

# “SCIENCE” VS. “RELIGION” IN CLASSICAL AYURVEDA<sup>1</sup>

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## *Summary*

This paper evaluates claims that classical Ayurveda was scientific, in a modern western sense, and that the many religious and magical elements found in the texts were all either stale Vedic remnants or later brahminic impositions. It argues (1) that Ayurveda did not manifest standard criteria of “science” (e.g., materialism, empirical observation, experimentation, falsification, quantification, or a developed conception of proof) and (2) that Vedic aspects of the classical texts are too central to be considered inauthentic or marginal. These points suggest that attempting to apply the modern western categories of “science” and “religion” to ancient South Asian medical texts at best obscures more important issues and, at worst, imports inappropriate orientalist assumptions. Having set aside the distraction of “science” vs. “religion” in classical Ayurveda, the paper finds support for claims that brahminic elements were later additions to the texts. It concludes by arguing that this is best explained not in terms of a conceptual tension between religion and science but in terms of social and economic tensions between physicians and brahmins.

The status of science in non-western cultures is a small but growing sub-field of the study of relations between science and religion (Peterson 2000:19; cf. Harding 1998; Selin 1997; Goonatilake 1992). This raises questions regarding the scope and value of the terms “science” and “religion” as used in historical and cross-cultural studies. Ayurveda, the ancient South Asian medical tradition, provides a useful case study. This paper examines a variety of claims that Ayurveda was truly empirical, rational, or scientific and that elements of religion and magic in the texts were minor, non-essential, or inauthentic. Evaluat-

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ing these claims will contribute to a broader framework within which issues of non-western science and religion can be discussed.

Several scholars argue that Ayurveda was scientific and that the many religious and magical elements found in the texts were either stale Vedic remnants or later brahminic impositions that sought to repress Ayurveda’s revolutionary empiricism: “In a tradition dominated by the pundits, Ayurveda . . . represent[s] the seeds of secular thought. True, this secularism is almost immediately repressed, normalized, impregnated with a religious vocabulary” (Zimmermann 1987:212). Debiprasad Chattopadhyaya argues that “In ancient India, the only discipline that promises to be fully secular and contains clear potentials of the modern understanding of natural science is medicine”; and he claims that the “magico-religious” aspects of the texts are “alien elements” and “later grafts” (1977:2–4; cf. 1986:30–35). G. Jan Meulenbeld suggests that brahminic domination is the reason that Ayurveda was unable to pursue its empirical course of modifying theories in the light of observed anomalies (1987:4–5). For Kenneth Zysk, remnants of magical elements attest to Ayurveda’s Vedic origins, and a veneer of brahminic elements attest to the “hinduization process” that brought it into the fold of orthodoxy (1991:118). According to these views, the classical texts consist of distinct layers: authentic Ayurveda—empirical, rational, and scientific—and one or more inauthentic and ill-fitting religious strata.

Several characteristics of science play a role in these claims: (1) *reductive materialism* in the characterization of health and disease, the make-up of the human body, and the function of medicinal substances; (2) the role of *empirical observation and inference* in diagnostic practice and as a factor in theory modification; (3) *theoretical rationality* as indicated both by a formal conceptualization of anomalies and by a non-deterministic view of action (situating empirical therapeutics within a more open sense of “karma”); and (4) evidence of rudimentary *professionalization* among ayurvedic physicians.

Religion, as the Other of these arguments, refers both to Vedic tradition, which predates Ayurveda, and Brahminism, which was under-

going important changes as Ayurveda developed.<sup>2</sup> The religion of the brahmins shifted over a period of centuries from an exclusive emphasis on conducting Vedic sacrifices to include supervision of new devotional rituals, often in the temples that emerged in the early medieval period (Wolpert 1989:37–87). These two related religious traditions are characterized to a large extent by normative ideas, practices, and social structures as set out in two sets of scriptures: (1) the *Vedas*, dating from well before the development of Ayurveda, which include a vibrant polytheism, an emphasis on rituals to maintain the natural and social order, the correlated high status of the priestly (brahminic) caste, religio-magical protections from harm and diseases (e.g., spells and amulets), astrology, and a complex symbolism linking food, cooking, divinity, ritual and salvation; and (2) the *Upanishads* (elaborated slightly earlier than the ayurvedic texts), which developed the concepts of reincarnation, karma (the positive or negative causal influence of previous actions, including those from past lives), and *moksha* (salvation by liberation from the karmic cycle of rebirth and redeath). Elements of all these religious views are present in the classical ayurvedic texts.

