step from the classification of nature to what we call "science," for instance from the knowledge of plants to botany.  

In this sense, Chinese scholars who studied nature are to be criticised not for their passion for classifying, but rather for their failure to produce consistent and improved classifications. If the classification of plants in a twelfth-century Chinese pharmacopoeia appears to us as irrational, incomplete and inconsistent as that of one which predates it by several centuries, does this not indicate that Chinese scholars, bureaucrats though they were, did not really know how to classify?

Nakayama is suggesting that a Chinese scholar was only concerned to set up a series of pigeon-holes into which everything could be crammed; if he was unable to fit all his data into the existing framework, he simply added a few new pigeon-holes (let us remember how convincing the purely imaginary categories invented by Borges sound—"animals painted with a camel-hair brush," "animals not included in this classification"). According to Nakayama, the Chinese scholar was not trying to elaborate a logical network of mutually exclusive but interconnected categories, if that is what we take to be the ideal basis of scientific classification. If this view is is correct, perhaps we should be speaking simply of Chinese systems of ordering rather than of classification.

The obsession with consistency is, however, a habit of Western scientific thought which all too often leads us to romanticise our own accomplishments while underestimating those of other cultures. For there is no one valid principle of scientific classification, just as there is no single natural classification. The concept of a "natural classification" is merely an ideal. The degree to which this ideal can be fulfilled depends as much upon the criteria selected as upon how much we know about nature. Any classification of nature is necessarily artificial, since the criteria must be limited in number and so selected.

It seems that the Chinese were not concerned with finding the single valid system of classification, or even the best single system. In their view

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3 The science of botany was introduced to China from the second half of the nineteenth century, in the form of translations (most of them mediated through the Japanese); Georges Météllié, Science and Civilisation in China (Cambridge University Press, 1954–), VI.1, Part 2 (in progress).

4 The inconsistencies which exist today between the zoological classifications of the phcenetists and the cladists are described by Stephen Jay Gould: "What, if Anything, is a Zebra?" in Hen's Teeth and Horses' Toes, (New York: Norton, 1984), pp. 355-65.

5 According to the classic work of George H.M. Lawrence, Taxonomy of Vascular Plants, (New York: Macmillan, 1955), p. 13, "An artificial system [for example, that of Linnaeus, based on sexual characteristics] classifies organisms for convenience, primarily as an aid to identification, and usually by means of one or a few characters . . . A natural system reflects the situation as it is believed to exist in nature and utilises all information available at the time."
natural phenomena were so complex that several systems of analysis had to be used at once:

[The illness] is almost always analytically categorised in the terms of more than one classification scheme... these methods, however harmoniously they may be used together, are theoretically discontinuous... the specific substances or phenomena which are classified escape any complete encompassment by the classes themselves.

This approach seems natural enough where diseases are concerned, for it has often been pointed out that in Chinese medicine diseases are considered (quite reasonably) as a dynamic process shaped not simply by the pathogenic agent but also by the characteristics of the individual organism and the influence of the environment. "Instead of choosing one pigeonhole in a large, rigid structure, the doctor assesses the multivariate relations of a small number of characteristics that apply to every clinical picture." Given the close links between medicine and pharmacopoeia, we shall hardly be surprised to find that in China plant "science" also deals in "multivariate relations."

In the Aristotelian tradition, the classification of species serves as an instrument to analyse their essential nature, and the causality of their relationships. Over the centuries this perspective has led scholars to elaborate more and more precise systems of identification and differentiation. To taxonomy has been added physiology and later genetics.

Zoology and botany have become increasingly "objectivist" as categories based on physical criteria alone come to replace those based on utility. Western botanical categories, which aim to be both exhaustive and exclusive, are rooted in this striving for objectivity.

