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Jan M. A. van der Valk
University of Vienna, jan.vandervalk@univie.ac.at

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Garuda 5 (*khyung lnga*): Ecologies of Potency and the Poison-Medicine Spectrum of Sowa Rigpa's Renowned 'Black Aconite' Formula

Jan M. A. van der Valk

This article focuses on ethnographic work conducted at the Men-Tsee-Khang (Dharamsala, India) on Garuda 5 (*khyung lnga*), a commonly prescribed Tibetan medical formula. This medicine's efficacy as a painkiller and activity against infection and inflammation is largely due to a particularly powerful plant, known as 'virulent poison' (*btsan dug*) as well as 'the great medicine' (*smān chen*), and identified as a subset of *Aconitum* species. Its effects, however, are potentially dangerous or even deadly. How can these poisonous plants be used in medicine and, conversely, when does a medicine become a poison? How can ostensibly the same substance be both harmful and helpful? The explanation requires a more nuanced picture than mere dose dependency. Attending to the broader 'ecologies of potency' in which these substances are locally enmeshed, in line with Sienna Craig's *Efficacy and the Social Ecologies of Tibetan Medicine* (2012), provides fertile ground to better

understand the effects of Garuda 5 and how potency is developed and directed in practice. I aim to unpack the spectrum between *smān* (medicine) and *dug* (poison) in Sowa Rigpa by elucidating some of the multiple dimensions which determine the activity of Garuda 5 as it is formulated and prescribed in India. I thus embrace 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 and side effects.

Keywords: poison-medicine dichotomy, herbal toxicity, side effects, aconite, Sowa Rigpa (Tibetan medicine).

Introduction

There was once a kingdom in eastern India whose inhabitants were bothered by lymph (*chu ser*) disorders and diseases caused by *klu* (subterranean or aquatic elemental spirits) and by microorganisms; it was possibly leprosy. Not knowing where to turn, the king and his subjects took refuge in the Three Jewels (Buddha, dharma, and sangha). As a result of this observance, Garuda (a mythical bird) manifested to help the kingdom and cleared away the obstacles faced by the people. When he was about to die, Garuda offered his body as medicine so that the people could continue to enjoy his blessings in the form of pills to be taken internally or worn as amulets. Garuda further promised that when the materials of his body were exhausted, his blessings would continue in the form of drugs. Thus it is said that *a ru ra* (chebulic myrobalan) symbolizes Garuda's flesh, *ru rta* (costus) symbolizes Garuda's bones, *shu dag nag po* (sweet flag) symbolizes Garuda's muscles, *gla rtsi* (musk) symbolizes Garuda's blood, and *bong nga nag po* (dark-blue aconite) symbolizes Garuda's heart. (Gyatso and Hakim 2010: 317)

Gyatso and Hakim (2010) present a convenient summary of a myth narrating the origins of the medicine named 'Garuda 5' (*khyung lnga*), in which its five ingredients correspond to the Garuda's¹ body parts. A dark-colored, 'black aconite' (*bong nga nag po*, or *bongnak*) is identified as the heart of this mythical bird.² The efficacy of this commonly prescribed formula against acute afflictions such as pain, infection and inflammation is in large part due to this 'heart.' This particularly powerful plant that is also named *menchen* (*sman chen*), 'the great medicine,' as well as *tsenduk* (*btsan dug*), 'virulent poison,' has been equated with a subset of *Aconitum* species by contemporary botanists and *amchi* (*am chi*, Sowa Rigpa practitioners; van der Valk 2017: 52-54).³ Its strong potency, however, is potentially dangerous or even deadly. How can poisonous plants be used in medicine, or conversely: when does a medicine become a poison? How can ostensibly the same substance be both harmful and helpful? These questions beg a more nuanced explanation than mere dose-dependency. Based on ethnographic observations and interviews with *amchi* from the Men-Tsee-Khang (the Tibetan Medical and Astrological Institute re-established in exile in 1961)⁴ in Dharamsala, India, I aim to show that the activity of Garuda 5 and of potent substances in general is better understood as enmeshed in local ecologies of potency that do not presuppose a separation of 'wanted' and 'unwanted' effects.

'The dose makes the poison'⁵ is a famous adage formulated by the sixteenth-century Renaissance scholar Paracelsus (1493-1541), whose ideas lie at the foundation of modern toxicology (Klaassen 2013: 5): (1) experimentation with single chemical entities (a 'toxicon,' as opposed to mixtures) is essential to determine their effects; (2) one should distinguish between their therapeutic and toxic properties, which (3) are not always clearly distinguishable, except by dose; and (4) the effects of chemicals have a degree of specificity. In the standard toxicology science textbook referenced above, a poison is introduced as:

[A]ny agent capable of producing a deleterious response in a biological system, seriously injuring function or producing death. This is not, however, a useful working definition for the very simple reason that virtually every known chemical has the potential to produce injury or death if it is present in a sufficient amount. (Klaassen 2013: 17)

This points to the most fundamental concept in modern toxicology, the dose-response relationship, although the characteristics of exposure are known to further depend on the route, site, duration, and frequency of exposure. From the toxicological perspective, all substances are potentially poisons, including food and medicine. Interestingly, the concept of 'hormesis' suggests that "some nonnutritional toxic substances may also impart beneficial or stimulatory effects at low doses but that, at higher doses, they produce adverse effects" (ibid: 25; see Calabrese and Blain 2005). This results in a U-shaped dose-response curve. In this sense, there is no clear-cut poison/medicine dichotomy, but rather a spectrum of biological effects (legislative, regulatory and medical frameworks notwithstanding).

As a starting point for my critique on the applicability of Paracelsian toxicology⁶ to Tibetan medical formulas, it is important to note the ambivalence inherent in the scientific definition of poisons quoted above, as well as in the complex nature of dose-response effects. Recent historical investigations of the European medicine cabinet also reveal "the multidimensional and dynamic role of drugs as poison and vice versa" (Pieters 2018: 10), questioning dose as the single determinant of their therapeutic/poisonous effects. Indeed, it appears that "[T]he double-edged sword of benefits and harms" (ibid: 12) has only been sharpened by the maturation of the fields of toxicology, pharmacology and the burgeoning pharmaceutical industry, as the quest for 'pure ingredients,' 'precise dosages,' and narrowly defined effects has "actually opened new avenues for mass poisoning in hospitals, nightlife, industry and the

battlefield.” These new chemical medications are founded on a legacy of eighteenth- and nineteenth-century ‘heroic medicine,’ with small doses that could be therapeutically effective but equally harmful. Pieters (2018) thus emphasizes that not just the dose but also the context of use defines what makes a poison, as he exemplifies in the case of injection of a highly toxic and expensive chemotherapeutic fluid against deadly cancer with more-or-less desperate patients and doctors in an increasingly commercialized medical/pharmaceutical industry.

