medical practitioners and pharmacists say, that they themselves have no doubt that their mercury

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84 Hofer 2008, pp. 175, 177–9.
85 Tawni Tidwell, e-mail communication, 20.11.2013.
86 Dr Pema Dorje, interview, Salugara, 01.09.2004. Compare footnote 12. Note that Yunying 25 is still made without tsotel, Mangjor now has tsotel, and Jurmar 25 is coated with cinnabar.
87 Men-Tsee-Khang 2011, pp. 5–6.
89 Dr Yeshi Donden, interview, McLeod Ganj, 03.12.2012.
90 Dr Choephel Kalsang, personal communication, McLeod Ganj, 04.12.2013.
91 Petech 1973, p. 90. Thanks to Tashi Tsering for sharing this reference.
92 Tashi Tsering thinks that during Gyurmé’s tenure in Derge and Kham he oversaw or sponsored the making of tsotel and probably received some amount of it that the family kept and took to India. Personal communication, Dharamsala, 05.12.2012.
detoxification methods work and that tsotel is safe. It is for the outside world that they have to either exclude it from their medicines, or prove that it is safe. This does not mean that Tibetans are not aware of mercury’s toxicity. Symptoms of mercury toxicity are clearly described in the Four Tantras or Gyüshi (Rgyud bzhi) along with possible antidotes, and Tibetan physicians have tremendous respect for mercury and are often afraid of it. At the Men-Tsee-Khang, processing mercury is explicitly excluded from the curriculum for the Menrampa (sman rams pa) medical degree and only taught to selected amchis. Mercury poisoning is understood to occur only when the processing has not been done correctly. Nevertheless, tsotel as a material artefact has increasingly come into the uncomfortable position of challenging Tibetan physicians and institutions to prove its safety.

Current toxicity debates on Asian medicines mention the use of heavy metals (especially mercury, arsenic, and lead) in medicines as one of the main causes of toxicity, next to environmental contamination of herbs through heavy metals. For Tibetans, such debates were triggered in 1998, when Finnish authorities banned the import of Tibetan medicines after detecting high levels of mercury in some samples; in 2001, a case of anaemia due to high levels of lead found in Tibetan medicines made it into the press; some other cases followed. A radical Weberian ‘disenchantment’ consequently hit Tibetan pharmaceutical production, at least at the Men-Tsee-Khang in India. International safety regulations introduced a form of reasoning quite foreign to Tibetan concepts of the poisons contained in mercury. Some privately working pharmacists stopped using mercury altogether and prepared precious pills without tsotel. The Men-Tsee-Khang responded to this crisis by inviting foreign researchers to scientifically prove that their tsotel-containing precious pills were safe. Between 2002 and 2009, two toxicity studies—a small pilot feasibility study and a larger cross-sectional study with 120 patients (results still unpublished)—were carried out. Although according to international standards these were small studies and not very significant, the results were exceedingly important for the

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93 Chapter 11 of the Last Tantra lists side-effects from taking improperly processed substances and how to treat them. Men-Tsee-Khang 2011 (transl.), pp. 132–3.
94 This includes the fear of explosion if the caldron is overheated and fears of being poisoned by mercury fumes, against which numerous precautions are taken.
95 Pasang Yontan 1988, p. 231.
96 Men-Tsee-Khang (transl.) 2011, p. 129.
97 See Aschoff and Banerjee, this issue, for relevant literature.
98 See Kloos 2010, pp. 102–3, for details on these reports.
99 Amchi Tashigang, interview, Delhi, 25.08.2012.
100 Sallon et al. 2006.
Men-Tsee-Khang itself, and they were given a large coverage during the Second International Tibetan Medical Conference in Dharamsala in October 2012.

During this conference, three lectures, among them keynote presentations, dealt with mercury in medicines, and two of them specifically with tsotel. As a representative of the ayurvedic lobby promoting the use of mercury in medicines, Vaidya Balendu Prakash, who had been involved with AYUSH (which stands for Ayurveda, Yoga, Unani, Siddha, Sowa Rigpa, and Homeopathy)\(^\text{101}\) and had received government funding for his clinical studies in the past, presented his positive clinical experience treating leukemia patients.\(^\text{102}\) Sara Sallon announced the preliminary results of the second tsotel study, which showed no neuro-cognitive signs of toxicity and no mercury in urine or blood samples.\(^\text{103}\) The head of the Men-Tsee-Khang pharmacy, Jamyang Tashi, gave a lecture on the preparation of tsotel, which explained the overall manufacturing process. During the final press conference, intended by the organisers to emphasise and spread the positive results of Sallon’s study, she stated again clearly that hers was a study on safety and not efficacy and that more studies were needed to confirm these results.