Thus in Europe the systematic classification of plants evolved in parallel with an unsystematic corpus of pharmacological knowledge, encyclopaedic rather than definitional, and concerned almost exclusively with the uses of plants. The divergence is already plain by the time of Theophrastus. His Hippocratic contemporaries took no interest in the botanical relationships between plants, and cared only for their uses as

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8 The actual objectivity of such categories, and indeed the possibility that humans can be objective in their observations, is called into question nowadays by certain schools of the cognitive sciences, which hold that conceptual categories hitherto considered to be extrinsic to the observer, and thus objective, are in fact "embodied" (i.e. grow out of bodily experience) and so subjective; George Lakoff, Women, Fire, and Dangerous Things: What Categories Reveal about the Mind (University of Chicago Press, 1987), p. xiv.
drugs or food. The botanists took no account in their classifications of pharmacological properties, which are very difficult to standardise. It is worth pointing out too that later scientific classifications of plant species in Europe were based on physical similarities and on the corresponding possibilities of cross-breeding, aspects which concern farmers, who work with living plants, rather than apothecaries.

Needham points out that in Europe the distinction between philosophical and utilitarian attitudes towards plant science became marked at the Renaissance, while “natural history as such was always mixed up in China with practical pharmaceutical needs.” He claims that in China too the study of plants was gradually freed of these pragmatic expectations. But this claim is far from justified by the frameworks of classification in the Chinese works dealing with plants. In China it never occurred to the scholars classifying plants to eliminate utilitarian criteria, perhaps precisely because these scholars belonged to the bureaucratic class, for whom utility and the service of the people were a primary concern.

Furthermore in China the taxonomy of a plant—by our definition, its “objective” physical characteristics—was considered its yin phase, a complement to its yang aspects or active principles, which were defined according to utilitarian criteria. A Chinese scholar would have found it difficult to endorse an investigation which ignored one phase of nature’s reality at the expense of the other.

The naturalists in the Aristotelian tradition sought as a first step to identify the essence of a species. Chinese scholars took a very different approach. Their notions of essence only corresponded at a very superficial level to the Western concept. The Chinese terms sometimes translated as “essence” refer to a virtual state rather than to a permanent underlying truth. Correspondences, transformations and resonances were their primary explanatory factors. Their arguments had to take into

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10. Joseph Needham & Lu Gwei-Djen, Science and Civilisation in China, VI.1 (1986), p. 228. The term “utilitarian” is used throughout this paper to refer to evaluations and categorisations based on the ways in which a plant was used, as opposed to categorisations based on physical characteristics.

11. Ibid., p. 315. Originally it is possible that the “flavor” or “sapidity” (wei 味) attributed to a drug did correspond to its taste, whether sweet, salt, bitter, etc.; this is the way in which the term wei is used in reference to foods and cookery. But from the earliest bencao 本草, the sapidity indicated does not necessarily correspond to a physical taste, but always to the place of the drug (as shown in its pharmacological properties) in the network of correspondences elaborated on the basis of yin-yang and wu xing theory; see for example Sivin 1988: 182.

consideration the interplay between opposites, yin and yang, the phases corresponding to the *wu xing*, and also the link between theoretical knowledge and what we translate as “experience,” *yan* or *jingyan*. It is rare to find a Chinese text sufficiently explicit and detailed to serve as a blueprint: experience is what allows a Chinese reader to substantiate a text and to put the information which it contains into practice. But in fact the term *jingyan*, “experience,” signifies more than the individual knowledge of the reader; it is better thought of in terms of a collective knowledge, combining the experience of the reader himself, of his teachers, and of the grand masters of the tradition to which he belongs.4

In a sense this notion of experience represents the invisible dimension, the active principle which allows initiates to flesh out the skeleton of esoteric texts (for instance alchemical works) or of works written in a kind of shorthand for the use of professionals (e.g. mathematical or architectural treatises). In Chinese medicine, experience allows the physician to make the inspired or intuitive leap from diagnosis to therapy.5 Equally, in both pharmacopoeias and agricultural treatises, this kind of experience is essential for understanding the texts. Experience still seems to play a far more important role in China than in the West, including even the “pre-scientific” West of confraternities and guilds.6

The common experience upon which Chinese scholars drew in their works was varied and sophisticated, much more complex than that of the European artisans for whom the written word served chiefly as a kind of memorandum. Yet at the same time most of these scholars, who were first and foremost bureaucrats, felt the same need as the artisans for contact with practice. Almost all authors of medical works had clinical experience. Few mandarins felt it necessary to have ploughed a field before writing a treatise on agriculture, but many were faced daily with concrete problems of administration and organisation. Chinese scholars

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13 Well illustrated in the medical literature by the classification of living beings according to the system of the philosopher Shao Yong 蕭巖 in the *Bencao pinghui jingyao* 本草品彙精要; Needham & Lu 1986: 305-8.