The *Gyüzhī* (*Rgyud bzhi*, the *Four Tantras*)—Sowa Rigpa’s⁷ canonical medical text, probably redacted in its current form in the fourteenth century (McGrath 2017)—however, states that all substances on earth are potentially medicines: *sa steng sman min ci yang yod ma yin* (Men-Tsee-Khang 2011a: 185). It does not explicitly say that all substances could be poisonous, yet it implicitly recognizes the beneficial potential of ostensibly toxic things. In the *Gyüzhī*, medicine (*sman*) and poison (*dug*) are formally distinguished and separately discussed, for instance in the three chapters of the *Oral Instruction Tantra* which detail the classification of poisons and their cures. Anything beneficial can be referred to as *men* (*sman*) in Tibetan language, while anything harmful is *duk* (*dug*). Yet, in Tibetan medical theory and the subfield of medicine making (*sman sbyor*) in particular, both terms acquire multiple and more precise meanings (Sonam Dolma 2013). A comprehensive account of the textual and theoretical bases underlying *men* and *duk* is beyond the scope of this article. Instead, I illustrate ethnographically how aspects of *amchi* discourse, medicine-making and prescription problematize a rigid poison/medicine dichotomy in practice, focusing on issues of dosage and ‘side effects.’ The selected observations of reformulation, detoxification, compounding, and clinical consultations that follow reveal the fluid, contextual nature of potent substances. Dosage plays a vital role, but it is not the central paradigm. Instead, these practices locally shape the poison-medicine spectrum in concert with multiple environmental and clinical factors. Moreover, when *amchi* consider the dose of substances, the focus is manifestly *not* on the ‘single chemical entities’ which are ‘active principles’ in modern toxicology and biomedical pharmaceuticals (see Butler 2019; Tidwell and Nettles 2019).

Leaving aside heavy metal contamination and poisoning—of which the detection and media coverage played a role in the politicization of Tibetan medicine in exile (Kloos 2008: 35–36, 2017: 148–150)—*bongnak* black aconite may well be one of the potentially most toxic substances used in Sowa Rigpa (Ma et al. 2015). Aconite poisoning, mainly in the

form of acute and possibly fatal cardio and neurotoxicity, is a rare but well-known phenomenon, especially in East Asian countries. It is often related to faulty identification and processing of Chinese medicines (Chan 2009, 2011; Nyirimigabo et al. 2015; Singhuber et al. 2009).⁸ These studies, however, presume that the toxicity (and efficacy) of aconite can be narrowed down to the binding to and stimulation/inhibition of molecular receptors by aconitine and related alkaloids. Yet none of the *amchi* I interviewed and worked with think in these terms, which should not come as a surprise. I argue that *amchi* attend to broader understandings of potency and efficacy, which allows for an attunement to ‘ecologies of potency’ in which pharmacists and their techniques, clinicians, patient bodies, and local formulations of Garuda 5 and other substances are enmeshed. In line with Sienna Craig’s *Efficacy and the Social Ecologies of Tibetan Medicine* (2012), this perspective provides fertile ground for better understanding the effects of potent substances. Craig maps the multiple ways in which human–environment interdependencies shape the efficacy⁹ of Tibetan medicine in her multi-sited ethnography in Nepal and Tibetan areas in China. She defines efficacy as:

[...] produced at the intersections of ritual action and pharmacology, within distinct social ecologies. Efficacy is a measurement of micropolitical power, biopsychosocial effects, and cultural affect. It is an intersubjective phenomenon, by which I mean that one cannot really know whether a medicine or therapeutic approach is efficacious until a practitioner makes and/or prescribes it, a patient uses it, and then reacts to its use. (Craig 2012: 7)

I subscribe to her nuanced definition, which recognizes the medico-ritual nexus and its social, sensorial, and material embodiment. However, my focus here excludes ritual contributions to efficacy (which in fact cannot be isolated as such, also in the case of Garuda 5).¹⁰ It also does not elaborate much on the complex of psychological, sociocultural and political-economic layers that infuses medicines with power, which has constituted the main object of study within the social sciences (see Coderey 2019). Regrettably, “medical anthropology has seemed hitherto to lack in full engagement with phytomedical reality, and the acceptance that the health care practices of most people on this planet depend on plants and animals” (Ellen 2006: 10), reflecting a problematic gap between medical anthropology and ethnobotany (Waldstein and Adams 2006; Hsu 2010). Anthropologists of pharmaceuticals have equally ignored materiality and “have left the discussion of the drugs themselves and their physiological effects

to biomedicine, accounted for socio-cultural aspects, and thereby inadvertently reinforced the Cartesian dualism that has set the agenda for the medical anthropological project” (Hsu 2010: 23). I aim to bridge this problematic divide through a heightened anthropological sensitivity to plants and their properties, by highlighting some of the more material, technical, and bodily dimensions which determine the activity of the Garuda 5 formula.¹¹ I also expand Craig’s approach by including the full spectrum of potency—the ‘good’ and the ‘bad,’ the ‘wanted’ and the ‘unwanted’—without presuming the universal validity of biomedical notions of efficacy, toxicity, and side effects. In this move, I am inspired by Margaret Lock’s ‘local biologies’ (Lock 1993, 2001: 483–487). Moving beyond the narrow purview of ethnomedicine as well as meaning-centered analyses, Lock saw the need early on to transcend the nature/culture dichotomy and to question the epistemologically untouchable position of both the human body and the medical sciences as ‘natural’ categories. Conceiving the body ecologically as a dynamic microcosm based on and overflowing in the local environmental macrocosm, I argue that the *Gyūzhi*’s poison/medicine dichotomy is, in effect, a spectrum of potent possibilities shaped by local interactions and bodily configurations.

Academic coverage of what scholars have termed ‘Tibetan pharmacology’—including its principles (Cardi 2005–2006, Hofer 2014), its interrelationships with Buddhist ritual (e.g., Gerke 2017), medical formularies and knowledge transmission (Gerke 2018), and textual-historical analysis of key concepts such as potency (*nus pa*) and substitution (*tshab*) (Czaja 2015; 2017)—is significant and growing. However, there is still a lack of close ethnographic attention to the material flows and frictions that make up the potency of Tibetan medical substances (but see Blaikie 2014: 260–317, 2015; Blaikie et al. 2015; Chudakova 2015, 2017; Gerke 2013a). Building on Barbara Gerke’s long-term anthropological research on toxicity in Sowa Rigpa, I recognize the crucial yet controversial entanglements between the healing and harming potentials of substances. A three-year project on pharmacological detoxification methods with practitioners in India and Nepal led her to investigate *tsotel* (*btso thal*), a highly processed and expensive organometallic complexed mercury sulfide compound considered to be “the pinnacle of Tibetan pharmacology” (Gerke 2013a: 123) and an essential ingredient for several of the most complex, potent, and popular Tibetan medicines named ‘precious pills’ or ‘jewel pills’ (*rin chen ril bu*). Gerke describes a dilemma faced by the Tibetan medical community: *tsotel* (if processed correctly) is perceived by them as the supreme medicinal substance, whereas the mercury it contains is seen as the most dangerous

neurotoxin in bioscientific circles and is implicated in poisoning scandals. While Tibetans do not doubt its benefits and are keenly aware of mercury’s toxicity in unprocessed form, practitioners and institutions are challenged to prove its safety. This focal shift from efficacy to safety was noticed by Gerke (2015) as a more general trend in the biomedical and regulatory literatures on Asian medicines (cf. Schrempf and Springer 2015, and especially Kadetz 2015a, b).

Within medical anthropology, discourses of harm reduction, prevention, and risk have been found to reinforce prejudice towards marginalized groups under the guise of scientific objectivity, engendering complex dynamics and politics of responsibility (Lock and Nichter 2002: 11–14). In this article, I am sensitive to how modern biomedical notions of risk can be mobilized to condemn ‘traditional medicines’ through their conception as hazardous entities. These sensitivities notwithstanding, biomedical notions of ‘risk’ and ‘side effect’ continue to play an insidious role in what follows.

