Diverse Biologies and Experiential Continuities: Did the Ancient Chinese Know That *Qinghao* Had Anti-Malarial Properties?\(^1\)

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**Abstract.** This article treats Chinese medical theories and concepts as cultural constructs that arose as much from practice-oriented concerns as from socio-political negotiations within the medical field. It further explores the interface of the biological and cultural. It is often futile to investigate how Chinese medical descriptions relate to biological processes, because the local biologies that the Chinese physicians recognized in the past and continue to describe in the present, are contested by mainstream medicine, but recent bioscientific research on the anti-malarial properties of the Chinese medical drug *qinghao* opens up new avenues for the historian. To be sure, no attempt is made to equate ancient nosologies to modern ones, nor to justify the cultural through the biological. In order to avoid pitfalls of simple equations, this article takes the experiential not merely as a subjective but as an inter-subjective reality that mediates the biological and cultural. The findings are striking: once one reads the Chinese medical texts as reporting on the experiential, one of their many possible readings is that they provide concrete descriptions of morbid conditions that also the contemporary mainstream physician recognizes.

**Keywords.** *qinghao* (Chinese drug), malaria, medical anthropology, local biologies

**Résumé.** Nous considérons les théories et les idées générales de la médecine chinoise en tant que constructions culturelles qui surgissent autant des soucis pratiques que des relations socio-politiques normalement c’est en vain qu’on décide le discours médical chinois en termes de processus biologiques, étant donné que le médecin occidentale conteste les « biologies locales » de la médecine chinoise. Néanmoins, le fait que la médecine occidentale reconnaît les
propriétés anti-malériales du médicament chinois *qinghao* ouvre une nouvelle voie à l’analyse historique de la rencontre entre la biologie et la culture. Il ne s’agit pas de faire des correspondances exactes entre nosologies historiques et modernes, ni d’exploiter la biologie pour éclairer l’histoire. Pour éviter de tels pièges, nous proposons que l’expérience, étant une réalité « intersubjective », agit comme médiateur entre la biologie et la culture. Si on interprète les textes chinois en tant que rapports d’expériences, on peut y décerner, parmi les nombreuses lectures possibles, des descriptions de conditions morbides qu’un médecin occidental peut aussi reconnaître.

**Mots-clés.** *qinghao* (médicament chinois), paludisme, anthropologie médicale

In light of the extraction and identification of the anti-malarial substance *qing hao su* 青蒿素 (Artemisinin) by Chinese scientists in the 1970s from the plant material of *A. annua* L. (*huang hua hao* 黃花蒿), which is the main ingredient used for producing the Chinese medicinal herb *qing hao* 青蒿, we can now give a straightforward answer to this question and say: yes, when the famous physician Ge Hong 華鐸 (284-363) recorded a prescription against “intermittent fevers” (nüe) in his *Zhou hou bei ji fang* 舊後備急方 (*Emergency Prescriptions kept in one’s Sleeve*), he, in all likelihood, referred to intermittent fevers due to malaria.

Another recipe: *qing hao*, one bunch, take two sheng [2 x 0.2 litres] of water for soaking it, wring it out, take the juice, ingest it in its entirety (you fang: *qing hao yi wo yi shui er sheng zi, jiao qu zhi, jin fu zhi* 又方 青蒿一握 以水二升潄取汁服之).

Needless to say Ge Hong did not have the modern biomedical concept of “malaria” and the term “intermittent fevers” designated many more morbid conditions than those caused by malarial parasites. It is only with hindsight because we now know that the chemical substance Artemisinin has anti-malarial properties, that we can be fairly certain that Ge Hong’s was an anti-malarial prescription. Retrospective diagnoses are tricky undertakings, since in other places and times sickness is framed in culturally specific ways, and as argued in this essay, also has biologically distinctive manifestations.

The ancient Chinese *materia medica* considered the Chinese medicinal herb *qing hao* therapeutic for a variety of conditions other than “intermittent fevers,” and modern researchers have perhaps been too quick in dismissing those as biologically unfounded culture-specific knowledge. For example, the Chinese scientists who in 1971 wrote the report of the “discovery” of *qing hao*’s anti-malarial properties in mice, spoke of “bone steaming” (*gu zheng* 骨蒸) and “heat vexation” (*fan re* 騒熱) as folk categories and did not consider the possibility that folk belief might convey accurate observations of the phenomenology of malaria. This essay discusses such culture-specific nosologies in the light of biological varia-
tion of malarial illness manifestations, after addressing some basic problems with retrospective biomedical diagnoses.