14 Farquhar 1986, passim.


16 Here I am speaking of practical and utilitarian experience as opposed to the systematically acquired experimental knowledge of scientific empiricists.
were obliged to consider efficient management techniques, and esteemed practicality. They aimed to understand society well enough to direct it; if they also endeavoured to understand and direct nature, this was usually in order to benefit society—hence the capital importance of utilitarian criteria in Chinese classifications.

Furthermore, Chinese literati needed to work on a large scale, and probably tended to think more in statistical terms than in equations. The Chinese bureaucracy often compiled impressive statistics for demographic and economic analysis; one might even speak of planning. However, this numerical approach, in conjunction with the fundamental metaphysical notion of transformation, probably also predisposed Chinese thinkers to tolerate approximation, and to avoid precise definition (which pushes the observer to isolate the phenomenon thus defined in time as well as space).

As an illustration of these general suggestions concerning the classification of natural objects in China, let us examine the case of crop plants. The interest of this example is that crop plants appear in at least four distinct genres of technical literature, so that a comparative study of classification methods is possible.

In China, as elsewhere, plants are recognised as a distinct natural order, placed in the hierarchic scale of Nature between minerals and animals. The nomenclature, forms, habitats, uses and groupings of plants, the ways in which they are related, etc., are treated under four principal rubrics in the Chinese literature: pharmacopoeias; agricultural and horticultural treatises; general encyclopaedias; and the florilegia, more or less encyclopaedic books entirely devoted to plants. All these works discuss crop plants, but this group is differently identified, subdivided and treated in each genre.

17 In the eighteenth century Quesnay and Franklin spoke of this with admiration, if with little precise knowledge; see Gregory Blue, Science and Civilisation in China, VII, section 48(a), in press. For an informed analysis of the successes and limitations of the Qing bureaucracy in implementing famine prevention policies see P.-E. Will, Bureaucratie et famine en Chine au XVIIIe siècle, (Paris: Mouton, 1980). On more general conceptions of the state’s economic role see Will, “Official Efforts at Improving Agriculture in Eighteenth-century China,” draft paper presented at a colloquium on “New Perspectives on the History of Science and Technology in China,” University of California at Los Angeles, March 1988. Chinese officials have been accumulating statistics and planning economic projects in detail since the Western Han.


19 I do not discuss separately the lexicographical and philological works devoted to plants, since the predominant organising principles of such works reflect lexicographers’ and classicists’ rather than naturalists’ concerns. It is best not to confuse the classification of words with that of the things they stand for. See Needham & Lu 1986: 192ff.
The pharmacopoeias (bencao) treat plants with medicinal value, including crop plants and their products, as well as minerals and animal products with curative powers. They enumerate the pharmacological properties of each product, and also usually list the taxonomic and ecological characteristics which allow them to be unambiguously identified.

The agricultural treatises (nongshu) generally deal only with crop plants. They usually detail a range of varieties of each species, then describe cultivation and processing methods. Some crop plants are also included in the herbals known as jihuangan bencao 救荒本草, which list wild plants that can be eaten in times of famine.

The encyclopaedic works combine the information contained in the two previous categories. The florilegia are essentially compendia of literary quotations, although they also contain some definitions, morphological descriptions, and information on properties and cultivation methods. As a general rule they stress the qualities of a plant that interest a belletrist over those pertinent to farming, and devote more space to peonies and bamboos than to ginseng and rice.

The compilers drew their information on plants from several sources: from peasants, who grew them; from herbalists, who gathered them in the wild or cultivated certain species; from apothecaries and physicians, who were interested only in the medically useful portions of plants, and who were obliged to distinguish true specimens from counterfeits and to be familiar with all their pharmacological properties; and finally (and probably least important) from scholars who aimed to identify plants mentioned in the ancient texts. The first three categories of informants used ecological, taxonomic, and utilitarian criteria to identify and classify plants, but the utilitarian criteria of farmers differed from those of apothecaries.