Even His Holiness the Dalai Lama chose to talk about mercury during the private audience he granted to the conference participants. He said that he himself has taken precious pills for the past 40 years and that he has never experienced any side-effects of mercury poisoning despite the fact that at some point he tested positive for elevated mercury levels. His comments exemplified both the Tibetan belief in the efficacy of tsotel as well as the need for scientific analysis, thus summarising the dilemma Tibetan medicine faces, i.e., having the empirical knowledge that their mercurial compounds work, having begun to prove their safety, but being as yet unable to establish their efficacy scientifically, and being exposed to global regulations on heavy metals in medicines. Presenting two studies that show that tsotel when taken in precious

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\(^\text{101}\) The Indian government department of AYUSH comes under the Ministry of Health and Family Welfare. Tibetan medical practices were recognised as Sowa Rigpa by AYUSH in 2010.

\(^\text{102}\) See Prakash, this issue.

\(^\text{103}\) These results were different from the first study, in which ‘urine levels (mean 89 mg/L) were significantly greater than the normal reference levels (B/20 mg/L)’ (Sallon et al. 2006, p. 410), a result that was not always accurately reported in Tibetan publications. An article in payul reported that ‘mean urinary mercury levels were under normal range’ (Namdul 2005); this was also uncritically published elsewhere (Men-Tsee-Khang 2004/05, p. 13). See also URL: <http://www.tibmedcouncil.org/pdf/college_n_institution/mentsi_khang.pdf>, last accessed 20 October 2013.
pills appears to be safe and did not cause significant side-effects, was an important event in Dharamsala. 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’.

Being currently unable to prove scientifically that *tsotel* is efficacious does not undermine the medical, religious, and political efficacy attributed to the compound, especially in its final form—precious pills. Their religious efficacy is linked to the secretive and ritualised manufacturing process, an important aspect of the social life of *tsotel*, explored in the next section along with political efficacy.

**Tsotel and its Religious and Political Efficacy**

The article by Czaja, this issue, tells the story of how, during the seventeenth century, the Gelukpa school was keen to receive the *tsotel* practice from the Drigung school in order to establish its own tradition to refine mercury and produce precious pills in Lhasa. Precious pills were not only taken as medicines, but also worn as amulets. Their strong religious emphasis and magical protection, especially from poisoning, presented a valuable asset to the Central Tibetan Government. The religious component, among others, is linked to mercury being considered the semen of Lord Shiva, which merges with his consort’s menstrual blood, symbolic for sulphur. This is the most sacred part of the mercury processing, impressive also because of the visible transformation of a whitish powder turning into a blackish paste, which is then further processed into ash.104 The phase in which sulphur and mercury are mixed in dim light is called ‘confrontation’ or ‘meeting the enemy’ (*dgra sprad*), and all pharmacists and participating staff are supposed to keep strict silence, reciting mantras silently for the entire time.105 The reason women are not allowed to be present during the manufacturing of *tsotel* is also linked to this ritual symbolism: it is believed that the presence of women could cause obstacles to the detoxification during burning one of the three poisons of mercury, ‘the poison of heaviness’ (*lic'i dug*),106 since, as several amchis explained to me, mercury could be disturbed and ‘over-boil’, symbolising Shiva’s ejaculation and consequent loss of vitality.107

105 Dr Yeshe Gelek, interview, Dharamsala, 30.10.2012.
106 Ridak 2003, p. 420.
107 The processing of mercury is referred to as ‘taming’ or *dülwa* (*dul ba*), a subjugation idea that also goes back to a myth in which Shiva, in the form of a demon, along with his entire entourage is subdued by Buddhist deities and converted to Bodhisattvas (Mayer 1996, p. 104). To what extent this myth plays out in actual pharmacological mercury processing is debated.
In many pharmacies, the processing of mercury is ritualised. So far, all tsotel events I have heard of (mostly but not exclusively outside the PRC) had religious components, even though they varied in degrees. The Chakpori-trained Amchi Ngawang in Kathmandu told me about a tsotel purification practice, which was divided into three ritual stages, all of which took place inside the pharmacy: (1) first, all raw materials were placed inside a mandala and consecrated; (2) then tsotel was made; (3) lastly, tsotel was placed inside a mandala and consecrated over several days. The ritual text used on this occasion was the Yuthok Nyingthik (G.yu thog snying thig), a set of meditative practices for inner transformation and for the enhancement of medical efficacy. Smaller pharmacies might invite only one lama to perform the rituals, while large institutions can afford to invite an entire group of monastics to perform the rituals inside the pharmacy. An altar with various offerings and statues is set up along with the actual medical ingredients, which are all consecrated as part of the manufacturing process.

