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## **From social lives to playing fields for “the Chinese antimalarial”: Artemisinin monotherapies, Artemisinin Combination Therapy and the herbal *Artemisia annua* juice**

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With the tenth anniversary of the landmark publication *Social Lives of Medicines* (Whyte, van der Geest & Hardon 2003), new avenues arise for exploring the ‘thinginess of things’ (Latour 2000). This paper, based on fieldwork between 2001 and 2008, discusses how “the Chinese antimalarial” as an over-the-counter medicine in petty enterprise clinics of East Africa became a biotechnological bulk item for Chinese import-export traders in a highly subsidised antimalarial health field after the WHO recommendations of 2005 and 2006. These observations are put in perspective with reflections on a practical engagement with the plant itself, i.e. *Artemisia annua* L. Rather than taking an ‘ego-centred’ and transactionalist viewpoint that follows the drug through a string of ‘regimes of value’ (Appadurai 1986), this paper underlines that a thing’s thinginess is ontologically constitutive of its playing fields.

Keywords: *Artemisia annua*, Artemisinin, Chinese medicine, malaria, East Africa, pharmaceutical anthropology

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### *Introduction*

A social life approach to what people in East Africa called “the Chinese antimalarial” would investigate how the values surrounding this thing changed in the chain of transactions from the locus of its production in the plantations and the pharmaceutical industries of the People’s Republic of China (PRC) to its distribution in urban East Africa, and its consumption in, usually, domestic settings. By framing their anthropological study of pharmaceuticals in respect of Appadurai’s (1986) *The Social Life of Things*, Whyte, van der Geest and Hardon (2003) diverted the researcher’s gaze away from the clinical encounter to a string of transactions into which pharmaceuticals, health personnel and patients become entangled. This allowed them to make an ethnographically nuanced and rich commentary on widely discussed issues ranging from peoples’ choice of treatment to their evaluation of its

effectiveness.

This paper endorses the argument of their landmark publication in so far as it focuses on the thing, namely what people in East Africa called “the Chinese antimalarial”. However, rather than researching the different values of this thing in its different life stages on its journey from China to Africa, this paper foregrounds the importance of playing fields for things to come into existence or, as Mol (2002) would put it, ontologically, for them to be “enacted”. The paper starts with highlighting the multiplicity of the thinginess of “the Chinese antimalarial” between 2001-08, and how its thinginess changed after the publicising of the World Health Organisation guidelines of 2005 and 2006. The second part of the paper will draw attention to the thinginess of a herbal antimalarial juice and explain the non-existence of this juice in contemporary health fields through insights gained in the first part of the paper.

### *Method*

Ethnographic method makes the argument. The argument that the thinginess of the locally perceived “Chinese antimalarial” changed together with the health field into which it was implicated could only be made because fieldwork was drawn out over seven years. It was undertaken in about ten one-month-long field trips between 2001-2008 to Tanzania, Kenya and Uganda. Participant observation in Chinese medical clinics was combined with semi-structured interviewing of the doctors who ran them, their local support staff and their patients. After about the fourth visit, I made first attempts to systematically record and discuss with practitioners the medications on offer. We spoke in English or Chinese, and with patients I sometimes had to take recourse to my smattering of Swahili. In general I depended on public transport or hired a local taxi driver, who over weeks/years turned into a research assistant. If the research involved long treks on foot through informal settlements, I was generally in company of a local male youth who had materialised on the spot. Accommodation was mostly in mid-range to down-market “hotels”, and occasionally in the homes of health personnel, local or Chinese. Some practitioners I visited more than five times over these seven years, some I stayed with repeatedly for several weeks. Some of us developed a somewhat cordial familiarity, almost a friendship, but no one became a buddy.