Ethnopharmacologist Nina Etkin (1992) critically analyzed the reductionist biomedical definition of ‘side effects’ and how these effects are interpreted and employed in unexpected ways in various sociocultural realities, as, in Etkin’s seminal study on the indigenization of pharmaceuticals by the Hausa of rural northern Nigeria. She argues that “the primacy or subordination of effects depends on why a medicine is administered, the intentions of the user and prescriber, and the anticipated outcome—in short, its cultural context” (Etkin 1992: 102). Contrary to the general opinion, she finds, traditional medical systems relying mainly on a pharmacopoeia of plants are markedly sensitive to a multiplicity of effects. Indeed, as plant-based medicines are complex mixtures to which multiple benefits are often ascribed, one would logically expect there to be more ‘secondary’ effects as well. Herbalists thrive on their awareness of this complex chemical ecology (Johns 1996) far removed from the unrealistic one-dimensional efficacy/toxicity or main/side effect of highly concentrated pharmaceutical molecules. The myth that pharmaceuticals have both stronger efficacy as well as less side effects belies their sociocultural and biological complexity. Secondary effects are relegated to a post-marketing rhetoric of ‘noncompliance’ and ‘misuse,’ masking what are often purposeful appropriations by its users.

The following three sections are mainly based on my doctoral fieldwork at the Men-Tsee-Khang, carried out during several extended stays between 2013 and 2015 over a duration of roughly six months. My work there

was part of an officially sanctioned, mutually beneficial collaboration. I taught Tibetan medical students botany and staff English on a weekly basis for several months and copy-edited a book on Tibetan medicinal plants (now published: Tsultrim Kalsang 2016). In return, I was able to access *amchi* working in the Materia Medica Department, the Pharmaceutical Department (‘the pharmacy’), the quality control lab, and the branch clinic of Gangchen Kyishong (‘Gangkyi’). In the next heading, I first introduce how Men-Tsee-Khang *amchi* talk (or do not) about scientifically defined risk and safety issues, relying on textual ideals. I then move into the pharmacy, where it turns out the potency of Garuda 5 in particular has to be carefully adapted and crafted to local bodies and ecologies. In the clinic, this medicine occupies an essential niche in multi-compound prescriptions, which adds to the (social-) ecological interactions that make its potency on a different scale.

Textual Ideals and General *Amchi* Discourse on Safety and Side Effects

On the third day of the Eighth ICTAM¹² conference in South Korea (September 9–13, 2013), Men-Tsee-Khang Dr.¹³ Jamyang Dolma presented on ‘The Effectiveness and Safety of Traditional Tibetan Medicine in the Treatment of Challenging Diseases.’ Jamyang Dolma first emphasized that Sowa Rigpa has a long history of empirical observation and research, which ensures its safety and efficacy, and that practitioners do not question the reliability of the classical texts nor the efficacy of their system. However, globalization has brought the need for ‘evidence’ and modern scientific studies even if these do not fit well with traditional concepts. She then summarized the results of clinical research undertaken by the Men-Tsee-Khang on diabetes, hepatitis B and hypertension, and on processed mercury. Her conclusion was that Tibetan medicine has been proven to be very beneficial, that “it is totally safe,” and that ‘authenticity’ is the key to its safety and efficacy. About a week later, during a five-day introductory course at Men-Tsee-Khang college (September 16–21, 2013), Dr. Nyima Gyaltzen gave a lecture on the ‘Seven Limbs’ (*yan lag bdun*), which detail the proper processing of herbs into medicine according to the *Four Tantras*, and came to a similar conclusion: “This [adhering to these textual standards] is why everyone knows that Tibetan medicines have no side effects.” These bold statements do not imply, however, that *amchi* mindlessly accept that all their medicines are equally beneficial and by extension ‘safe’ in all circumstances. Their aim here was to validate the efficacy of properly produced Sowa Rigpa formulas vis-à-vis a professional and student audience. In their statements,

Tibetan doctors assume that the practitioner-patient interaction modulates prescription and usage. Dr. Rigzin Sangmo from the Research & Development Department exemplified this issue in her coming to terms with my questions on the existence of side effects (interview, May 1, 2014): “for example, if you take cold [potency] medicines for a very long time this might negatively affect your digestion, but the practitioner can foresee this and adapt the medicines accordingly.” The practitioner attunes the qualities of the medicine to the constitution and current situation of the patient, which I highlight further as one of several opportunities to attune to the local ecologies of potency in the section on prescription practices below. She disliked attributing side effects to Tibetan medicines—one of the negative hallmarks of biomedical drugs for which Sowa Rigpa is globally represented as a natural, harmless complement or alternative—but did not deny the possibility of ‘adverse reactions’ such as constitutional incompatibility or allergies.

Saying that Tibetan medicines have side effects is often taken as a smear on the whole system, a lack of trust in the practitioner’s traditional expertise, the classical texts or even the Medicine Buddha *in extremis*. These statements are part of a larger discursive trope expressed by both practitioners and patients that influences healthcare perceptions and decisions in the ubiquitous scenario of medical pluralism in Dharamsala (Prost 2008: 36–41, 58–60). It also feeds into its globalization and spread into alternative medicine and wellness markets (Janes 2002). Stereotypically, biomedical pharmaceuticals are strong, have rapid effects but might bring about adverse reactions whereas Tibetan medicines are soft, slow-acting, natural, and eradicate the root-cause of the disease (see Besch 2006: 191–194 for the same trope in Spiti).¹⁴ On top of that, what a Tibetan in Dharamsala might consider a minor nuisance as part of the healing process, European patients may consider a problematic side effect. Engaging with Indian road traffic made abundantly clear to me the very different perceptions of risk and danger involved. As Dr. Tsultrim Kalsang explained to me, taking medicines can have unpleasant but necessary effects:

Sometimes people taking *khyung lnga* or other strong medicine feel uncomfortable. It is not going to worsen, sometimes it gives more [healing] effect [in the end]. It takes time. If it continues like this, then you have to stop [taking the medicine]. Two or three days is ok. You need some movement, without movement there is no effect. A little bit worse, going down [purgation] or up [emesis]. If I have a medicine for constipation and get loose

motion, then the medicine gives effect. It doesn't mean there is another disease. It is the effect. If I take medicine for constipation with no effect: no movement, still the same as before, [then] what is the use of medicine? (Interview, July 17, 2015)

During my fieldwork and in conversations with practitioners and patients, I came across only very few instances where Tibetan medicines were deemed to have had a negative influence on people's health. However, some reported unintended consequences of taking Garuda 5 are relatively severe: burning and numbing sensations of lips and tongue, itchy throat, dizziness, fainting, and weakened heart rhythm. Yet these effects have equally led to adaptations in Garuda 5's formulation, compounding and prescription, as is detailed in the following two sections.