This paper challenges the way these issues have been framed. The first section of the paper offers a brief overview of Ayurveda, and the second section considers claims that the tradition was scientific and finds these claims to be untenable. The weaker claim that Ayurveda had certain empirical characteristics is well supported. The third section of the paper looks at the place of religion in Ayurveda, finding that Vedic religious elements are too central to be excluded, but that brahminic elements may well be later impositions. Hence, the frequent claim that Ayurveda was science in *categorical opposition* to religion is misdirected. The opposition was not between science and religion, but between two traditions: an ancient medical tradition, with its Vedic elements and empirical tendencies, and a certain type of religion, brahminism. The fourth section of the paper considers the implications of

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<sup>2</sup> We must be wary of assuming that “Hinduism” refers to one unified religious tradition (Sontheimer and Kulke 1989; cf. Brockington 1981).

the fact that a modern opposition between the categories of science and religion has been imposed on these ancient medical texts. The recent academic search for a truly scientific (hence, non-religious) core in Ayurveda is suspiciously similar to the privileging of “modern science” over “traditional religion” in orientalist discourses. This leads us to question the use of these categories not as descriptors of abstract belief systems — distinguished by their degree of resemblance to modern thought — but as strategic levers in ideological struggles. Historical and comparative studies suggest that “magic” often functions as a means of isolating an illegitimate realm from the legitimate realm of “religion” (Benavides 1997). I suggest that the terms “science” and “religion,” as used in discussions of classical Ayurveda, highlight competing positions in just such a social and material struggle for legitimacy. That is, the claim that Ayurveda was “science” (notwithstanding its essentially religious elements) characterizes its *historical competition* with a specific sort of religion. The modern academic use of these terms directs our gaze to ideological and material issues not to a free-floating distinction between rationality and superstition. Following this line of thought, the final section of the paper redraws the lines of tension found within the two main ayurvedic texts: from tension between religion and science to that between ayurvedic physicians and brahminic priests.

### *A Brief Overview of Ayurveda*

Ayurveda is the *veda* (knowledge) of *ayus* (life or longevity). As practiced in modern India, the tradition has changed substantially from its classical roots, incorporating elements of Islamic, western, and folk medicine (Leslie 1976; cf. Gangadharan 1990; Filliozat 1990). The Indian government, under the Bharatiya Janata Party, is currently promoting Ayurveda, with substantial budgetary support, as part of its program of encouraging *swadeshi*, indigenous systems (Kumar 2000). As now practiced in the West, Ayurveda incorporates many characteristics of individualistic self-help spiritualities (e.g., Tirtha 1998; Frawley 1999). Zysk refers to the latter development, which has occurred primarily in North America over the last decade and a half, as

“New Age Ayurveda” (2001). In this paper, “Ayurveda” refers solely to the classical medical tradition as set out in the ancient Sanskrit texts.

The primary texts of classical Ayurveda are the *Caraka Samhita* and the *Susruta Samhita*.<sup>3</sup> The earliest strata of both texts date most likely from just before the Common Era, though it seems likely that both works, if not compilations in their entirety, were at least substantially reworked as late as the ninth or tenth centuries (Wujastyk 2003:3–4, 63–64; cf. Meulenbeld 1999:114, 130–141, 341–344; Zysk 1991:33; Weiss 1980:94, 103; Hoernle 1982 [1909]). *Caraka* pays more explicit attention to theory. *Susruta* is primarily a surgical text, with its well-known and influential chapters on types and uses of surgical implements (*Susruta*, Su. 7–9). Both texts mention the importance of the *Atharva-Veda* to Ayurveda: for example, brahmins versed in that Veda are to be present at childbirth (*Caraka*, Sa. 8.34; cf. In. 12.80), and mantras from it are to be recited before all meals in order to detoxify food (*Susruta*, Su. 46.141).