To establish the thinginess of the thing in the second part of the paper, and to speculate about the characteristics of the health field in which such thinginess might be enacted, other research skills were necessary. First, I depended on collaborations with textual scholars, notably Dr. Frédéric Obringer (CNRS, Paris) and Prof. Wu Zhongping 吳中平 (Shanghai TCM University). I completed the translation of all *materia medica* texts that I could locate in modern editions from 168 BCE up to CE 1596 by 2002 (published in Hsu 2010)<sup>1</sup> and started with the translation of all recipes recorded in the genre of recipe books in printed texts identified through computer searches between CE 340-1911 in 2011 (Wu and Hsu forthcoming). Based on these, I instigated “ethno-archaeological” research (explained below), which involved collaborations with gardeners and botanists, a pharmacognocist and a malariologist, and friends from different walks of life. Importantly, it also required the anthropologist to make her hands dirty, to become thingy as an ethnographer, so to speak, and work with and through the physicality of her own body.

### ***Part I: “The Chinese antimalarial” in the East African health fields, 2001-2008***

There are three book-length studies on what in East Africa was called “the Chinese antimalarial”, a term in the singular that, as we will see, referred to a plurality of different drugs. The playing fields that these books report on involve international organisations, such as the WHO and World Bank, multinational conglomerates, like Novartis, governments of, for instance, the PRC and USA, and the research programmes and institutions they financed. All three monographs are ambitious in remit and cut across the natural sciences, health policy, world history, clinical medicine and, not least, Chinese medical theory and practice not entirely without bias. Of the three only one is an academic study by a social/medical anthropologist (Meier zu Biesen 2013) who navigates the complex situation admirably.<sup>2</sup> This paper puts the triangle of entrepreneurial practitioners, enterprising patients and medicinal preparations centre stage and contributes to the ongoing discussions (1) with limited

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<sup>1</sup> Research on Ming (1279-1644) and Qing (1644-1911) texts would have required archival research.

<sup>2</sup> The other two books were written in the orbit of prominent players: Professor Li Guoqiao 李國橋 at the Guangzhou TCM University (Zhang [2006] 2013) and USAID (Dalrymple 2012), while this one is based on a doctoral thesis.

but robust first-hand observations and (2) by drawing attention to an aspect of the thinginess of this thing that none of the three monographs mentions.

### *Artemisinin mono-therapy brands as OTCs*

Research on Chinese medicine practices was throughout my fieldwork mildly charged with tension. In the early 2000s local journalists had been vocal about the “mushrooming” of these clinics, the Ministry of Health was re-structuring itself and formulating legislation about T/CAM (traditional and complementary and alternative medicine) and the background “noise” was that of the USA first invading Afghanistan (on 7.10.2001) and then Iraq (on 19.3.2003). In this situation the local clientele of the practitioners was more welcoming to the anthropologist than were the professionals. During the first two spells of fieldwork in the ‘rainy season’ in March and the ‘small rainy season’ in December, more than half of the OTC transactions in Chinese medical clinics were for the ‘Chinese antimalarial’ and most of the thirty patients I then interviewed in Dar es Salaam considered “the Chinese antimalarial” a *dawa ya Kichina*, where *dawa* referred both to the medicine (*yi* 醫) and the medication (*yao* 藥). Thus, *dawa ya Kichina* signified both Traditional Chinese Medicine (*zhongyi* 中醫) and the biomedical practice (*xiyi* 西醫) by physicians of Chinese origin (e.g. those of the Chinese biomedical expert teams, *yiliaodui* 醫療隊). It could also designate just the medications: the Chinese medical “natural herbs” (*zhongyao* 中藥) or pharmaceuticals produced in China. Among the former belonged Chinese medical formula medicines (*zhongchengyao* 中成藥) and folk herbal medicines (*caoyao* 草藥), among the latter biomedical pharmaceuticals (*xiyao* 西藥), formulas of the integrated Chinese and Western medicine (*zhongxiyi jiehe* 中西醫結合) and ‘the Chinese antimalarial’, which no doubt shaped some local peoples’ perception that “Chinese medicine has rapid effects” (Hsu 2002).