Many retrospective biomedical diagnoses are grounded in the assumption that biological processes give rise to “diseases” that are universally the same, while “illness” is culturally specific. A prime example in support of such a concept of illness and disease concerns unusual behaviour that the Fore in New Guinea attributed to kuru sorcery and scientists eventually attributed to a brain disease. In this particular case, the behaviour of the afflicted appears to have followed a distinctive course and generally was not confused with that of other diseases. Put crudely, what the Fore called kuru, the scientists retrospectively identified with a disease that had similar symptoms, CJD (Creutzfeld-Jakob Disease); medical anthropologists spoke of kuru as an illness and of CJD as a disease. In general, however, the local and the biomedical term rarely refer to exactly the same phenomena. Sometimes, these terms can be entirely unrelated but usually they overlap in respect of certain easily identifiable signs and symptoms.

Paul Unschuld has argued that malaria has a biological reality, which cross-culturally can be recognized in the local terminology of “intermittent fevers,” i.e., han re (冷熱; intermittent coldness and heat) and nüe (熱; intermittent fevers) in Chinese medicine. Not all conditions of intermittent fevers are malarial, but some of them definitely are (perhaps the prototypical ones). In full awareness that there are other culture-specific terms that cannot be mapped onto “empirical reality” as straightforwardly, Unschuld argued against an extreme relativism when it comes to the interpretation of different illnesses.

Unschuld was following the lead of medical anthropologists who adhere to the notion that a biological substratum of disease is universal, even if the culture-specific way in which it is expressed differs in degrees. For instance, the use of the term “somatisation” in psychiatry makes it possible to conceive of “depression” not as an exclusively European and North American illness but as a universal condition, which is experienced in more somatic ways elsewhere than in Euro-America (Kleinman 1980, Weiss 2001). However, the usefulness of a clear disease/illness dichotomy has been criticised by medical anthropologists not least because the physiological aspects of an illness episode are often not identical cross-culturally. Margaret Lock’s concept of local biologies calls into question the concept of disease as a universal biological substratum onto which are grafted culturally specific illnesses. Thomas Csordas takes the person’s experience of the body as a foundation of existence that is never pre-cultural, and points out a complex interplay of the physiological and socio-cultural. For instance, the concept of “nerves” as “embodied metaphors” for a variety of mental, psychological, emotional and “stress”-enhanced conditions makes possible the understanding of
culture-specific phenomena as variations on a cross-culturally re-emergent theme of distress that is both biologically and socially distinctive in different cultural contexts. Some episodes of “nerves” are diagnosed as “depressive” by psychiatrists, others as “psychotic,” others as perfectly “normal” expressions of tiredness, overwork, daily worries, financial hardship and hunger (i.e., non-psychiatric conditions). This essay takes this phenomenological approach in medical anthropology a step further in that it focuses on the illness experience that a local term conveys and, furthermore, aims to relate this experience to biology in its locally specific manifestations. The biology of morbid conditions can vary cross-culturally, not only in the case of mental distress and ill-defined categories of distress such as menopause, but also, as argued here, in the case of a “physical” condition par excellence: malaria.

To put it bluntly, Ge Hong’s nüe (intermittent fevers) need not be the only Chinese medical term that refers to malarial conditions in the ancient Chinese texts that recommend qing hao. Although malaria is often cited as a prime example of a disease with a biologically universally identical pathology, its biology can be amazingly specific locally and can express itself very distinctively in different populations. This became most evident to me during my recent fieldwork trips (from 2001-2008) into regions of East Africa where malaria is endemic. Whereas missionaries, soldiers, tourists, and other foreign visitors experience malaria as a horrendous disease that attacks them intermittently with high bouts of fever that, if not treated, are deadly, the locals with whom I worked rarely presented malaria in this life-threatening way. They complained of pain in the joints, headaches, flu-like fevers, a general unease and “low energy.” This was not a matter of mind and culture only, but intrinsic to the biology of malaria.