Yet Ayurveda introduces a unique focus on the physical body and its processes, with an emphasis on observation and on the importance of grounded theoretical principles for successful therapeutics. On the one hand, we might expect a medical tradition from any culture to be relatively well grounded in observation and experience. On the

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<sup>3</sup> Except where noted, translations of *Caraka* are from the version of Ram Karan Sharma and Vaidya Bhagwan (1976–94) and those of *Susruta* are from the version of Kaviraj Kunja Lal Bhishagratna (1991). Priyavrat Sharma’s translation of *Caraka* (Sharma 1994) and *Susruta* (Sharma 1999), and Dominik Wujastyk’s selective translations of ayurvedic works (Wujastyk 2003) were also consulted. References to *Caraka* and *Susruta* are by book, chapter, and verse. The eight books of *Caraka* are Sutrasthanam (abbreviated as “Su”), Vimanasthanam (Vi), Nidanasthanam (Ni), Sarirasthanam (Sa), Indriyasthanam (In), Cikitsasthanam (Ci), Kalpasthanam (Ka), and Siddhasthanam (Si). The six books of *Susruta* are Sutrasthanam (Su), Nidanasthanam (Ni), Sarirasthanam (Sa), Cikitsasthanam (Ci), Kalpasthanam (Ka), and Uttara-Tantra (Ut). For an overview of the wider range of classical ayurvedic literature see Jaggi 1973. For detailed summaries and discussions of historiographic issues see G. Jan Meulenbeld’s magisterial five-volume *History of Indian Medical Literature* (1999–2002).

other hand, according to those who see the tradition as scientific, the ayurvedic physicians developed something uniquely empirical and rational among ancient systems of thought: “Discarding scripture-orientation, they insist on the supreme importance of direct observation of natural phenomena and on the technique of rational processing of the empirical data. . . .” (Chattopadhyaya 1977:7). It is in this attempt to go beyond describing therapeutics to explaining health and disease that Ayurveda stands out.

Ayurvedic physicians are to seek the happiness of their patients, which involves primarily the prevention and cure of disease. However, wealth, happiness in the next life, and *moksa* (salvation) are frequently mentioned as secondary goals. Diseases are caused primarily by the inappropriate use of the mind and senses, though the immediate bodily manifestations of disease are explained in terms of material processes and entities. Proper use of mind and senses depends on the constitution of the individual, the time of the year, and ethical factors. Diseases are also caused by gods, demons, and patients’ actions in their past lives. Karma only partially determines an individual’s mental and physical constitution and causes disease only to a limited extent. As a result, healthy living and therapeutic actions can affect health in this life, despite karmic influences.

In treating disease, ayurvedic physicians seek to maintain the equilibrium of various physical components of the human body: the *dhatus* (tissue elements), *rasa* (chyle, plasma), blood, flesh, fat, bone, marrow, and semen. Magical cures, involving amulets and mantras, are recommended in certain cases, but the primary therapeutic focus is materialistic. The primary ayurvedic therapies are drugs, diet, emesis, purgation, and enemas. The common material basis of food and the body are central to all ayurvedic therapies. Food is “cooked” in the body and reduced to a component that nourishes the seven tissue elements, each in turn, and a waste component that nourishes the impurities of the body, the *malas*. The *malas* include bodily emissions and, most importantly, the three *dosas* (humours): *vata*, *pitta* and *kapha*. So long as the *dosas* remain in proper balance for each individual, they present no problem.

Disequilibrium of the three *dosas*, however, is the primary cause of disease and is the main focus of ayurvedic medical treatment.

### *Ayurveda as Science*

Recent claims that Ayurveda was scientific are explicit that “science” is to be taken here in terms of “the modern understanding of natural science” (Chattopadhyaya 1977:2; cf. Zimmermann 1987:212; Meulenbeld 1987:4–5). This section considers several ways in which Ayurveda might appear, at first sight, to be scientific in this narrow sense: materialism, empirical observation, experimentation, falsification of theories, quantification, a developed conception of proof, and two specific logical concepts (*prabhava* and *yukti*). The purpose of this section is to measure Ayurveda by this modern western definition of science, in order to evaluate claims that it does, in fact, meet this definition. A close reading of the texts leads to the conclusion that Ayurveda was not properly scientific according to these criteria, though it was empirical, i.e., observation-based, in more general ways that would seem to apply to any medical tradition.