However, “the Chinese antimalarial” was by Western medical standards a “Western pharmaceutical”. Unlike traditional poly-pharmacy, it contained one chemical substance only which Professor Tu Youyou 屠呦呦 and her team at the TCM Academy in Beijing had isolated out of the plant extract, purified and almost to its entirety identified in chemical structure in the 1970s: artemisinin. Nevertheless, a

few lone Chinese medical practitioners contested the boundary so rigidly endorsed by biomedical professionals between “traditional” and “modern” medicines. Some went so far as to claim that “the Chinese antimalarial” was in fact a “traditional” Chinese medical drug, one type among a dozen others of different formula medicines, which had arisen due a specifically Chinese, “alternatively modern” chemistry that in turn gave rise to an “archaeology of assemblages” (Hsu 2009). However, most Chinese vehemently rejected this line of argumentation. It was not only absurd but historically incorrect: the Chinese antimalarial was isolated and developed by modern Chinese scientists in the context of a military task force, 523.

The alternative antimalarial treatments were with SP/Fansidar (sulfadoxine-pyremethamine) and Nivaquine (chloroquine). However, SP was known to be harmful for people living with HIV/AIDS, as local newspaper articles, small posters pasted onto the walls in dispensaries and the casual remark of a health worker suggested. Chloroquine was considered basically ineffective but nevertheless on offer (on this, see also Kamat 2009); traditional healers were allowed to dispense this ineffective medicine as it was thought to cause less harm than good (which arguably is erroneous). Furthermore, in areas where malaria is endemic, those people who survived into adulthood generally experienced re-infections as episodes similar to the flu, marked by head aches and joint aches (e.g. Granado & al. 2011:108), and hence treated them with pain killers. Unlike the expatriates who were interested in taking prophylactic antimalarials - Malarone (atovaquone and proguanil hydrochloride), Lariam (mefloquine) and various brands of doxycycline, a tetracycline antibiotic, the locals took antimalarials only in the case of an acute infection. Given this range of choice, “the Chinese antimalarial” was praised for effecting both: (1) a rapid clearance from fevers and (2) absolutely no side effects. Scientists and professionals are rightly skeptical of laypersons’ perceptions that produce the gossip of the day, but in this case local perceptions have been validated by biomedical research as accurate (e.g. Hien & White 1993, table 1, and Ribeiro & Olliaro 1998).

However, even for government employees with a regular income,<sup>3</sup> “the Chinese antimalarial” was fairly expensive. A Fansidar tablet cost 75 TS, and a

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<sup>3</sup> In 2001 the salary for the lowest grade was ca 50,000 TS/month, ca £50.- 1000 TS was about 1£ in 2001 and 1 US \$ in 2008.

treatment cycle was made up of three of those, while a box of “the Chinese antimalarial” required a five-day treatment cycle and cost 4500 TS. One government clerk on the lowest salary grade, who lived at the very outskirts of the city, explained that he did not take any antimalarials at all as they adversely affected his stomach ulcers. After spending 7000 TS in vain on a co-morbidity that he tried to have treated first in the Chinese medical clinic and then for double the price in the Aga Khan hospital, he felt he had no longer any money for treating his malarial condition and took Panadol instead. Another government employee, however, who lived in a well-established neighbourhood, claimed that “the Chinese antimalarial” was relatively inexpensive. He explained that he would go to the local dispensary to get a blood test done, as it cost only a few shillings there, and then buy a full treatment course of “the Chinese antimalarial” from the nearby Chinese medical clinic. He was one of the few people who knew that there were different brands and that none was a prophylactic. He said the Chinese doctor had requested him to return for testing the efficacy of the treatment but he refused to do so as it was an extra expense. When asked whether he would take an entire treatment cycle after the fever had abated on the first day, he claimed he did so. He responded to this question as did most of my interviewees. Patients showed compliance also for other Chinese medical treatments, even if they had to take tablets for an entire week. They may of course have said this to please the interviewer, but a variety of other observations (the readiness with which they showed me their package of medication, and what was left in it of tablets, the certainty and velocity with which they told me the prescribed dosage, etc.) suggested that they had indeed been educated by public health personnel how important it was to adhere to medical prescriptions.<sup>4</sup>

As already noted, the thinginess of the things that the one term “the Chinese antimalarial” implied was multiple. In 2001 three main brands were on offer. These included Artesunate, which contained artesunate (dihydroartemisinin hemisuccinate) and was produced by Guilin Pharma; Artemedine<sup>5</sup> which contained artemether (artemisinin with a methyl-group) and was produced by the Kunming Pharmaceutical Corporation; and Cotecsin (or Co-texin) which contained dihydro-artemisinin and was

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<sup>4</sup> Having said this, in 2001, I saw one Chinese medical doctor ostensibly cut a carton of tablets of a five-day treatment cycle in half, and selling the half portion for half the price. She said she did this occasionally for humanitarian reasons.