Reformulating, Detoxifying and Compounding Garuda 5 in the Pharmacy

When I asked Dr. Tsultrim Kalsang about the potential dangers of taking Garuda 5 (interview, April 19, 2014), he explained to me that the amount of Garuda 5 that will be prescribed first of all depends on the condition of the patient (being careful with children and the elderly) and the nature and severity of the disease (a stronger disease may need a higher dose). Depending on which subtype of *bongnak* and its strength (as judged by root color, appearance, and sensation on the tongue), however, the method for detoxification may vary. The quality and availability of natural resources, itself determined by their habitat and harvesting patterns, impacts pharmaceutical practice. Practitioners need to be sensitive to this local ecology. Tsultrim Kalsang, a Tibetan medicinal plant expert stationed at the Materia Medica Department, has repeatedly been consulted by the pharmacy to confirm that the roots are of the right kind. He informed me that prolonged boiling of the roots in water, or treatment with cow milk or urine can be undertaken, if necessary, to transform poison into medicine.¹⁵

Dr. Penpa, who oversees the day-to-day production of medicines at Men-Tsee-Khang's Pharmaceutical Department, added that effectively the quantity of aconite is usually reduced to levels below what is indicated in formularies:

It is the case. Because in earlier times people were stronger, not because of [the presence of] this poison. They could take this amount of *tsenduk*. These days people more easily get the effect. So, we have to reduce it. [...] Not only for this *tsenduk*, also for these burning cones: moxa. Before we used big cones. Now we cannot use the bigger sizes, we

use very small ones. Earlier, people were used to hard work. They had good energy in their body, they could take all this. These days people are more relaxed. [...] Usually *tsenduk* is not in huge quantity in the medicine, but we had to reduce this [further] slightly. (Interview, April 21, 2014)

"The bodies of people nowadays have become frail due to a lack of manual labor," was an observation echoed by several Tibetan doctors I met. Undoubtedly taking the harsh lifestyle of nomads and farmers on the high Tibetan plateau as a reference for optimal health, medicines must now be adapted to the 'docile bodies' (Langford 2007) of Tibetan exile, Indian, and 'Western' patients. Following Blaikie's (2015) argument on the multiplicity and contingency of 'classical formulas' in real-world pharmacy practice and the spate of research on industrial reformulation (Pordié and Gaudillière 2014; Pordié and Hardon 2015; Schrempf 2015), variations in the composition of Garuda 5 should not come as a surprise. However, in comparing the small number of English-language publications detailing Tibetan formulations, it seems that the variation is relatively minor. Bhagwan Dash (1994), an Ayurvedic scholar-physician, Smanla Phuntsog (2006), a lineage-based Ladakhi *amchi*, and Jigme Tsarong (1986), Tibetan exile and former Men-Tsee-Khang director, basically agree on the formula. This may be due to the standardizing effect of the *Four Tantras*,¹⁶ as well as widespread reliance on the *Excellent Vase of Elixirs* (*Bdud rtsi'i bum bzang*) by Lhasa Mentsikhang's founding director Khyenrap Norbu (Mkhyen rab nor bu, 1883-1962). The latter is a foremost reference for pharmacists operating in Tibet, India, and beyond, especially on ingredient quantities which are seldom published (Khyenrap Norbu 2007: 150-151). Yet, when one compares these textual formulas with an actualized composition of Garuda 5, a different story emerges (Table 1). Nowadays at Men-Tsee-Khang's pharmacy, the amount of aconite is generally much lower (from 25% to less than 10% of the total weight in this case), and musk (*gla rtsi*) is substituted by the resin of *gul nag* (the black type of *gu gul*, a primary component of Indian *dhoop* incense).¹⁷ The aconite/myrobalan weight ratio is 1/5 instead of 1/2 in Khyenrap Norbu's formulary, which likely further decreases aconite's toxicity (and potency) in addition to the difference in amount in itself.¹⁸

On February 27, 2014, 634 kilograms of Garuda 5 was compounded under Dr. Penpa's supervision, following the recipe outlined in Table 1. Arriving at the third ingredient, menchen, he noted that: "This time we put not so much, because it is very strong energy. [...] These days first we have to clean it, then we have to boil it for a little bit to reduce this...how to say...potency, yes maybe duk." This

Table 1. Comparison of an authoritative textual formula of Garuda 5 with an actualized composition at the Men-Tsee-Khang.¹⁹

Khyenrap Norbu's 'authentic Garuda 5' (<i>khyung lnga tshad ldan</i>) textual formula		Men-Tsee-Khang's actualized formula (batch compounded on February 27, 2014, under supervision of Dr. Penpa)	
<i>a ru</i> (Garuda's flesh)	40 <i>srang</i> (50%)	<i>a ru</i> (<i>Terminalia chebula</i> Retz.), pitted fruit	250 kg (39%)
<i>ru rta</i> (bones)	10 <i>srang</i> (13%)	<i>ru rta</i> (<i>Saussurea costus</i> (Falc.) Lipsch.), root	unspecified
<i>shu dag</i> (tendons, <i>rgyus pa</i>)	6 <i>srang</i> (8%)	<i>shu dag</i> (<i>Acorus calamus</i> L.), root	unspecified
<i>btsan dug</i> (heart)	20 <i>srang</i> (25%)	<i>sman chen</i> (<i>Aconitum</i> sp.), tuberous root	55 kg (9%)
<i>gla rtsi</i> (blood)	3 <i>srang</i> (4%)	<i>gul nag</i> (<i>Commiphora mukul</i> (Hook. ex Stocks) Engl.), resin	unspecified
	79 <i>srang</i> (100%)		634 kg (100%)

quote directly points to the potentially close relationship between potency (*nus pa*) and toxicity (*duk*), while highlighting the need for manipulation of pharmacological activity. Senior pharmacy doctors advise on how long the roots should be boiled, depending on the nature of each batch and their experience.²⁰ Pharmacists must recognize the impact of local ecologies (e.g., different subtypes and potencies of *Aconitum*), but also pay attention to how these interact with and shape lived bodies. Focusing on the use of aconite in Garuda 5, we can therefore speak of local ecologies of potency. Figure 1 offers a general overview of the pill-making process at Men-Tsee-Khang's pharmacy, which I interpret as a step-wise modulation and optimization of potency (see van der Valk 2017: 236-238 for a more detailed description).

As Dr. Nyima Gyaltzen indicated in an earlier quote, the "seven essential limbs of standardization" (translation of *yan lag bdun* in Men-Tsee-Khang 2011b: 135) play a central role in the putative absence of 'side effects' in Sowa Rigpa in general. The seven limbs are listed in the last of the *Four Tantras*, in chapter 12 on herbal compounds, and include *dukdön* (*dug 'don*), the 'removal of toxic substances' (ibid: 135). These unwanted portions of medicinal ingredients (e.g., leaf petioles, flower sepals, fruit stones) are not considered to be acutely poisonous in the pathological sense, but their coarseness hampers the digestive fire (*me drod*) and harms the body constituents (*lus zungs bdun*). However, this relatively 'simple pre-processing' (following Saxer 2013: 68) does not seem sufficient for *tsenduk*,

which requires careful, extra attention. Although still far removed from the complexity, duration, and cost of processing or 'taming' (*'dul ba*) mercury (cf. Sonam Dolma 2013: 114-116; Gerke 2013a),²¹ Dr. Penpa stated that *tsenduk* needs 'real' detoxification. As was confirmed by Dr. Tsering Norbu, who worked in the pharmaceutical department for several years in the early nineties, *menchen* roots are boiled in distilled water at Men-Tsee-Khang but are sometimes also used directly. He is the author of a large book of more than six hundred pages in Tibetan that compiles *materia medica* and the formulas in which they are represented from classical Sowa Rigpa texts (Tsering Norbu 2005). He found that boiling in water was not described as a detoxification method for *menchen*.²²

Maybe some experienced doctors [in the past] did it like that. But [another form of] detoxification is mentioned. First you have to make ash, [still hot with] fire in the wood. A little bit of fire. After all the wood is burned, [take] a little bit of warm ash. Put powder of *Aconitum* in a pan, then put it in the ash, and cover [the pan] with paper. After a few minutes, the paper becomes wet. The powder color becomes a little yellow, then ... Not detoxified, not like mercury. Mercury has many processes. [But its] energy has become less, that is the idea. (Interview, July 21, 2015)

Interestingly, Dr. Tsering Norbu specifies that, in the case of aconite, the aim is to decrease its 'energy' (*nus pa*). The



Figure 1. The main steps of *rilbu* (*ril bu*, rolled pill) production at Men-Tsee-Khang's pharmacy, left to right and top to bottom. Pre-processing (in this case, manual sorting of *spang spos*), weighing and dosing of raw materials (here of Tikta 8), grinding, mixing, pill rolling, size checking, drying (of Agar 35), and counting, labeling and packaging (Garuda 5).