Many aspects of Ayurveda are materialistic. A wide variety of medicinal substances are held to bring about the equilibrium of the components of the body. Observation of physical symptoms (e.g., pain, complexion, strength, appetite, sleep, digestion — *Caraka*, Vi. 8.89) is central to correct diagnosis and treatment. In addition, the physical environment is held to play an important role in health, disease, and the efficacy of medicinal substances (e.g., *Caraka*, Vi. 3.7–8). The concept of time also reflects attentive observation of material phenomena (i.e., a broadly empirical stance). For example, time is an important factor in the constitution of the embryo (*Caraka*, Vi. 8.95, Sa. 2.29). In addition, attentiveness to the seasons and to the temporal progression of diseases is a crucial factor in the administration of therapy (*Caraka*, Su. 11.46, 13.18–19, 25.45–47, 26.13, Vi. 8.125–128).

Yet, *Caraka* is explicit that this materialistic dimension is only one approach to medical treatment:

[Therapies] are of two types, viz. spiritual and rational. Spiritual therapy comprises incantation, talisman, jewels, auspicious rites, religious sacrifices, obla-

tions, religious rites, vow, atonement, fasting, chanting of auspicious hymns, paying obeisance, pilgrimage, etc. Elimination as well as alleviation therapies and such other regimens, effects of which can be directly perceived, belong to the category of Rational Therapy. Depending upon the nature of their composition, they are also of two types, viz. those having material substrata [e.g., medicinal substances] and those without having any material substrata [e.g., massage, physical restraint, or frightening the patient]. (*Caraka* Vi. 8.87; cf. Su. 30.28)

This sort of reference to religious therapies is exactly the sort of passage that is held to be a later imposition (or earlier survival) by those who argue that Ayurveda is scientific. Yet merely the presence of materialistic elements does not make Ayurveda scientific.

The above list of material phenomena to be observed underlines the centrality of empirical observation in Ayurveda. But, again this is not sufficient to make it science. For example, observation is used to draw non-material conclusions: *Caraka* holds, for example, that an observable “twinkling of the eye” is evidence for the existence of the Absolute Soul (Sa. 1.70). *Caraka* goes so far as to label as “heterodox” the view that sensory perception is the only path to valid knowledge, insisting on “other sources of knowledge, viz., scriptural testimony, inference and reasoning”; moreover, *Caraka* insists that “it is not correct to say that only things which can be directly perceived exist, and others do not” (Su. 11.8).<sup>4</sup>

Ayurveda’s emphasis on observation as a source of knowledge is not sufficient to support the claim that it was scientific. To be considered empirical in a scientific sense, a system of thought must do more than simply link knowledge claims to observable phenomena; it must do so in certain ways. To support the strong claim that Ayurveda was science, we would need to demonstrate that ayurvedic knowledge was arrived at or extended through processes of experimental verification or falsification. We would need to ask whether the medical concepts were accepted, modified or rejected on the basis of observation or

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<sup>4</sup> Sharma 1994 translates, “Hence it is illogical to say that only perception is there and nothing else.”



experimentation. An empirical relation between data and practice is very different from one between data and theory.<sup>5</sup>

There is no evidence of experimentation as a means of verifying/falsifying theories in classical Ayurveda. Zimmerman finds “No examination, no research, no enquiry or attempt to find a reason for the data. . .” (1987:158). Of course, the texts do encourage certain sorts of observation. Students of Ayurveda are instructed to learn anatomy from “direct personal observation” of “all the various different organs, external and internal” of a human corpse that has soaked in water for a week (*Susruta*, Sa. 5.50–56). Practical knowledge is also grounded in direct experience: students are to practice surgical techniques on gourds and dead animals (*Susruta*, Su. 9.1–3). More intriguingly, the texts give occasional instructions for empirical tests to determine the specific nature of substances:

The test in the case of Gangam rain water consists on exposing to it, for [48 minutes], a quantity of undiscoloured Shali rice in a silver bowl. . . . Gangetic rain water should be ascertained from the fact of the aforesaid Shali rice not being in any way affected in its colour. (*Susruta*, Su. 45.3)

Although such examples reinforce the claim that Ayurveda is empirical in a weak sense, they do not indicate a properly scientific relation between theory and data.