<sup>5</sup> At the time it did not actually have a brand name and was known by its generic name artemether.

produced by the Beijing COTEC New Technology Corporation; it was particularly valued among expatriates in Kenya. Each package contained 40 mg for the first day and 20 mg for the subsequent four days (the WHO recommended a seven day treatment with precisely these dosages, see Phillips-Howard 2002:320).

Licensed pharmacists sold the Belgian Arinate and the French Artesumax at a price of about 6500 TS in 2002. The Chinese and European brands both used Chinese plant materials, but only the latter produced tablets to GMP standards. In the following years two Tanzanian brands became available, Malather and Thaitanzunate, that both sold for less, ca. 3500 TS. Both contained artemisinin for a treatment course, but the latter only 100 mg instead of 120 mg. In Kenya, by contrast, the Belgian brand was aggressively advertised on TV. Their audiences were not the sufferers who typically are poverty stricken (WHO 2012), but enterprising middle class men. In the mid-2000s, the prize for each year's four most successful Kenyan distributors was a speedy BMW.

Most locals were not aware that “the Chinese antimalarial” could not be used as a prophylactic - but who apart from the foreign tourist or expatriate would take them prophylactically anyway? Locals did however know that it was unusual for an “antimalarial” to have no side effects but they did not understand why. Expatriates occasionally talked chemistry. I got the clearest scientific explanation of the pharmacokinetics of artemisinin from a researcher at NIMR (National Institute for Medical Research) on one of the first days in the field. He had offered to give me a lift back to my hotel when we were caught in a traffic jam that lasted over an hour. “Prophylactic antimalarials interrupt the life cycle of the vector in the liver,” he explained. “In the hepatic schizont stage?”, I asked (vaguely remembering bits of my undergraduate lectures on the four *Plasmodium* species that cause malaria). “Yes”, he said, and continued that the side effects accordingly arose primarily from damage to the liver. Artemisinin and its derivatives, by contrast, worked on the red blood cells in the blood stream infected by the parasites (in the life stage of haploid merozoites). The molecule artemisinin had a highly labile, heat sensitive but highly efficacious peroxide bridge (see also Hien and White 1991, White 2008). It effected, so to speak, an “explosion” of the infected red blood cells. This explained the speed with which it cleared high fevers. However, even though over 99.9% of the parasites causing a bout



of fever were killed by few Artemisinin tablets, it was easy for the remaining 0.1% to proliferate and multiply, and cause a new fever bout. This was called “recrudescence”, he said. Recrudescence itself did not cause resistance to the molecule artemisinin but it heightened the possibility for the parasite to develop resistance to it over time.

“Recrudescence” was evidently a concept that caused concern but even though I repeatedly brought up the theme at conferences in Africa, Europe and East Asia, most scientists were rather vague about it. It was again during a serendipitous off-record moment that the anthropologist was competently informed by an expert expatriate, this time the director of KEMRI (Kenya Medical Research Institute). While conducting fieldwork in Mombasa, I had been invited to spend Christmas 2005 with his family in Kilifi, and as he was seeing me off, we stood by the road for over an hour, waiting for a *matatu* bus.<sup>6</sup> In 2005, the WHO recommendation had been issued for Artemisinin monotherapies as treatment of choice for severe *P. falciparum* malaria, but “recrudescence” (and the heightened risk it posed for the parasite to develop resistance against the purified substance artemisinin) was the main reason they were discouraged in 2006, when the WHO made a firm recommendation for ACT (Artemisinin Combination Therapy) instead.<sup>7</sup> In ACTs artemisinin is combined with a conventional antimalarial synthetic substance that attacks the schizonts in the liver. The addition of this synthetic substance also made it possible to reduce the period of a treatment cycle to three days only. However, it might be precisely due to this chemical change in the thinginess of the thing that anthropologists would now note a change in local peoples’ perception of “the Chinese antimalarial”.