One important obstacle to botanical classification in China should also be noted here, namely the fact that in Chinese there was no universally recognised lexical distinction between the learned language and the vernacular, like that between Latin and the vulgar European tongues. Scholars were careful to distinguish between ancient plant names, generally used as the erudite form, and vernacular names. But the ancient names were also vernacular in origin, and like their more recent counterparts, often reflected principles of folk classification. From the Renaissance on, European botanists agreed that each Latin name should be used only for the members of one family, while in popular usage the same name was often given to unrelated plants which were used in similar ways. In Chinese the distinction between scientific and popular language was not as sharply drawn. The problems this posed for anyone attempting to group plants systematically become clear if we take as an example the Chinese term ma 麻 (hemp, Cannabis sativa). Hemp produces both textile fibers and oil. Chinese peasants gave the name ma to five other crop plants, some of them fiber plants, others oil crops, all

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from different botanical families. Scholars grouped all of them in a single category.21

Classifying plants was further complicated for authors who could not rely simply on personal knowledge but were obliged to work as compilers. Many of these authors had firsthand knowledge of plant taxonomy, natural habitats and pharmacological properties, and had their own notions of what constituted a satisfactory system of classification.22 But since most works that embodied plant classifications (especially since the Song dynasty) were compilations by teams of scholars on imperial order, those with practical expertise frequently found themselves only one voice among those of a team that might include philologists, bibliographers, and ambitious high officials.23

To return to the four genres dealing with crop plants, what did they have in common? The prefaces of works dealing with plants, and in particular the prefaces of the bencao, generally contain well-developed and apparently systematic thoughts on classification procedures, and explain why the system adopted is better than previous compilations. But in the eyes of the modern taxonomist the contents of the book do not fulfill this promise. The authors were not, after all, trying to establish a system rational enough to satisfy a Westerner accustomed to essentially morphological categories. They did not insist on rigorously separating popular and learned knowledge, or specifying one or a few consistent criteria.

In principle nothing prevented the compiler from identifying and if necessary reclassifying his entries, however diverse their sources, into a coherent system according to new criteria. But even if that were his aim, he would need analogous data for each item.

European botanists succeeded because they abandoned utilitarian criteria to investigate systematically the physical characteristics of plants. They first took up taxonomy, then later physiology. For each plant they accumulated a complete description list which included the leaves, the fruit, the flowers, and the stem, among other traits. A similar taxonomic vocabulary was developed in China, but its function was quite different. The physical aspect of a plant or drug was the concealed or materialised

21 Needham & Lu 1986: 170-76.

22 This was true of Li Shizhen, often spoken of as the Chinese Linnaeus, who single-handedly wrote the most perfect of all the bencao, the Bencao gangmu 本草綱目, printed in 1596. Even if not all bencao authors had Li's field experience, at least since the Xin xiu bencao 新修本草 of 659 they were expected to have to hand samples of each drug product which they wrote about, to be sure of the accuracy of their description and classification; Paul Unschuld, Medicine in China: A History of Pharmaceutics, California University Press, 1986: p. 45, 134.

23 See for example Needham & Lu 1986: 192, 205; Unschuld 1986: 45, 55; Francesca Bray: Science and Civilisation in China, VI.2 (1984): 70-74. This flowering of all kinds of compilations was certainly linked to the contemporary expansion of printing in China.
form—the yin phase—of its invisible properties or active principles—the yang phase.\textsuperscript{24}

The authors of \textit{bencao} assume that most readers will already be reasonably familiar with the drug in question, and perhaps also with the plant from which it derives, so that the purpose of the physical description is primarily to avoid confusion with similar plants or products. It is thus rare to find a complete taxonomic description of plants that the author considers well-known.\textsuperscript{25} The agricultural treatises, the \textit{nongshu}, except in the case of newly introduced species or exotics, paid more attention to listing the differences between the varieties of the same species than the general characteristics of that species.