Overall, the making of tsotel involves three main aspects: ‘materials’ or dzé (rdzas), ‘mantras’ (sngags), and ‘meditation’ (ting nge ‘dzin); simply processing mercury is only dzé. Such ‘spiritual’ or ‘sacred’ aspects of tsotel are an inherent aspect of its efficacy. Without the blessings and consecration, the nüpa of the ingredients is incomplete. For the amchis involved in the manufacturing of tsotel, the spiritual aspects of tsotel are significant. A senior physician from Lhasa explained it this way:

If we can master the stainless practice of the Great Mercury Purification through the lineage of ‘seeing transmission’ (mthong ba’i rgyud), temporarily, it can help us to remove all the diseases, and ultimately, it can help us to attain the supreme state of omniscience. As the Mahāsiddha Orgyenpa said, ‘if we let even the size of a mustard seed enter our body, it enables us to enter the land of the ḍākinīs’. If we let the size of a mustard seed of Great Mercury Purification that came from the standard stainless practice enter our body, we will be able to go to the land of the ḍākinīs…. So it is very powerful.

detoxification practices is part of my ongoing research. On the aspect of ‘taming’, see Sonam Dolma, this issue.

110 Tashi Tsering, personal communication, Dharamsala, 03.12.2012.
111 Recorded during a Tibetan medicine workshop in Kathmandu, 06.12.2011. Translated by Tenzin Demey.
The significance of the spiritual potential of tsotel events is also expressed by the empowerments that amchis receive before taking part in such a practice. The Yuthok Nyingthik and the Medicine Buddha empowerments are the standard prerequisites for tsotel practice, and amchis will be taught to recite particular mantras during certain stages of the purification process. They also have to take certain ‘vows’ (dam tshig), such as not to expose the purification process to sunrays, as well as to keep ‘dogs and women’ away from the pharmacy.\textsuperscript{112} The various stages of purification each have different rituals associated with them. For example, when the ‘rust is removed’ (g.ya’ phyis pa) the pharmacists recite the Yuthok prayer and the Medicine Buddha mantra continuously while rubbing mercury in sealed goatskin bags with pepper and ginger powder over a period of one to three days. Precious pills are also consecrated, usually with a mendrup ritual. Some of the ingredients are relics and blessed substances, used as a papgyiin, mentioned above. All these ritualised aspects add to tsotel being labelled the ‘king of essences’, empowered to add nüpa to the efficacy of tsotel-containing precious pills.

Another example of the spiritual efficacy of tsotel is told by Craig and Adams, who studied the effect on the SARS epidemic in 2002–03 in China on the social and economic value given to some Tibetan precious pills, which during the epidemic had a sharp rise in sales, not only among Tibetans but also Chinese.\textsuperscript{113} That Tibetan villages remained unaffected by SARS was ascribed to the complex efficacy of precious pills, incense, and protective amulets. Potency was attributed to the precious pills because of their expensive ingredients, their known protection against epidemics, and their blessed contents, especially when they were manufactured in small units in the TAR itself and not for the mass-market in China.\textsuperscript{114} In the PRC, the spiritual efficacy attributed to precious pills is also promoted to some extent by performing mendrup consecration rituals in the pharmacies as a part of their re-enchantment of ‘authentic Tibetanness’.\textsuperscript{115}