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<sup>6</sup> Uncertainty was rampant. At the time, hardly any articles had reported resistance to Artemisinin *in vivo*, and if, they were controversial. For the current situation in Kilifi, see Ndungu (2013). The IC50 remains exceedingly low *in vitro*.

<sup>7</sup> The exact wording has been difficult to locate but see WHO (2005:28, under paragraph 3.4.2): “Intramuscular artemether is included in the WHO complementary model list of Essential Drugs as a reserve antimalarial ... Artesunate suppositories have now been produced according to Good Manufacturing Practice. Experience with these products is limited but their use may be appropriate for emergency treatment prior to referral at health facility and community levels in severely ill patients who are unable to swallow oral medication when im artemether (or iv quinine) is not available.” For the change in policy in the following year, see WHO (2006:21, paragraph 7.1): “Artemisinins should not be used as monotherapy, as this will promote resistance to this critically important class of antimalarials. ... In endemic regions, some semi-immune malaria patients could be cured using an incomplete dose or treatment regimens that would be unsatisfactory in patients with no immunity. In the past, this had led to different recommendations for patients considered as semi-immune and those considered as non-immune. This practice is no longer recommended.”



### *Import-export trade with ACTs in bulk*

By winter 2007/08, when I was doing fieldwork in Kampala, the playing fields of “the Chinese antimalarial” had changed. It was no longer sold in Chinese medical clinics that always had had permission to sell ‘traditional’ ‘natural’ ‘herbal’ treatment only. Now it was on offer exclusively in licensed Western medical pharmacies. Coartem (a combination of artemether and lumefantrine) was now the main product on sale. However, the price of a treatment course had tripled (it was the equivalent of 14,000 TS), as to be expected of a brand by a Swiss firm, Novartis. “The Chinese antimalarial” was no longer the wonder drug that miraculously cleared malarial fever bouts within hours and had no side effects. Despite many scientific articles to the contrary, rumours abounded of its severe side effects (e.g. Meier zu Biesen 2013:332-360).

When I explained to locals that I was studying *dawa ya Kichina*, people would guide me to young men involved in the competitive selling for *Tianshui* 天水 natural products. These young men, in turn, led me into rooms in multistory supermarkets, jammed up with chairs and large cardboard boxes - vestiges from a previous meeting. *Tianshui*, which traced its roots to Southeast Asia, struck me as a commerce-oriented social movement in the name of health. This health enterprise was an entirely different social phenomenon from the one I was studying as it involved the organization of large group meetings, not unlike those of the pentecostals, during which herbal health products, mostly in pill/tablet/capsule/granule and crème form, were advertised and sold *en gros* to individuals, on credit, for them to sell on to others in a snowball effect. This as yet understudied social movement was directed at people suffering from undefined chronic health problems who through a combination of intense group experiences and personal redefinition were lead not only into better health but also into total bankruptcy and social rupture.

Had the Chinese medical clinics disappeared from the health field? No, they were there, as elsewhere in urban East Africa, thinly spread out throughout the city, advertising themselves to the entire spectrum from the local population in the fairly well-to-do neighbourhoods to the populace at loud and busy bus stations. “The

Chinese antimalarial” had once provided the Chinese medical doctors with a steady flow of income but they evidently did not depend on it.