All the works considered here apply several systems of grouping at once.\textsuperscript{26} In the pharmacopoeias, whose first concern is the efficacy and properties of drug plants, the plants are still grouped in sections according to natural characteristics (e.g., do they belong to the trees \textit{mu} 木 or to the smaller plants \textit{cao} 草?) and utilitarian characteristics (e.g., do they belong to the crop plants, and if so, to the cereals, to the fruits, or to the vegetables?). These two criteria operate at the same level, but the second is dominant, so that plants which are clearly related (as for instance certain members of the \textit{Allium} genus) are to be found in different sections depending on whether they are cultivated or wild. The main categories of plants distinguished by the \textit{bencao}, then, are the following: trees, smaller plants, cereals, vegetables and fruits. Frequently these categories are subdivided, sometimes according to physical criteria. Plants within a section are divided according to habit (branched tree, non-branched tree, creeper, epiphyte . . . ), ecological or geographical characteristics (fruits of the mountains or of the marshes, or from the Southern regions . . . ), or their taxonomy (fruits with skin or with a shell . . . ). Sometimes the subdivision is based on such utilitarian criteria as culinary use (vegetables that are spicy, tender and mucilaginous, or refreshing; spice plants; scented fruits . . . ).

The encyclopaedias and florilegia are similarly arranged, except that they often distinguish an extra category of flowering plants. Unlike the \textit{bencao} they do not emphasize medical properties. Some group plants known primarily for medical efficacy under the separate heading “drug plants.”\textsuperscript{27} The \textit{nongshu} divide crop plants into several categories, includ-

\textsuperscript{24} Needham & Lu 1986: 315.

\textsuperscript{25} In the \textit{bencao} the author also frequently takes into consideration only the medically useful parts of the plant (G. Métailié, personal communication).

\textsuperscript{26} The analysis presented here is extremely superficial, but detailed analyses may be found in the two volumes of \textit{Science and Civilisation in China} dealing with botany (Needham & Lu 1986 and Métailié [in progress]). The principal Chinese pharmacopoeias from which the following information is drawn are the \textit{Bencao pinhui jingyao} of 1503-1505, and the \textit{Bencao gangmu} of 1596.

\textsuperscript{27} As in the case of the \textit{Quanfang beizu} 金方備祖 of 1256, which begins
ing cereals, vegetables, fruits, textile plants and timber trees. The arrangement always begins with cereals and then field crops, followed by the plants of the vegetable plot and orchard, that is to say, all the plants necessary for subsistence. They usually group plants providing raw materials for handicrafts, and such commercial crops as timber, bamboo, dye plants and tea, under one or more headings at the end of the work.

Thus in all four genres the main categories are more or less the same—at least, differences follow logically from their different functions. More intriguing, however, are the contents of these main categories, and the sub-groupings. For instance, do the authors of the bencao and those of the nongshu recognise all the same species as belonging to the cereals, or to the fruits? The genres do differ, usually because of their criteria of use, but sometimes due to terminological confusions in the vernacular.

To give an example, for the Chinese the term “cereal,” usually expressed by the word gu 穀, denoted all grain-bearing plants which served as staples, including not only grasses but also several legumes, among them the soy bean. To quote the definitions given by China’s most renowned writer on plants, Li Shizhen 李時珍:

In ancient times the people had no grains for [staple] food: they “ate hair and drank blood.” Then Shen Nong 神農, the Divine Cultivator, appeared. He first tasted the plants and picked out the cereals, and thus he taught the people the art of farming . . . 28

This passage could well be found in any agricultural treatise, and the same is true of the following passage where Li points out that certain classical texts speak of the “five,” “six” or “nine cereals,” others of the “eight” or even the “hundred cereals,” concluding that “the classification of cereals is indeed complicated.” Then Li gives a definition of cereals from the Suwen 素問 section of the Huangdi neijing 黃帝內經, the Bible of Chinese medicine. Its definition is purely utilitarian: “The five cereals are the staple food (yang 養).” Li himself defines the vegetables as “those plants which can be eaten (ru 茹).” He then quotes the Suwen: “the five vegetables complement (chong 充) [the cereals].” As for fruits, Li remarks that the fruits of trees are called guo 果 while those of vines are called luo 麥. “When they are ripe they can be eaten to stay hunger, and when they are dried they can be eaten as relishes. The Suwen says that the five fruits help (fuzhu 輔助) [the cereals].” 29

with twenty-seven chapters on flowers, and ends with four on medicinal plants.

28 Gu was also used to designate (i) the millet Setaria italica, that is to say the most widely grown cereal of the central regions of the Chinese state in antiquity, and (ii) any unhulled cereal as distinct from mi 米, milled grain. Bencao gangmu, (Beijing: Renmin Weisheng Chubanshe, 1985), 22: 1433.