Needless to say, some patients claim to have malaria when, in fact, no malaria parasites can be found in their blood stream, and the local term homa ya malaria comprises many more conditions than malarial fevers. Moreover, many health professionals over-diagnose malaria for lack of equipment, when patients suffer from general fever or even from other conditions as, for instance, depression. Despite these frequent misdiagnoses by lay persons and professionals alike, patients diagnosed as suffering from malaria on the grounds of the plasmodia found in their blood, due to their acquired immunity, experience its pathology not primarily as intermittent fevers, but more often with joint aches and other flu-like symptoms.

In addition, Plasmodium falciparum can cause cerebral malaria, which typically presents in convulsions and is particularly lethal for infants. Considering the peculiar experience of this condition, it is not surprising that locals identify it as a distinctive illness and do not call it homa ya malaria. Convulsions in infants and toddlers, some of which may be
caused by the rapid high fevers that \textit{P. falciparum} may induce in the very young, are attributed to so-called \textit{dege dege}, although \textit{dege dege} is again a term that is used for making sense of many more symptoms than convulsions, ranging from heightened irritability to complete apathy. It is an age-specific illness that can only affect small children.\textsuperscript{16} \textit{P. falciparum} causes cerebral malaria also in adults, albeit rarely in immune individuals, and it can then be experienced in acute fever bouts which may cause states of delirium, very different from the above-mentioned general malaise and lethargy. My point is that the biomedical disease “malaria” has symptoms so variable that its characterization as “intermittent fevers,” which is the usual one among medical historians and anthropologists, is incomplete if not misleading. It needs to be borne in mind that non-biomedical illness categories, inclusive of the Chinese medical ones, may actually convey information based on accurate observations and experiences of morbidity. The problem presents itself then as a body ecological one,\textsuperscript{17} which calls for a decoding of the language in which this biologically relevant information is conveyed.

With this in mind, let us turn to the Chinese texts that recommend the use of \textit{qing hao}. Ge Hong was the first in Chinese medical history to recommend \textit{qing hao} for the treatment of “intermittent fevers” (\textit{niè}). He soaked the entire fresh plant in water and wrung it out thereafter. This must have resulted in an emulsion of water and the flavonoids and aromatic oils contained in stem and leaves. It is possible that this extraction method, which is likely to have yielded Artemisinin in larger quantities than other methods of preparation recorded in the Chinese \textit{materia medica}, was directly linked to Ge Hong’s recommendation of its use for treating acute fever episodes of “intermittent fevers.” Not only does Artemisinin have anti-malarial properties but also several flavonoids; synergistic effects may or may not have also played a role.\textsuperscript{18}

\textit{Qing hao}, as known by its synonym \textit{cao hao} (herbaceous \textit{hao}), was also mentioned in other texts of Chinese medical history, foremost those of the Chinese \textit{materia medica}, a genre of texts that consist of long lists of Chinese medicinal drugs identified by name and synonyms; by flavour, quality and other properties, such as to whether the drug has potency or not (\textit{you} / \textit{wu du} 有 / 無毒); by main indications; and sometimes also by “pharmaceutical” information on how to prepare and when to administer them. The first canonical \textit{materia medica}, which is no longer extant in its original form but has been reconstructed from the multiple citations of this work in later \textit{materia medica}, is \\textit{Shennong’s Canon of the Materia Medica (Shennong ben cao jing 神農本草經)}, presumed to have been compiled in the 1st century BCE.

The herbaceous \textit{hao} (\textit{cao hao}). Its flavour is bitter, cold. It treats \textit{jie} itches, \textit{jia} itches,\textsuperscript{19} and ugly wounds. It kills lice and lingering heat between bones and
joints. It brightens the eyes. Another name is qing hao, another name is fang kui. It grows in river waste lands. At a first glance it appears as though the authors of this text were completely unaware of potential anti-malarial properties of qing hao. They primarily recommended it for treating different kinds of itches, ugly wounds, and lice. This is a recommendation much in line with the first extant text recording the therapeutic usage of qing hao, a Mawangdui medical manuscript unearthed from a tomb closed in 168 BCE, which recommends qing hao for treating “female haemorrhoids”:

[Female] haemorrhoids that have entered the opening [of the anus] for one cun + [2.31 cm], in appearance and kind they are like lice on oxen three […] […] When defecating, they ooze and expel blood; when not defecating, they go upwards [inside the anus].