But not all tsotel manufacturing is ritualised. The Tibetan medical department at CUTS, since it is an Indian government undertaking, does not officially include rituals when preparing tsotel with students, and prayers are only taught to students interested in the spiritual aspects of pharmacology.\textsuperscript{116} Nevertheless, Tibetans in Indian exile rely on their medical traditions to authenticate their

\begin{footnotes}
\item\textsuperscript{112} Ridak 2003, p. 420.
\item\textsuperscript{113} Craig and Adams 2008.
\item\textsuperscript{114} Ibid., pp. 20–2.
\item\textsuperscript{115} Saxer 2013, pp. 244–8, 292.
\item\textsuperscript{116} Lobsang Tenzin Rakdho, interview, Sarnath, 23.12.2012.
\end{footnotes}
culture, and mercury sulphide containing precious pills are a part of it. Kloos argues that the making of tsotel also contains what he calls a certain ‘political and pharmaceutical efficacy’. He illustrates how during the process of pharmaceuticalisation of Tibetan medicine in India, which began in the 1980s, Tibetan pills in general and precious pills in particular became ‘the material essence of an "authentic" and at the same time endangered Tibetan culture’. Through this they are ascribed, says Kloos, not only a pharmacological efficacy but also a ‘political efficacy’ in the fight for a ‘free Tibet’. I often observed that precious pills from Dharamsala are preferred by Tibetans from Tibet because they are manufactured close to the Dalai Lama and believed to be imbued with his blessings and thus are considered more efficacious. Whether precious pills can indeed be seen as having acquired the significance of a ‘panacea for cultural and political problems’ beyond Dharamsala, will need more ethnographic research on the ground. The examples by Craig and Saxer show that the tsotel events in Tibetan areas of the PRC seem largely driven by pragmatic commercial incentives, such as efforts to receive a proper manufacturing licence, a ‘protection certificate’, or a GMP certification, despite the final packaging of precious pills representing ‘authentic Tibetanness’. The SARS example shows that the religious efficacy of precious pills is closely tied to ‘authentic Tibetanness’, but not necessarily related to ideas of a ‘Free Tibet’. However, any of these aspects might still be interpreted by local Tibetans in terms of idioms of cultural preservation and political freedom.

Conclusions

Inspired by anthropological works on ‘social lives’ of medicines, this article sketched four key areas of the social life of tsotel, the processed mercury sulphide ash used in many Tibetan precious pills. The ‘pharmaceutical nexus’ of tsotel events elucidated the intricate social networks of religious, pharmaceutical, and economic participants, which in the past involved entire communities, their local monastic establishments, physicians, and political leaders. With increasing pharmaceuticalisation, this nexus might one day play out solely within the walls of a single large pharmaceutical company, taking the

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117 Kloos 2010.
118 Kloos 2012, p. 197.
119 Ibid., p. 200, my translation.
120 Ibid.
121 Ibid.
role of the donor, manufacturer, as well as host of a mendrup ritual. However, the Bonpo establishment of a tsotel tradition shows that there are also local small-scale initiatives not only to produce tsotel but also to manufacture precious pills that can also be attached to particular religious lineages, empowering marginal religious groups.

Next, I looked at tsotel as a medical, religious, and political commodity that so far has found a niche in GMP rules in China; it still remains uncontrolled in India. Labelling tsotel as a ‘traditional practice’, shielded with the help of ‘protection certificates’ in the PRC, does not necessarily mean safeguarding its practice on the ground. The example from Saxer’s work presented above showed how ‘state protection’ of knowledge can actually circumvent traditional practices and force pharmacies that have a long tradition of making tsotel and precious pills to stop doing so. In the long run, smaller pharmacies might be marginalised by such ‘state protection’ practices.

Safety, the third aspect discussed, is probably the most crucial cornerstone in tsotel’s biography, and its future will be determined by whether, how, and where it will be considered toxic, and whether it is therefore deemed legal or not, safe or not, and therefore must be regulated, exempted, or banned. I argued that the social life of tsotel is increasingly linked to perceptions of toxicity and safety because of its chief ingredient, mercury, being contested globally. Despite the exemption allowing mercury for traditional and ritual use, the UN’s global ban on mercury poses a challenge to Tibetan medical communities. The ban has accentuated debates on mercury’s toxicity worldwide, to which Tibetan medical practitioners need to react. The overall focus on mercury as the problematic ingredient of tsotel seems to be due to two things: the global attention given to mercury as the most dangerous neurotoxin among heavy metals, and Tibetan pharmacologists considering processed mercury supreme among their medicinal substances. However, mercury might not necessarily be the most toxic ingredient of tsotel, since it is for the most part found in the form of a stable and largely insoluble mercury sulphide compound. The arsenic, lead, and tin compounds in tsotel deserve equal attention in toxicity studies, but so far have hardly been addressed. In Dharamsala, I have not seen Tibetan physicians making a clear distinction between ‘safety’ and ‘efficacy’ as presented by Sallon in her toxicity studies. At the Men-Tsee-Khang, both safety and efficacy of tsotel were demonstrated when the chief pharmacist ceremoniously consumed a high dose of it. Where do efficacy and safety merge in the various medical epistemologies? For Tibetan medical practitioners, mercury toxicity is the result of wrong processing; therefore, the presence of mercury will not make them doubt or adapt their recipes easily.