However, Chinese business people appeared to be more numerous than ever before, populating an emergent field of state-subsidized medical commerce with high-tech biotechnology. These business people were not medical doctors. They imported in bulk Chinese ACT brands alongside Chinese-manufactured surgical instruments and hospital furniture into Uganda. These brands included Artequin (a combination of artesunate and mefloquine), Duo-cotectin (a combination of dihydro-artemisinin and piperaquine phosphate) and Arco (a combination of artemisinin and naphthoquine). Arco, in particular, heralded this new era of pharmaco-engineering. Importantly, Arco could be administered in a single dose, as advertised by a glossy brochure into which very considerable hi-tech graphics and colour photography had gone. In line with other recent inventions, the main biotechnological effort seemed to have been spent on easing the consumption of the new product, and thereby sales and profit margins, in place of improving the quality of its production or distribution.

In summary, through the study of the thinginess of “The Chinese antimalarial” we have been able to discern within the neoliberal global health market two distinctive playing fields related to different moral economies. In the early 2000s, traditional Chinese medical doctors had been involved in the dispensation of a variety of different artemisinin monotherapies, but by 2008 Chinese import-export traders with Chinese brands of ACTs had become the main players in the antimalarial health economies. The former had offered health provision as individualistic petty entrepreneurs, working with unregulated medicines in unregulated health markets within a grey zone of legality, while the latter were proponents of a growing, aggressively lucrative health commerce fed by international and national subsidies.<sup>8</sup> In these playing fields, the reputation of “the Chinese antimalarial” had changed. Locals were generally not aware that this had to do with a change in the thinginess of the thing and an NGO worker said: “The Chinese antimalarial is not really the wonder drug they said it was.” In fact, it had the same side effects as other antimalarials, if they were not worse.

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<sup>8</sup> This field-based observation was reinforced by the news, e.g. “Malaria and the politics of disease”, *The Economist*, 8.4.2008. See also Meier zu Biesen (2013:301 ff.).

Meanwhile, the organization *Tianshui* offered as a yearly prize an intercontinental travel (e.g. one week Brazil) to those who had been able to sell drugs in bulk at a peak. They were almost exclusively young men. Ostensibly, they were not selling crack (Bourgeois 1996) but doing good by selling health products. There was an air of vibrant competition, out of which came increasingly visible winners and losers. The winners' aggressive selling strategies were likely matched, within the very same organization, by the losers' acquisition of drugs in bulk on credit during the high of a therapeutic group meeting and their failure to find an outlet for selling them later. As the prizes in this health economy involved fast cars and travels afar for enterprising, male and masculine individuals, mobility and cultural diversity, or even super-diversity, was celebrated.

## ***Part II: Towards an ethno-archaeology of a herbal anti-malarial juice***

The idea that in different cultural settings different people might adopt similar practices when engaging with their social and natural surroundings has not been a matter of extended debate recently. It somewhat inverts the current projects of cultural ontologies and the cultural politics those imply. It emphasizes domain-specificity of knowledge and practice, as do cognitive anthropologists. However, while the latter are wedded to a science of representations, the research presented in what follows draws inspiration from Chinese scholars of the 17<sup>th</sup> century, who spoke of the 'propensity' of things, *shi* 勢 (Jullien 1995), and also by 20th century phenomenologists who spoke of a strikingly similar concept, "affordances" (Straus, Merleau-Ponty, Leder; see also Gibson 1979), recently taken up in Science and Technology Studies. Both concepts direct the researcher's attention to the thing, suggesting that the effectiveness of a thing is given in its materiality and configuration, and the 'demands' those put on its surroundings. While cultural difference may be acknowledged, it is not of primary importance. At stake is practical

efficaciousness that emerges out of peoples' practical engagement with the world, and, as we will see, this tends to happen through their bodies.

After returning from the field in 2001, I searched for studies on the traditional Chinese medical *qinghao* 青蒿 (*Artemisia annua* L.) rather than on the purified antimalarial substance that this plant produces, *qinghaosu* 青蒿素 (artemisinin). Not a single paper had been written on its history (despite several misleading titles). This contrasted with the articles in the thousands on the molecular structure, biochemistry, pharmacokinetics and clinical efficacy of *qinghaosu*. It appeared as though scientists considered premodern Chinese scientific knowledge completely irrelevant. Likewise, protagonists of *qinghao* as a herbal anti-malarial had shown little curiosity to learn from premodern Chinese medical practice and writings. The founder of the organization Anamed, for instance, developed what in fieldwork people called 'antimalarial herbal teas', although, in the early 2000s, only few urbanites had had direct experience of those. Anamed's 'natural herb' method involved the drying of leaves, the boiling of water and the ingestion of infusions (e.g. Willcox et al. 2004), which to a historian of Chinese medicine has far more affinity with German phytotherapy than with premodern Chinese medical lore.