These “female haemorrhoids,” which like women oozed blood (hence their name), apparently looked like lice. From the second century BCE to the materia medica of the Tang (618-907) and Song (960-1279) the use of qing hao for primarily the external treatment of wounds was emphasized. Although the extant writings by Ge Hong recommend qing hao for treating “intermittent fevers” (as in the quote on p. 206), he was not remembered for that in the materia medica of the Tang and Song but for his packaging of wounds with fresh qing hao.

In the most ancient recipes, it [qing hao] was mostly used on its own. Mr. Ge, when treating wounds caused by metal knives, in their early stages took raw qing hao, pounded it with a pestle, and applied it on top of them. He took silk to pack the wound, the bleeding stopped, and they healed.

It was more than a millennium after Ge Hong’s death that Li Shizhen 李時珍 (1518-1593) in his posthumously published Classified Materia Medica (Ben cao gang mu 本草綱目) of 1596 quoted the prescription against “intermittent fevers” given on p. 206. Does this mean that before the 16th century the authors of the Chinese materia medica were unaware of the anti-malarial properties of qing hao? If one adheres to the view that malaria universally is a disease that only manifests in intermittent fevers, it would be difficult to deny. However, since malaria biologically presents differently in regions where it is endemic, its cultural perceptions may vary accordingly. Considering that the complaint of joint aches is typical of recurrent malaria today, this may have applied to the above “lingering heat between bones and joints” in Shennong’s Canon of the Materia Medica—nota bene, among a variety of other morbid conditions. Malaria is colloquially called the “bone breaker,” also in other regions.

In later materia medica texts, one finds cao hao (synonym of qing hao) being recommended for conditions like “bone steaming” and “exhaus-
tion arising due to heat/fevers” (re lao 熱勞). Although Chinese medical historians do not generally consider these two terms to describe malarial conditions, with hindsight, knowing that qing hao has anti-malarial properties, it is not to be excluded that they referred to some conditions that may have been caused by malaria. In fact, those may have been the ones that were effectively treated and led to this recommendation.

For treating bone steaming, take one liang [41.3 g.] of urine to soak it overnight, dry it, turn it into powder and make a pill. It entirely eliminates exhaustion arising due to heat/fevers.27

The *Materia Medica for Successful Dietary Therapy* (*Shi liao ben cao* 食藥本草) of 721-739 recommends using the raw plant, after soaking it in urine and making it into a powder and pill. Notably, it does not recommend heating the plant extract, which, as we know with hindsight, changes the molecular structure of Artemisinin to a molecule without any anti-malarial effects.28 We are reminded here that *Shennong’s Canon of Materia Medica* also recommends qing hao for “brightening the eyes” (ming mu 明目), a condition that in the *Materia Medica for Successful Dietary Therapy* is mentioned among a list of terms indicating enhancement of one’s vitality:

They say qing hao is cold, enhances qi 氣, causes growth of head hair, can make the body feel light, supplement the interior and prevent ageing, brighten the eyes, and halt wind poison.29

Again, Chinese medical historians generally do not consider herbs that “brighten the eyes” to be anti-malarials. However, if we take into account that endemic malaria causes anaemia, which is experienced as lethargy and tiredness, we can see why a herb with anti-malarial properties might be considered a vitality- and longevity-enhancing drug. And again, the medicine should not be heated. The *Materia Medica for Successful Dietary Therapy* recommends qing hao as a pickle, and Tao Hongjing (456-536) seems to have recommended it as an unprocessed food supplement in his Notes to *Shennong’s* Canon of the *Materia Medica* (*Shennong* Ben cao jing ji zhu 神農本草經集注) around 500 CE: “It is everywhere, this one is today’s qing hao, people even take it mixed with fragrant vegetables for eating it.”30 Obviously, the food supplement of presumably fresh qing hao (that was still fragrant) was not used therapeutically but for preventive health. Although the text states that the vegetables were “fragrant,” there is little doubt that they were considered such due to the fragrance of qing hao, which in other texts is called “fragrant hao” (xiang hao 香蒿) or even “stinking hao” (chou hao 臭蒿).31