122 Only Bai 2000 includes arsenic in his study on tsotel.
Despite tsotel’s efficacy not being validated scientifically, its strong religious and political efficacy is evident from examples presented in the fourth area of tsotel’s biography. The recent exemption in the global UN mercury ban, allowing the continued use of mercury in ‘religious and traditional activities’ could also lead to innovative ways in which tsotel practices might purposely be presented or (re)constructed as ‘religious’ or ‘traditional’ in order to fit such exemptions.

Considering the use of tsotel as a papgyün or khatsar, the biography of tsotel stretches across the lives and histories of different medical formulas; it has many incarnations—each batch is different. Its life even stretches across geographical areas: tsotel from eastern Tibet ends up in a mendrup preparation in Kathmandu, of which a dose will go into the next making of tsotel, years later, back in eastern Tibet. In that way, tsotel has pedigrees, lines of ancestors. Tsotel travels as a blessed commodity across lives of other medicines, even talismans, purchased online. Considering this and Blaikie’s view that each medicine is ‘a unique assemblage of heterogeneous components’, makes it impossible to write a ‘complete’ biography.

Contemplating the anthropological approach of biographies of substances further, one could ask the question: if biographies are narratives, by whom, and to whom is the story told? Biographies of substances will differ whether being told by a Tibetan physician or by an anthropologist. Within Tibetan communities, the biography of tsotel is largely a secret one that not many doctors know or talk much about. For the anthropologist, the ‘social life’ of tsotel becomes a useful tool to tell its kaleidoscopic story to a Western audience and make sense of the social significance of an unusual medicinal ash.

Pharmaceuticals also have a ‘life after death’ once they are consumed; the final stage of a biography of a medicinal substance is its efficacy when transformed inside bodies, certainly a challenging section in the life of tsotel. The next chapter of tsotel’s biography might be driven by the scientification through biochemical toxicity and safety studies, through which it might be classified as a safe and legal commodity of increasing market value. Since this process only began recently, is ongoing, and not yet ethnographically studied, I only sketch it as a possible trajectory. A recent overview analysed 22 Chinese tsotel studies. Based on the published Chinese literature that I was able to collect so far (see separate bibliography), I conclude that most papers aim at showing

123 Blaikie 2013, p. 4.
124 Van der Geest 2011, p. 10.
125 Huang et al. 2013.
that tsotel is, first of all, safe\textsuperscript{126} and non-toxic.\textsuperscript{127} Chinese authors foresee that Tibetan medicines, which they clearly define as ‘a traditional medical system in China, . . . will become the new drugs of the future, and so, in-depth study of its pharmacological developments has far-reaching significance.’\textsuperscript{128} Studies have focused on tsotel’s pharmacokinetics,\textsuperscript{129} its chemical, micro-structural, and trace-element analysis,\textsuperscript{130} as well as the actual processing methods of making tsotel.\textsuperscript{131} A patent was applied for regarding the mechanical processing technology of tsotel, which claims to replace mechanical with electrical manufacturing techniques, dealing with the toxic mercury vapours more effectively, and shortening the time of production.\textsuperscript{132} Some very recent studies have approached tsotel through nano-chemistry, showing that the inorganic contents of tsotel are mainly mercury, sulphur, and graphite, forming nanoparticles (NPs), varying significantly in different batches and pharmacies.\textsuperscript{133} Ways of explaining tsotel’s actual efficacy from a biomedical perspective is still a long way off. One can assume that the next chapter in the social life of tsotel will be linked to scientific studies on nano-chemistry, and how the findings of such studies might imbue this ash with even more medicinal, economic, and political efficacy and value.

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\textsuperscript{127} Dou 2005.
\textsuperscript{128} Bai 2000, p. 70. See also Yan 2007, p. 150.
\textsuperscript{129} Jiang et al. 2009; Li et al. 2008; Zhang et al. 2012.
\textsuperscript{130} Li et al. 2011, 2012; Yan, Ma, and Zhu 2007; Yan 2007; Yan and Ma 2010.
\textsuperscript{131} Suo 2007.
\textsuperscript{132} Chen 2009.
\textsuperscript{133} Zhao et al. 2013, pp. 2, 7.
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