The “definitions” just cited may seem to us inadequate, coming as they do from the scholar who went furthest towards perfecting the precise description of plants, in certain cases even grouping them—if implicitly—into natural families. But unlike post-Renaissance European botanists, Chinese scholars never gave their general categories precise meanings accepted by all the learned. They were prepared to accommodate the imprecisions of the vernacular and of popular categories; as we may imagine, in a country as vast and diverse as China this led to much confusion. Xu Guangqi 徐光啟, author of the masterly work on agricultural management entitled Nongzheng quanshu 農政全書 (published in 1639), recognises the extent of the problem in a passage discussing the terminology of millets, which used to be the staple cereals of North China:

What anciently was called shu (Panicum miliaceum) is still known by the same term today, or sometimes it is called “yellow grain” (huáng mǐ 黃 米). Ji (Setaria italica). Formerly setaria was often known as “the cereal” (gu [see above]) or sometimes su崇拜, ... Plants grown over a vast area and [very] useful are all called by a common name, as in times past, and even today, everyone just calls setaria “the cereal.” In Xinjiang (Northwest China) people refer to turnips simply as “the vegetable,” while in Wu (Southeast China) jujubes are called “the fruit” ... and in Luoyang the peony is called “the flower.”

The term shu was used by Chinese peasants at that time not only for panicum millet, but also for sorghum (Shu shu 蜀黍, “Sichuan panicum”). Maize was assimilated sometimes (because of its height) to the sorghums (as yu Shu shu 玉/御蜀黍, “jade sorghum” or “imperial sorghum”), and sometimes (because of the size of its grains) to wheat (yu mai 玉麥, “jade wheat”). As Xu Guangqi says, all these are borrowed terms. But authors naturally tended to group plants of the same name together. One striking example is that in all the bencao, beginning with the Shen Nong bencao 神農本草 of the late first or early second century, and including even the Bencao gangmu (1596) by Li Shizhen (who elsewhere devoted considerable pains to elucidating the true relations between certain plants of the same name), the opium poppy is grouped with the cereals because it is called “bottle setaria” (yīngzǐ su 酪子粟). It is true that the seeds of the opium poppy, which were used as a drug, resemble those of setaria millet, but the opium poppy has

31 Nongzheng quanshu (Shanghai: Guji Chuganshe, 1979), 25: 620.
32 His analysis of the ways in which the various species and varieties of trees called tong 棗 are related is remarkable for its botanical precision; see Métaillé 1988.
never been a “staple” in China, and it is to be noted that it does not figure among the cereals in any Chinese agricultural work, but only in the pharmacopoeias.\textsuperscript{33}

We also find differences between the sub-groupings in the \textit{bencao} and the \textit{nongshu}, and these reflect the importance of utilitarian criteria in Chinese classification. The order in which the entries are arranged, for instance, is significant and varies from one genre to another. “Cereals” are one example. Although the very first \textit{bencao}, the \textit{Shen Nong bencao}, subdivided the categories of drugs into three groups according to their pharmacological properties,\textsuperscript{34} later \textit{bencao} did not adhere strictly to these divisions and the order of drugs in each section seems to depend more or less on the author’s evaluation of their efficacy.\textsuperscript{35} Thus in every \textit{bencao} sesame (\textit{huma} 胡麻 or \textit{zhima} 指麻) heads the cereals because of the many beneficial properties attributed to its oil; all the other \textit{ma} (see above) are also grouped at the beginning of the section to accompany sesame. However in the \textit{nongshu} sesame, like all the other \textit{ma}, is always to be found at the end of the category of “cereals.” The order of cereals in an agricultural treatise suggests the relative economic importance of various crops at that period in that region. In the \textit{Qimin yaoshu} 齊民要術 of circa 535, which describes the agriculture of the Northern plains, setaria is at the top of the list of cereals. Once the economic centre of China has shifted to the South, by the Song dynasty, the great agricultural treatises put rice in first place. However a monograph like the \textit{Mashou nongyan} 馬首農言 of 1836, which describes the very harsh conditions of Shaanxi province, gives primacy to hardier species like panicum.\textsuperscript{36}

Could the Chinese scholars who compiled \textit{bencao} have ordered each section on the sole criterion of pharmacological properties? No, such a system would not have been workable. According to the Chinese conception the qualities of a natural object cannot remain the same if the conditions surrounding it change. It was not possible to fix the characteristics of a particular plant, for they would depend on its environment and climate, when it was gathered, and how it was processed. Nor was it reasonable to suppose that different products derived from the same plant would share the same properties. Li Shizhen says, speaking of wheat:

\textit{Wheat:} sweet sapidity, slightly chilling, non-toxic . . . The nature of new wheat is hot, of old wheat balanced . . .