Alongside the above mentioned two large translation projects of the *materia medica* and recipe literature on *qinghao*, a small workshop at Green College, University of Oxford, led to a collaboration between the pharmacognocist Dr. Colin Wright and myself since 2006. The results of this "ethno-archaeological" research have been published (Wright et al. 2010), but not the experiential aspects of the experiment and their theoretical implications for medical anthropology.

The project was insofar "ethno-archaeological" as it consisted of re-enacting a *qinghao* recipe recorded by the alchemist-physician Ge Hong 葛洪 (340 CE) in *Emergency recipes in one's sleeve* 肘後備急方, chapter 3.16.

Another recipe: *qing hao*, one bunch, take two *sheng* [2 x 0.2 litres] of water for soaking it, wring it out for taking the juice, ingest it in its entirety (又方 青蒿一握 以水二升漬 絞取汁 盡服之).<sup>9</sup>

Words and worlds are perhaps more intertwined and entangled than Saussurean structuralism has it. The “ethno-archaeology” we engaged in was not primarily to produce the kind of positive knowledge that the ethno-scientists established in the 1960s and 70s, but alluded to a Foucauldian ([1966]1970) understanding of an “archaeology” of knowledge, which I propose to couple with Merleau-Ponty’s ([1945]1962:132) understanding of perception as ‘physiognomic’. Accordingly, linguistic meaning making would be a drawn out process of perception, which is always marked by an indeterminacy that is inherent to the process and only gradually, but never entirely, reduced. This renders dichotomies between ‘literal’ and ‘metaphorical’ word meaning obsolete.

#### *A physiognomic approach to word meaning*

In 2006 the *A. annua* seeds germinated well and grew to bushy plants at Hailey House in Oxfordshire, well 2.5 to 3 metres in height in June. They were harvested in the morning and in the afternoon prepared at the School of Pharmacy, University of Bradford. Two *sheng* in the Jin dynasty (4<sup>th</sup> century) were 4 dl of water, (not 2 litres!); this was general knowledge, recorded in the standard dictionary *Hanyu dacidian* 漢語大詞典. Yet the branches of the fresh plants were metre-long. The only way to soak ‘a bunch of *qinghao*’ in water was by detaching the fine foliage from the stems. Fresh foliage, stripped off the long branch-stems of a single plant, usually weighed about 70g, and this foliage could be crammed into 4 dl of water, such that all leafy material was just about covered with water.

While I was busy with enacting Ge Hong’s text, Dr. Colin Wright tinkered around without a text, aiming to extract juice out of fresh plant materials. Within less than an hour he found a way of first pounding the leaves with a pestle in a small mortar and then pressing out of the pulp little drops of green juice with index and thumb. He explained that the dosage for mice was in millilitres. Such practice-based

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<sup>9</sup> For detailed references of the Chinese sources, see Hsu (2010).

tinkering had evidently also happened in premodern China. Li Shizhen 李時珍, for instance, incorporated Ge Hong's recipe into his *magnum opus* of 1596 but in modified form. His recommendation was to pound the fresh plant materials: "Use one bunch of *qing hao*, two *sheng* of water, pound with a pestle to juice and ingest it" (用青蒿一握 水二升 搗汁 服之).