This means, on reflection, that the brief entry on cao hao in the *Shennong ben cao jing*, which mentioned “lingering heat between bones and joints” and said “it brightens the eyes,” may well have recommended
*qing hao* as an anti-malarial, in addition to its wound-healing properties. Later *materia medica* specified how it should be prepared, either as a food supplement (*Ben cao jing ji zhu*) or as a pill after having been soaked in urine, dried in the sun, and made to powder (*Shi liao ben cao*). None of the pharmaceutical recommendations in those *materia medica* involved Ge Hong’s ingenious method of first soaking and then wringing out the fresh plant. Accordingly, only Ge Hong may have recognized its usefulness against bouts of malarial fevers, marked by a high parasite load. In this context, it is worth noting that the wide range of convulsive disorders, which terms like “daemonic *qi*,” “rigor mortis possession disorder”32 and “*fu lian*”33 designated, may have included cerebral malaria. If that is indeed the case, it may well have been bouts of cerebral malarial fevers that the *Supplements to the Materia Medica* (*Ben cao shi yi* 本草拾遺) of the 8th century treated by wringing out the juice from the presumably fresh plant:

\[
\text{Hao controls daemonic } \textit{qi}, \text{ rigor mortis possession disorders, fu lian, the blood } \textit{qi} \text{ of women, fullness inside the abdomen and intermittent coldness and heat, and chronic diarrhoea. In autumn and winter, use the seeds, in spring and summer, use the sprouts, together pound them with a pestle, wring out the juice, and ingest. Alternatively, dry in the sun and make into a powder, and apply in urine.}…34
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To be sure, Chinese medical historians rarely associate “daemonic *qi,*” the “*rigor mortis possession disorder*” and “*fu lian*” with malaria and tend to relegate them into the domain of culture-bound possession behaviour or mental illness.35 If, however, in awareness of *qing hao*’s effectiveness against *falciparum* malaria, one acknowledges that the pathology of malarial fevers can become manifest in other ways than as intermittent fevers, these disorders may also have designated conditions caused by cerebral malaria, among others.

In summary, if one accounts for the diverse biological manifestations of acute, recurrent and endemic malaria, and of cerebral malaria, the recommendations in the Chinese *materia medica* of using *qing hao* for the treatment of complaints ranging from “lingering heat between bones and joints,” “bone steaming” and “exhaustion arising due to heat/fevers” (e.g., due to anaemia) to “daemonic *qi,*” “*rigor mortis possession disorders*” and *fu lian* (e.g., due to cerebral malaria) may well be recommendations based on the observation of its implicit anti-malarial effectiveness (naturally, due to the vagueness of these nosological Chinese terms, only in some, not in all cases). The methods of preparation that these ancient Chinese texts recommend vary from using fresh *qing hao* as a food supplement (to enhance vitality and longevity) to the wringing out of the fresh plant after soaking it in water (for treating acute fever bouts).
Two lessons can be drawn from the above interpretation of *qing hao* as an anti-malarial in the ancient Chinese *materia medica*. First, if one takes seriously pre-modern knowledge, it contains, in coded fashion, therapeutic insights that are amazingly specific and accurate, and that contemporary scientists may well find to be empirically valid (it is hoped that this article will spur clinical research to demonstrate this). Second, medical anthropologists and historians of medicine may find that if—rather than adhering to the simplified model of disease and illness, which has long been contested anyway—they take seriously the cross-culturally diverse biological manifestations of morbid conditions, local nosological terminology will appear to be based on lived experience, and not be belittled as the biologically unfounded “cultural construct” as which it is so often presented.

NOTES

1. When Don Bates was a Visiting Scholar at Cambridge during his final sabbatical year, I had the pleasure of meeting regularly with him for sandwich lunches at the University Club. Don read drafts of a number of my articles with great keenness and insight: he was, after all, a historian who had created an academic unit which brought history and anthropology together, and this combination was in line with my own approach, and with the interpretive turn in anthropology. Don also was genuinely interested in Chinese medicine, and appreciated its significance. Indeed, his first anthropological recruit for the Department of Social Studies of Medicine was a specialist on East Asian medicine, Margaret Lock; and Don himself travelled to China and exposed himself to Chinese medicine at a time when such contacts were still fairly unusual. Over our sandwich lunches, Don also shared with me many of the ideas that later took shape in “Medicine and the Soul of Science.” That essay accords a special role to Chinese medicine and its relationship to cosmology, and in so doing, raises methodological and substantive issues for anthropologists and historians alike. In response, I propose some reflections on Chinese medicine and its body ecologic in a historical/anthropological framework which owes much to those Cambridge conversations.