(van der Valk, 2014)

heat-based potency-modulating method he describes is laid out in the text *Lag len gces bsdu* by Deumar Tendzin Püntsok (De'u dmar Bstan 'dzin phun tshogs, born 1672, Deumar Tendzin Püntsok 1970: 532-549). Tsering Norbu said he has seen this being done at Lhasa Mentsikhang when he was there in the eighties. Different processing methods are currently used in different contexts, but Tibetan doctors in Dharamsala are confident that there, too, the potency of *bongnak* has been attenuated.²³ Pre-processing, detoxification and compounding techniques are either described superficially or not at all, even in major pharmacy or *menjor* (*sman sbyor*) textbooks (Blaikie 2014: 267-270; Cardi 2005-2006: 99, 105). These experientially-based 'pith instructions' (*man ngag*) are orally transmitted and often considered secret, thus inviting high diversity in practice.

Eventually, I discussed the issue with Dr. Penpa Tsering (Interview, July 18, 2015). He is a very experienced and well-known *menjor* expert who resigned from Men-Tsee-Khang to lead his own production named Kundey Khangsar Tibetan Herbal Products, not far from Dharamsala. Although he agrees with the other, more junior Dr. Penpa currently working in the pharmacy that people were stronger in ancient times, he claims it is not possible to identify the variety of different *bongnak* subtypes on the market reliably as Tsultrim Kalsang does. In line with Tsering Norbu, Penpa Tsering maintains that *menchen* does not need to be detoxified as is done in Ayurveda: *arura*, Garuda 5's principal ingredient, controls its toxicity. There is considerable variation in potency due to harvesting time and location, amongst other factors, and this should be assessed by tasting and testing the effect of the Garuda formula after compounding.

VDV: You say you have to know how toxic *menchen* is to know the dose. How do you know how toxic it is? Can you taste it or see it?

PT: No, no. [Only] after making the pills. We have to see by experience how much we have to put. After making the pills, we are trying them. If it is okay [then we can use them], if the toxicity is high then we don't have to use that one. We can do like this also: we mix [the pills] again, compounding, putting less or not putting [extra] *menchen*. Putting other things will lessen the toxicity.

Making and taking Garuda 5 is clearly not without danger to pharmacists and patients. If adverse effects occur and are reported, one is advised to have some Tibetan noodle soup (*thug pa*) or yoghurt, and to rest. The dosage may also be reduced, for instance from three or four to only one or two small black pills. In the practical setting of *menjor*, safe

and potent medicines are not a given, but are the contingent result of a series of carefully executed procedures. Experience, skill, and sensory perception are *sine qua non* for the modulation of the poison-medicine spectrum. As ethnopharmacological studies have shown, organoleptic assessment is a key criterion for the classification, selection and medicinal use of plants that is both individually and culturally specific, reflecting differing notions of illness and efficacy (Pieroni and Torry 2007; Shepard 2004). Nonetheless, as put forward by Etkin (1992: 103), indigenous healers in many places—and biomedical physicians to some extent—are known to apply 'side effects' as dosage markers, which is also the case for Garuda 5.²⁵ As Cardi (2005-2006) details, Tibetan practitioners regard single-ingredient herbal medicines as inferior in efficacy and potentially more harmful compared to multi-compound formulas where the therapeutic actions of the ingredients are coordinated, negative effects balanced out, and where the composition may be adjusted to individual patients. Throughout, the aim is to obtain a potent medicine that is also 'smooth' (*'jam*). From a Tibetan medical viewpoint, then, unwanted effects are likely to arise if the medicines have been poorly manufactured and/or unsuitably prescribed.

Prescribing Garuda 5 in the Clinic

An energetic seventy-year-old Indian woman from the nearby village of Sidhbari entered the consultation room while her husband waited outside. Dressed youthfully and wearing strong perfume, she sat down and put her iPhone on the office table. She immediately started summing up her ailments in English interspersed with Hindi, describing her serious skin disorder that had spread over her arms and legs at the top of the list:

It is not psoriasis or scabies. An allopathic doctor said it was allergic eczema, but I didn't want the cortisone. The skin peels off, but it keeps coming back. I take thyroxin every day. I took Tibetan medicine for years for bronchial asthma, it got better but was not completely cured.

(Observed consultation, May 6, 2014)

While taking the pulse, Dr. Sonam Wangmo noted that internal fever was present; it was a very hot pulse. The lady also had a *mkhris pa* ('bile') constitution. Sonam Wangmo advised to avoid lemon and sour yoghurt. The patient replied she was a strict lacto-vegetarian. Her sleep was bad, and she wakes up every half hour. The *amchi* summoned another senior female practitioner from the adjacent room to discuss the case. Together they concluded that there was indeed a chronic 'hidden fever'

(*gab tshad*) and that *chuser* ('yellow fluid') was disturbed. The doctor explained to the patient that because of her age, less strong medicines were advisable. The medicines should be taken with hot water rather soon after eating. After the patient had left, Dr. Wangmo explained to me that taking high doses of strong medicine could result in low blood pressure, which may lead to fainting. These reactions are not considered side effects, but are instead interpreted as a consequence of prescribing medicines inappropriate for the patient's current state. Thangchen 25 was prescribed in the morning time to purify the blood and separate the hidden fever from it. After lunch, Ngülchu 18 was prescribed to reduce *chuser* and to ward off afflictions by *nāga* (*klu*). Skin problems are commonly related to these *nāga* serpent spirits (although this was not mentioned to the patient), and here the processed mercury sulfide complex is particularly effective. Two combinations to be taken on alternate days were prescribed for the evening: Gurgum 13 plus Khyung Nga Nila²⁶ (for the liver and impure blood and to fight lymph-related infection, respectively) and Pökar 10 (against itching skin) plus Khyung Nga Nila. To smoothen the skin, Tripa lotion was prescribed.

I asked a number of *amchi* what Garuda 5 is commonly used for, and the keywords I got back were 'infection,' 'inflammation,' and 'pain'.²⁷ Typical examples I was given were to keep one pill in your mouth in case of painful toothache, or to take a few against knee pain or acute headache caused by *srin* (a technical term frequently applied to parasites and pathogenic micro-organisms). Several *amchi*, as well as patients, referred to Garuda 5 as "a sort of antibiotic" with the formula's fast-acting antibacterial effects in mind. During my time observing consultations with Dr. Sonam Wangmo at Gangkyi clinic (April-May 2014), I witnessed more than a dozen cases where Garuda 5 was prescribed. *Amchi*-la confirmed that Tibetan patients will specifically ask for it when needed. Tibetan medicines, however, are not usually prescribed as a single formula—already a complex compound of processed natural ingredients—but as a combination of formulas to be taken before breakfast, after lunch and after dinner. On top of that, Garuda 5 is one of few formulas that is compounded and prescribed together with others, to be taken at the same time of day (as in the consultation summarized above): a third-order combination or compounding of compounds. Other examples of these 'supercompounds' include Pökhyung (Pökar 10 + Garuda 5), Pangkhyung (Pangyen 15 + Garuda 5), Samkhyung (Samnor + Garuda 5), and Nyikhyung (Sendru Nyikyil + Garuda 5), all of which are widely known and used (cf. Penpa Tsering and Choelothar 2013). According to Sonam Wangmo, who has more than fifteen years of clinical experience, this complex ecology of substances

is required to treat contemporary problems and diseases that have become more complicated.²⁸ In contrast to nowadays, Dr. Wangmo added, senior doctors in ancient times were very sure about their diagnosis and preferred to wait and see the effect of single formulas, which they may have prescribed three times a day for seven days. Once again, the frailty of human bodies (and knowledge) is mobilized to explain for changes in Tibetan medical practice that seem to deviate from the classical 'golden age' of the past. Such statements are influenced by a larger Tibetan Buddhist and Hindu trope of degenerative times (Skt. *kaliyuga*), which has shaped Sowa Rigpa's entangled intellectual history and innovation for centuries (Gyatso 2015: 7-8, 137-138). In line with Gyatso, prescribing Garuda 5 necessitates an empirical, medical mentality that gives ample attention to "the local specificities of the natural world" (ibid: 8); that is, to its local ecology of potency.