\textsuperscript{33} Xu, \textit{Nongzheng quanshu} (Shanghai Guji Chubanshe, 1979), 25: 629.

\textsuperscript{34} Unschuld 1986: 42.

\textsuperscript{35} See Métailié 1988 on the groupings developed by Li Shizhen, who often puts together plants that belong to the same natural family and in consequence possess similar properties.

\textsuperscript{36} Bray 1984: 441 ff.
Wheat noodles: sweet sapidity, warming, slight toxicity . . . Northern noodles have a warming nature and eating them does not produce thirst, but Southern noodles have a heating nature and eating them does produce troubling thirst. The noodles of the Western frontier regions are cooling. All these effects are the result of the local qi . . . In the North frosts and snow are abundant, therefore the noodles are not toxic, but in the South snow is rare and so the noodles are toxic.37

Because Chinese scholars depended on utilitarian criteria, the reader of a particular genre, whether bencao or nongshu, could share the experience of the authors through his own intellectual training or practical experience. He could thus understand the tacit interplay between criteria that determined divisions and groupings. Even if a work was unfamiliar, experience allowed him to make an educated guess as to its detailed organisation. Utilitarian classification was thus perfectly workable, at least for experienced readers. It is therefore natural that each genre should have had its own set of criteria and thus its own patterns of organisation.

Western understandings and orderings of the natural world have been shaped by philosophers observing society in a detached way, striving for objectivity and abstraction and for ever more comprehensive “natural” classifications. They value consistency within and between systems of knowledge. They reject utilitarian criteria as patently subjective. As a result, knowledge has become increasingly professionalised and difficult of access to those without scientific training.

In China, on the other hand, the fundamental understanding of nature was relative, with resonances and transformations as primary explanatory factors, and little place for rigid relationships. Most natural philosophers belonged to the bureaucratic class and many held high positions in government. Their professional concern for the welfare of the people imposed a pragmatic approach to knowledge. They were not motivated to be disinterested observers. Natural objects such as plants or animals were of interest, not because of their intrinsic, “essential” qualities and the place they occupied in a complete natural system, but because of the functions they served within a particular technical system—medicine, agriculture, or poetics. This utilitarian approach does not require consistency between systems, and so it is not rigorously “scientific” by Western standards. But that is not to say that it is not estimable as science. Since the classifications are based on widely known criteria of utility and not on abstracted physical characteristics, its strength lay in being an open system of knowledge, more readily accessible to ordinary people and more adaptable to their use than a system that only specialists can apply.

37 Bencao gangmu, 22, 1451-3. The passage on noodles is from Li’s commentary.
Essence and Utility

The Classification of Crop Plants in China

by

Francesca Bray

There are many things about China that we explain in terms of its two-thousand-year tradition of bureaucracy. Implicit in this term “bureaucracy” is the notion of files, pigeon-holes, ordering and classification, and it would be difficult to deny that the evolution of scientific thought in China was strongly influenced by the fact that most scholars belonged to the bureaucratic class. In general this influence has been considered negative rather than positive. Needham, for instance, links the development of “proto-scientific” ideas not to the mainstream intellectual tradition but to Taoist thought, which conflicted in many ways with bureaucratic Confucianism. Nakayama Shigeru, speaking of the evolution of astronomical studies in China, argues that the “classificatory approach” of Chinese scholars inhibited analysis.

For the Chinese, to engage in scholarship meant to record and classify. Whatever the phenomenon, it was duly noted and put in one of the several compartments set up for classification purposes. Once this had been done, however, the scholar’s job was finished.

But there is nothing wrong with classification as such. One might even suggest that classification naturally leads to the precise analysis of characteristics and of relationships, thus constituting the very basis of a science of nature. What might perhaps surprise us is that the Chinese scholars who devoted so much effort to classification did not take the

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