As time went on we found that the practicalities of a situation would be key to the procedure and pre-empt doubts about action. The question was now: how long should we soak the foliage? The text was not explicit about this. I had tried to wring out the fresh leaves to no avail. My efforts only destroyed some epithelial cells such that the pleasant scent of the plant increased and filled the entire lab. The text was vague but the practice required a decision. I proposed to address this question in a systematic manner, and find out how long one should soak the plant through a string of trial and error experiments, say, every two hours. Colin, however, appealed to common sense: "It is 6 pm now, you are welcome to stay in the lab and do your systematic trial and error experimentation, but I am going home. I have family and I am hungry. Dinner will be served at 7 pm. You have had a busy day, you got up at the crack of dawn, you only had a bite for lunch, you must be tired and hungry too. We can continue our experiment tomorrow." And so we did. We were guided in a common sensical way, not by the text, but by our bodies. Those afforded a good night's sleep, not unlike the bodies of the premodern Chinese physicians who wrote the text.

The following morning it was possible to wring out the plant. The foliage was dark green and soft, it was what in a Chinese text is called *lan* 爛, and generally translated as 'rotten'. After soaking overnight, the foliage was not rotten, just soft, like overcooked boiled vegetables, which in colloquial Chinese are also *lan*. Interestingly, I continued to translate the word *lan* as rotten because this was standard, despite this experience. However, rotten plant materials have a different biochemistry. If *lan* refers to the state in which they are soft enough to be handled, it refers to a change in biophysics. Had I adopted a more physiognomic approach to word meaning, I would have taken more seriously the phenomena I dealt with hands-on. For instance, the *Bencao mengquan* said (Hsu 2010:103): 生搗爛絞汁, which I

would now translate as: “If they are fresh, pound them; if they are soft, ring out the juice.” This reading of the word arose from an engagement with the world.

Admittedly, fifteen hours had passed before returning to the lab, where in the culture of a premodern physician the night may have been shorter, and this cultural difference may have affected the thinginess of the thing and its efficacy. Moreover, my skills at wringing out the plant were rather dilettante. The malariological tests, undertaken at the Swiss Tropical Institute in Basel on the following day, demonstrated that Li Shizhen’s rendering of Ge Hong’s recipe and the herbal antimalarial juice made from pounding fresh plant materials effected a 96% recovery from malarial mice infected with *P. berghei* (Wright et al. 2010).

Several attempts to continue this project failed. We encountered problems with getting the right seed, its growing, its harvesting and transport, and with funding. Business people operating in today’s commercialised fields of “natural herbs” saw little profit in it: “Why make a juice, it poses problems for distribution.” Colleagues in phytochemistry were inclined to believe that the efficaciousness of a fresh juice was greater than that of an infusion, but the problem of dosage when working with fresh plants was a consistently raised objection to the viability of an antimalarial juice. Indeed, this is a well-known problem among ethnomedical researchers, and as long as there is no research into it, we should be relieved that there is no playing field today for the above herbal antimalarial juices. Tinkering with low doses can be detrimental. We are reminded here that *A. annua* can be neurotoxic if regularly absorbed in small amounts (White 2008).

## ***Summary***

The above underlined how the thinginess of a thing, such as “the Chinese antimalarial”, is modified, hand in hand, with the transformations of the playing fields in which it is enacted: in the unregulated health markets of urban East Africa in the early 2000s different unregulated brands of Artemisinin monotherapy flourished as over-the-counter antimalarials dispensed by Chinese medical doctors. By contrast, after the WHO recommendation of 2006, ACTs belonged among the bulk wares of



Chinese import-export traders in a heavily subsidised antimalarial health economy. What Kopytoff (1986:213) said of doing the biography of a thing still applies: “What, sociologically, are the possibilities inherent in its ‘status’ and in the period and culture, and how are these possibilities realised?” His insight that things that become commodities operate not merely in a monetary economy but are part of a moral economy remains valid. Both playing fields I described were highly commercialised but they were part of different moral economies. The former was bordering on the informal sector, the latter was part of a subsidised health economy, which was drowning in flows of transnational monies. The thinginess of the thing, in the latter case an expensive ACT, was implicated into the playing field of which it was constitutive. The surprisingly effective fresh herbal antimalarial juice, by contrast, was so far enacted only in premodern health fields. A focus on playing fields, rather than foregrounding the change in value that a thing undergoes as it is embedded into different contexts, underlines how the materiality of the thing is constitutive of the sociality that makes its existence possible.

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