Conclusion

On camphor we have a very impressive saying in Tibet: it is the king of the medicine, especially [due to its] very cold and rough nature. But if you don't prepare it or compound it in a good way, it is very, very harmful. It should not be like poison, but very harmful. Because its rough nature increases *rlung* (wind). Now, at present in Tibet, we really don't use that much camphor.²⁹ [...] The saying goes that this king [of medicine] will be harmful more than healing, kill more people than help people. [...] *Tsenduk*, [black] aconite, is the king of poison. This will be helpful more than harmful. These two are compared. (Dr. Tenzin Thaye, Deputy Head of Men-Tsee-Khang's Pharmaceutical Department, Interview, April 30, 2014)

The above quote, related to me by Dr. Tenzin Thaye, compares the effects of camphor and aconite—the respective kings of medicine and poison.³⁰ It warns us that what is beneficial and what is harmful is not straightforward in Sowa Rigpa, and may even turn out to be opposite to our expectations. So, was Paracelsus wrong? In the case of Tibetan medical compounding and prescription practices, what counts is the potency of mixtures and not the effect of a single entity (see Schwabl and van der Valk 2019). It is the processing of and interactions between ingredients, and attunement to lived patient bodies, which ensures a 'smooth' medicine. *A priori* distinctions between therapeutic and toxic effects are mere conjecture. In this dynamic ecology of potency, the dose remains important but is not the ultimate criterion. These interwoven biological and cultural dimensions of efficacy and

toxicity have long been recognized and encapsulated in non-dichotomous, ambiguous potency concepts such as the Greek *pharmakon* (Rinella 2010), the Amazonian *rao* (Shepard 2004) and the Zulu term *muthi* (Ashforth 2005). Although Ayurveda and Chinese medicine have separate words for ‘medicine’ and ‘poison’ like Sowa Rigpa, it is now clear that this need not imply that their intentions and outcomes can and should be easily distinguishable.³¹ To come to this conclusion, I built on Craig’s (2012) *Social Ecologies* to unpack medicine/poison and ‘main’/‘side’ effects as the contingent result of dynamic plant-practitioner-patient body interactions and practical modulations of potency in the pharmacy and the clinic. These local ecologies of potency are sensorial, at once social and chemical, and involve multiple human and nonhuman actors and labor.

Although biomedical definitions are spreading and hybridizing with Asian medicines, safety, efficacy and toxicity remain situational, multi-dimensional concepts. The more pressing question then becomes how negative effects might be documented and averted by *menjor* experts and in the clinic, where proper diagnosis of the patient plays a central role in determining which medicines have suitable activity profiles. The formulation of *rilbu* is a step-wise potency modulation process that removes, transforms and balances out or ‘smoothes’ the useless, coarse and poisonous elements of *materia medica*. In the daily workings of the pharmacy, however, practical and experience-based decisions have to be taken on the exact details of this process. Which types of aconite can be used as ‘the great medicine’ (*menchen*), what amount, and should the roots be pre-boiled or not? Different opinions and methods abound, but all *amchi* agree that extreme caution should be exercised. The *menjor* experts I interviewed further agreed that the actual amount of aconite to be added depends on the strength of the raw material and on the strength of patient bodies nowadays, resulting in a considerably lower dose than what is recorded in historical and contemporary references. The real risk then lies in the uncritical adoption of textual formulas by inexperienced producers, or not attending to the local ecologies of potency manifested in the interaction between Tibetan medicinal plants, skilled producers-with-machines, and the local biologies of patient bodies. In the clinic, practitioners diagnose the patient’s constitution and imbalances of the elements and prescribe medicines as part of a larger treatment regimen that further considers intricate relationships with food and environment.

Garuda 5 fulfills its medicinal role within this clinical encounter as a compound among compounds, which

I described as another level of the balancing act that maximizes its healing potential. If we approach the activity of potent substances as a multidimensional spectrum constituted by its contingent socio-material surroundings, there is no longer a need for simplistic dose dependencies or rigid poison/medicine oppositions. This is the case, at least, for the anthropologist struggling to overcome the hegemony of structuralist binary opposites. The aim here is not to falsify or eradicate the conceptual poison/medicine divide, which continues to play a critical role in the minds of practitioners. I did not focus on how Sowa Rigpa texts theoretically cross the divide, but instead showed how this barrier is breached—not without risk—in practice. In this move, I am inspired by Janet Gyatso’s (2015) historical analysis of scholar-physicians such as Zurkharwa Lodrö Gyelpo (Zur mkhar ba blo gros rgyal po, 1509–1579), who forged a more pragmatic and empirical ‘medical mentality’ in productive tension with classical Buddhist scholasticism and soteriology.

Understanding categories to be but provisional heuristics that stand for a far more complex situation on the ground, medical thinkers came to recognize that opposing taxonomical pairs do not reference polar opposites in reality. Rather, they are better understood as markers along axes that can often be asymmetrical and that in any case admit a wide array of permutations. (Gyatso 2015: 400)

Do Tibetan medicines have side effects? From a biomedical perspective, they might. But this is not the point. Building on Etkin (1992), ‘side effects’ are an artifact of a reductionist gaze fixated on often only one ‘active substance’ as ‘magic bullet’ targeting a molecular receptor, and the concomitant assumption that this mechanism automatically leads to a distinguishable ‘primary effect.’ This view is hardly applicable to Sowa Rigpa, with its flexibly interpreted multi-compound formulas based on complex and processed natural ingredients that are indicated for a spectrum of culturally mediated symptoms and disorders (see Schwabl and van der Valk 2019). In this sense and in this sense only, Tibetan medicines indeed do not have ‘side effects.’ This also places general *amchi* discourse on drug safety in a different light. I maintain that the material potency of Tibetan medicines is more coherently explained by starting with observations of actualized local medical practice. Promising developments in systems biology approaches notwithstanding, it is furthermore vital that Sowa Rigpa’s nuanced conceptualizations of potency, toxicity, and compounding take center stage in this endeavor (see Tidwell and Nettles 2019).