3. Ge Hong, *Zhou hou bei ji fang* 胡後備急方 (Emergency Recipes kept in one’s Sleeve), Jin, 4th c. (340 CE?). *Si ku quan shu* 四庫全書 (Collection of the Works from the Four Storehouses). References to *Wen yuan ge Si ku quan shu* 文淵閣 四庫全書 (Taipei: Shangwu yinshuguan, 1983); *juan* 3, “Zhi han re zhu nüe fang” 治寒熱諸婦方 16, vol. 734 p. 407. I am indebted to Frederic Obringer for checking the translation of all quotes and to David Rogers for checking my knowledge of malaria, but take full responsibility for the final wording.


11 It was also not a matter of race, for malaria is for the African infant just as deadly as it is flu-like for the European missionary who has been able to build up immunity after life time exposure to it. D. A. Warrell and H. M. Gillies, Essential Malariology, 4th ed. (London: Hodder Arnold, 2002).
14 Rachel Jenkins, personal communication, at Green College, Oxford, in 2003; and also own fieldwork experience (e.g., Pemba, January 2004). This is not to deny the effect of malaria on mental health: e.g., M. Weiss, “The Interrelationship of Tropical Disease and Mental Disorder: Conceptual Framework and Literature Review (Part 1—Malaria),” Culture, Medicine and Psychiatry, 9 (1985): 121-200. However, since malaria has been declared a prime public health problem in recent years, overdiaoses are likely because malaria is now on everyone’s mind.
19 jie sao jia yang is itching that can affect toes and fingers. See, for instance, jie jia in Ling shu 鬲續 in Huangdi neijing 黃帝內經 (Yellow Emperor’s Inner Canon). Zhou to Han, 3rd c. BCE to 1st c. CE. Anonymous. References to Huangdi neijing shangyu suoyin 上帝內經紹雲 in Renming weisheng chubanshe 黃帝內經紹雲 (Beijing: Renmin weisheng chubanshe, 1986) p. 307, or Chao Yuanfang 趙元方. jie chuang in Zhu bing yuan hou lun 薬病源後論 (Treatise on the Origins and Symptoms of Medical Disorders) Sui, 610. References to Zhu bing yuan hou lun jiaozhu, annot. by Ding Guangdi 丁光迪 (Beijing: Renmin weisheng chubanshe 1991), juan 50, p. 1411.
21 All measures of length, volume, and weight change over time. The measures specific to the time period in which a quote was written are given in square brackets. They are based on the tables in the appendix to the *Hanyu dacidian* (Great Dictionary of the Chinese Language) (Shanghai: Hanyu dacidian chubanshe, 1994).


23 For details, see E. Hsu (after consultation with Frederic Obringer), “*Qing hao* (Herba Artemisiae annuae) in the Chinese materia medica,” in E. Hsu and S. Harris, eds., *Plants in Medical Practice and Common Sense: On the Interface of Medical Anthropology and Ethnobotany* (Oxford: Berghahn, in press).

24 The 1249 edition of the *Zheng lei ben cao* (Beijing: Renmin weisheng chubanshe, 1957) has an obscure character, where the *Si ku quan shu* 四庫全書 edition, *juan* 10, v. 740, p. 483, reads *guo*, meaning “to pack.” I am indebted to Chang Chechia for drawing my attention to this problem.


26 *Shi liao ben cao* 食療本草 of 721-739, as quoted in the *Zheng lei ben cao*, *juan* 10, p. 20b.

27 Phyllis Lee, pers. communication, spoke of it in sub-Saharan Africa, after my first presentation on *qinghao* at the Oxford Medical Anthropology Research Seminar in February 2003, University of Oxford.


29 *Zheng lei ben cao*, *juan* 10, p. 20b.


31 See Hsu, “The History of *Qing hao*,”

32 For *zhu* 注: “possession disorders,” see *Zhu bing yuan hou lun* 諸病源候論 (Origins and Symptoms of Medical Disorders), *juan* 24, p. 690-715.


34 *Zheng lei ben cao*, *juan* 10, p. 20a.