Many Tibetan doctors continue to claim that Sowa Rigpa formulas are side-effect free as long as they are manufactured authentically and prescribed correctly. Given the data I have collected, it is impossible to maintain that Tibetan pills do not have the potential to harm the patient. It could be argued that it is epistemologically unfitting to expect the Men-Tsee-Khang to start taking stock of ‘adverse reactions’ the way science-driven toxicologists would. This would imply that Sowa Rigpa needs to be ‘improved’ or ‘modernized’ to be safe, which simultaneously installs biomedically biased institutions as the ultimate arbiters of safety, quality, and efficacy. Or is this perhaps the advent of a uniquely Tibetan alternative modernity that redefines both ‘tradition’ and ‘modern science’ as mass-produced Tibetan medicines enter capitalist markets (Kloos 2015)? Such a trajectory has been followed for more than a decade in the case of Ayurvedic, Unani, and Siddha drugs. In 2008, a national pharmacovigilance system was launched under the aegis of the Department of AYUSH and evaluated in successive committee meetings, following World Health Organization guidelines (Chaudhary et al. 2010; Thatte and Bhalerao 2008). The ‘open-minded scientists’ (Ganguly 2012) part of this program maintain that “[a]lthough a technical term equivalent to ‘pharmacovigilance’ does not feature in Ayurvedic texts, the spirit of pharmacovigilance is vibrant throughout Ayurveda’s classical literature” (Chaudhary et al. 2010: 252). Notwithstanding possible benefits of such an approach for practitioners and patients, I argue that the very opposition between risk and benefit—as found in the biomedical assessment of risk/benefit ratios of pharmaceuticals³²—is misleading when considering the dynamics of and correlation between toxic and therapeutic effects in Sowa Rigpa practice. While *amchi* may think in terms of *duk* and *men*, they also closely attend to and modulate the local expression of the poison-medicine spectrum in the pharmacy as well as in the clinic, where they rely on individual constitutional assessment. Finally, we should take into account that the very definition of risk and choosing between risky options is a politically and economically infused, value-laden selection process that is contingent on subjective, individual comparisons with daily-life dangers. Perhaps the risk is higher in some cases, but most likely so is the benefit. Researchers should not presume the universality of biomedical safety and toxicity notions based on ethnocentric and paternalistic assumptions. In this light, the effects of the on-going regulation and standardization of Sowa Rigpa and other healing traditions on the potency of their medicines is a topic worthy of further investigation.

Jan M. A. van der Valk (PhD, Anthropology, University of Kent, 2017) is an anthropologist and ethnobotanist. He is currently a postdoctoral researcher in the multidisciplinary project ‘Potent Substances in Sowa Rigpa and Buddhist Ritual’ (2018-2021) at University of Vienna’s Department of South Asian, Tibetan and Buddhist Studies. Van der Valk’s doctoral thesis traces the techno-scientific transformations of Tibetan medicines from plant to pill, forging links between two key manufacturers, in India and Switzerland respectively. He is a student of Dr. Pasang Yonten Arya since 2012, and opened the first Tibetan medical (herbal) practice in Belgium (<www.deblauwepapaver.be>).

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Endnotes

1. The Garuda (Tib. *khyung*) is a popular mythical creature in both Hindu and Buddhist traditions which later merged with the Bonpo ‘sky-soarer’ in Tibet. This king of birds has the torso of a man and holds a *nāga* (serpent spirit) king between his hands and sharp beak. In Tibetan iconography, the Garuda assumes multiple roles and forms (Beer 2003: 74-77; see also Karmay 1993). The Garuda 5 origin myth introduced here is also rooted in references from the *Gyüzhi*.
2. It appears that *Aconitum* spp. equally play a role in the Indian mythical origins of poison. Three alternative accounts of its origin are depicted and summarized in Dési Sangyé Gyatso’s monumental seventeenth-century set of Tibetan medical paintings (see Parfionovitch, Dorje, and Meyer 1992: 117-118). In the most prominent account various types of aconite are said to be derived from the shattered body of Poison Incarnate (*Hālahāla*), who was vanquished by the Hindu gods in their quest for the nectar of immortality.
3. Tibetan medical texts distinguish up to four main color types of *bong nga*: white (*dkar*), red (*dmар*), yellow (*ser*), and black (*nag*). Only the black type (*bong nag*) is said to be “poison as well as medicine” (Dawa 1999: 50, quoting *Rin chen ‘khrungs dpe*), and it is subdivided further into different forms with varying potency (cf. Parfionovitch et al. 1992: 77, Plate 31). The remaining three types neutralize different poisons; *bong dmar* and *bong ser* in fact alleviate poisoning by *bong nag* (Men-Tsee-Khang 2011: 205).

4. Refer to Kloos (2008, 2015, 2017) for the history and the tightly interlinked cultural aspirations and politics of the Men-Tsee-Khang in the context of preserving ‘Tibetan medicine in exile.’ Men-Tsee-Khang positions itself as a guardian of tradition and is considered by many to be the prime institution in exile involved in the education and production of Tibetan medicine.
5. “*Alle Dinge sind Gift und nichts ist ohne Gift, allein die Dosis macht es, dass ein Ding kein Gift ist*” (Paracelsus (1538) 1965-1968: 510). The universal validity of this tenet is also increasingly being challenged by toxicologists, particularly in light of the chronic toxicity of endocrine-disrupting contaminants, which turns out to be difficult to predict based on dose-response curves (Myers et al. 2009). More recent biomedical research points out that timing is equally a crucial factor in the metabolism and detoxification of drugs (Gachon and Firsov 2011).
6. Here, ‘Paracelsian toxicology’ refers to the modern strand of basic toxicological science built on dosage as the foundational paradigm. Paracelsus’ own theories of poison are more complex, varied and idiosyncratic (Hedesan 2018). Grounded in Aristotelian and Christian hierarchical views of nature as well as Hermetic-alchemical cosmology, some of his ideas do resonate with Sowa Rigpa. Notable examples include the reliance on intricate alchemical procedures to transform poison into medicine, and a focus on the stomach (the ‘inner alchemist’) and proper digestion in the elimination of harmful food essences (conceived as a type of poison).
7. ‘Tibetan medicine’ and its cognates are by far the most prevalent glosses for Sowa Rigpa (*gso ba rig pa*, ‘the science/knowledge of healing’) outside its Himalayan homelands. I nonetheless prefer the latter, as it is less ethnocentric and nationalist, and points to the textually grounded yet heterogeneous nature of this medical tradition (Adams et al. 2011; Hsu 2013; Craig and Gerke 2016). The spelling ‘Sowa Rigpa’ (not *Sowa Rikpa*) is maintained, reflecting common usage.
8. Chan (2009) reports that the estimated lethal dose for humans is about one gram of fresh plant material or 5 ml of alcoholic tincture, corresponding to 2 mg of aconitine and considering that the alkaloid content of the different plant parts varies significantly (roots and tubers > flowers > leaves and stems). The most prevalent Chinese medicinal species are *Aconitum Carmichaelii* Debeaux (*fu zi* 附子, lateral roots; *chuan wu* 川乌, root tuber) and *A. kusnezoffii* Rchb. (*cao wu* 草乌, root tuber).
9. As Craig (2012: 6) notes, the most common Tibetan translation for efficacy is *phan nus*. This is a contraction of the words for benefit (*phan thog*) and potency (*nus pa*), effectively coupling the useful with the powerful.
10. Dr. Tsultim Gyatso, a Men-Tsee-Khang trained monk-physician based in Choglamsar (Ladakh), presented Garuda 5 as an example of a compound exhibiting ‘the potency of aspirational prayers’ (*smon lam gyi nus pa*). He related this to the Garuda legend mentioned in the introduction (Interview, September 18, 2018). This is, however, just one small example of a vast and understudied subject.
11. See Pordié (2014, 2015) for parallel attempts from the perspective of industrially (re-)engineered Ayurvedic proprietary medicines.
12. ICTAM stands for International Conference of Traditional Asian Medicines. It is the main event organised by IASTAM, the International Association for the Study of Traditional Asian Medicine.
13. The Central Council for Indian Medicine has recently officially recognized the medical qualifications of Sowa Rigpa practitioners who graduated from Men-Tsee-Khang, as well as three other institutions in India (Indian Medicine Central Council Act 1970, amended on April 5, 2018). This implies that registered graduates can legally adopt the title of ‘Dr.’, which is also preferred by Men-Tsee-Khang *amchi* themselves.
14. In the clinical interactions I observed between *amchi* and Tibetan patients at Men-Tsee-Khang’s Gangkyi clinic, Tibetan medicines were not rarely employed to abate the side effects perceived by patients undergoing strong and prolonged biomedical treatments (e.g., for tuberculosis, hepatitis, and HIV), to support and protect weakened organs. A similar usage of *ma ni ril bu* was noted by Kloos (2010: 114).
15. Several experimental chemical analyses have confirmed that these traditional processing methods—also applied in Chinese medicine and Ayurveda—are effective at the extraction of diester diterpene alkaloids and their conversion into less toxic monoesters (Jaiswal et al. 2013; Nyirimigabo et al. 2015; Singhuber et al. 2009).
16. The components (without amounts) and their correspondence with Garuda body parts, their curative properties and potential supplementary ingredients (*kha tshar*) of Garuda 5 are the first to be listed in the pill chapter of the *Subsequent Tantra* (cf. Men-Tsee-Khang 2011b: 90-91). Here, *bi kha nag po* is the heart of the Garuda.
17. Substitutions across botanical kinds and kingdoms are not uncommon in Sowa Rigpa (Czaja 2017; Gerke 2016; Sabernig 2011), and are not easy to explain fully based on the pharmacological principles of taste and potency.
18. Besides the total percentage of aconite in each formula, I also calculated the ratio between the weights of aconite and myrobalan. This second means of comparison between formulas makes pharmacological sense. *A ru ra* is

used in Tibetan medicines as a balancing and detoxifying agent, it thus neutralises potentially negative effects of the other ingredients. Phytochemically, chebulic myrobalan (*Terminalia chebula* Retz.) is known for its high tannin content. Tannins bind and precipitate proteinaceous molecules including alkaloids, which are considered to be aconite's major active compounds.

19. This does not reflect all necessary (pre-)processing and detoxification procedures, neither does it include the addition of a black 'iron essence' (*lcags rtsi*) pill coating, and ritually empowered substances. The amounts of several Men-Tsee-Khang ingredients were left unspecified to respect their intellectual property rights.

20. Men-Tsee-Khang's physico-chemical and microbial quality assessment lab detects the presence/absence of alkaloids in each batch of raw materials and products as part of their routine checks, but no standardization of alkaloid content is carried out as this would require quantification (and more advanced analytical machinery).

21. 'Detoxification' (*dug 'don*) and 'taming' (*'dul ba*) are only two amongst several terms and translations used to denote the processing (Skt. *śodhana*) of metallic mercury. Alternatives are 'cooking,' 'purifying,' and 'perfecting' (see Gerke 2013b: 5).

22. Dash (1994, 11-12) warns the reader that *tsenduk* (which he considers to be a type of the Ayurvedic *vatsnābha*) is exceedingly poisonous and that it should be detoxified before use, advising prolonged soaking in cow urine until the purified aconite does not produce tingling sensations or numbness on the tongue. Khyenrap Norbu (2007: 151) on the other hand mentions soaking it in eight-year-old child's urine for three days.

23. Dr. Cairang Nangjia, a Tibetan scholar and practitioner with an independent clinic (previously affiliated to Qinghai University's Tibetan Medical College), informed me that at Lhasa Mentsikhang *bongnak* is currently kept for a day in alcohol to which a bit of musk (*gla rtsi*) is added before compounding. At Qinghai's Provincial Tibetan Hospital *bongnak* is boiled in water beforehand, whereas in some private clinics it is added in unprocessed form. Cairang Nangjia explained that private doctors who make their own medicine know the dose and strength of the *bongnak* they put. In larger institutions this is not the case, hence the need to reduce (and standardize) its potency as a safety precaution (Personal Communication, December 6, 2017).

24. Blaikie (2014: 286) reports that Garuda 5 is also pervasively prescribed in Ladakh, where the detoxification of *bongnak* includes "several hours of constant grinding by hand while mixing in precise proportions of *a ru ra* (*Terminalia chebula*), which neutralizes its poison."

25. In Chinese medicine, boiled aconite roots are also reported to be tested traditionally through taste: the absence of tingling and numbing sensations from trying the decoction implies they are ready for use (Nyirimigabo et al. 2015: 11).

26. Khyung Nga Nila pills have the same size and color as the standard Garuda 5 formula, to which some extra components are added to make it more effective against sores and skin problems (Dr. Penpa Tsering, Interview, July 18, 2015). Dr. Pasang Yonten Arya learned about this recipe from the famed Dr. Tenzin Chödrak, and remembered that detoxified lapis lazuli (*mu men*, hence '*nila*' which is Sanskrit for 'blue') and refined mercury are added (Personal Communication, August 6, 2016). A third Garuda formula produced at Men-Tsee-Khang, with a similar appearance, is Khyung Nga Chuder Chen. Its indications include bone aches, muscular spasm, and shooting pains in the limbs.

27. Garuda 5's beneficial qualities (*phan yon*) may be summarized as follows (translated from Penpa Tsering and Choelothar 2013: 7, which is memorized by fourth-year medical students at Men-Tsee-Khang): "treats severe stomach pain, inflammation of the head (including ears, nose, and gums), pain due to intestinal parasites (*srin*), tonsillitis, itching and cracking skin, and is particularly excellent against leprosy and 'yellow fluid' (*chu ser*) disorders. Its potency is neutral, and the mode of administration mentioned here is four pills taken together with boiled water." Interestingly, Garuda 5 is listed as a pill that cures cold disorders in the *Subsequent Tantra* (Men-Tsee-Khang 2011b: 91), whereas pain and inflammation are usually associated with excess heat.

28. Dr. Penpa Tsering equally felt that Garuda 5 is prescribed much more by Tibetan doctors nowadays, as bacterial and viral diseases have become more prevalent (Interview, July 18, 2015). See Prost (2008: 43-53) for a list and discussion of diseases and disorders prevalent in the exile community and their purported causes, and for the link with social inequalities between different generations of (migration of) Tibetans (ibid: 54-73).

29. Similarly, Dr. Choelothar mentioned that *ga bur* is often taken out of formulations as it is dangerous to use for patients suffering from *ngyan nad*; infectious epidemics such as Hepatitis B and Tuberculosis, which are locally prevalent in Dharamsala (Barbara Gerke, Personal Communication, June 2, 2016).

30. *A ru ra*, chebulic myrobalan, is generally referred to as the king of medicine (*smān gyi rgyal po*). The superior type of *a ru*, held in the right hand of the Medicine Buddha, is a panacea for all bodily ailments. Mercury is equally said to be the king of poison. Camphor is the king of medicines in the context of hot illness-relieving powders (Chapter 4 of the *Subsequent Tantra*).

31. For interpretations beyond the conventional poison/medicine dichotomy of historical Chinese medical texts, refer to the foundational work by Paul Unschuld (1975) and Obringer's (1997) analysis and comparison with the Greek term *pharmakon*.

32. See Keller (1999: 44) and Wiesner (2014) for the application of the risk/benefit ratio to herbs in the European context, and van der Valk (2017: 217-228) for how this plays out for the reformulated Garuda 5 produced by the Swiss pharmaceutical company PADMA.

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