Quantification is often considered a key characteristic of scientific reasoning and method as manifested in ancient medical systems (Lloyd 1986:257). The classical Ayurvedic texts show some limited evidence of this, but not enough to qualify as properly scientific. The ayurvedic texts also attend closely to time, with an emphasis on astrological timing, and attentiveness to the seasons, the duration of alterations in diet during periods of therapy, and cycles of human life and reproductive processes. They specify appropriate dosages of medicinal substances. All these factors again underline the importance of observation. These examples, however, do not “go far beyond the range of what could be

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<sup>5</sup> For an overview of positivistic views of science and of epistemological and cultural critiques see Hacking 1983, Giere 1998, and Sardar 2000.

justified fairly straightforwardly by appeals to readily accessible evidence”; they do not even attempt the “spurious quantification and ad hoc numerological elaboration” that G.E.R. Lloyd finds in some Hippocratic texts (1986:257). In other words, we find an instantiation of *sankhya* (enumeration), a notion important in Indian thought, and we find enumeration linked in a very general way with observation; but we do not find the connections between quantification, experimentation, and theory generation that are hallmarks of modern western science. Once again, claims that Ayurveda was, in fact, scientific in this narrow sense are not supported.

A rigorous conception of proof is another criterion of science that is not clearly instantiated in the classical Ayurvedic texts. The path by which ayurvedic knowledge was generated and established is unclear. We can neither credit nor discount a claim that this knowledge was proven empirically. Despite claims to the contrary, Vedic ritual appears not to have manifested an explicit notion of proof (Lloyd 1990:98–104). The ayurvedic texts emphasize authority and tradition, rather than proof and empirical evidence, as sources of legitimacy for medical knowledge (*Caraka*, Vi. 8.13–14).

Nor is there any appeal to any conception of proof in the rules for debate between physicians (*Caraka*, Vi. 8.15–28). Emphasis is placed almost exclusively on the personal qualities of participants. The text sets out normative standards for supporting substantive positions taken by practitioners within the discipline, and issues of proof do not receive even a superficial nod. Argument is rhetorical not empirical. This neglect of empirical evidence supports the view that Ayurveda’s empirical characteristics were neither logically nor practically fundamental in a manner analogous to modern science. It is not surprising that Ayurveda involved different criteria for authority than does modern western science. However, this difference is one more counter-argument to claims that it was scientific in this narrow sense.

Two other arguments that Ayurveda was scientific point to its conceptual apparatus. First, a set of four concepts (*rasa*, *vipaka*, *virya* and *prabhava*) deals with pharmacological anomalies (*Caraka*, Su. 26.53–79; Sharma 1994:184–187; cf. *Susruta*, Su. 40). That is, these

concepts appear at first sight to represent theory modification in the light of empirical observation. Second, the concept of *yukti* represents a form of empirically based inference uniquely defined by *Caraka* (Su. 11.21–25; cf. Dasgupta 1932:376n1). A closer examination of these concepts will show that, although they are clearly empirical in a limited sense, they are not scientific as Chattopadhyaya (1977:7, 9, 175–179, 207, 314ff., 390) and Larson (1987:250–51) suggest.

Ayurveda has a well-developed set of logical concepts and categories, reflecting its emphasis on causal analysis. It explains the effects of medicinal substances in terms of putatively material substances and processes using an equilibrium model of health. Ayurvedic theory draws on philosophical concepts from other ancient schools of thought.<sup>6</sup> However, it displays several unique characteristics. The logical examples found in the *Caraka* are almost entirely of a medical nature, suggesting that they are integral to Ayurveda rather than grafted on (Dasgupta 1932:402). In addition, *Caraka* mentions but does not use terms for “cause” drawn from different traditions, indicating a reliance on its own tradition of causal analysis (Dasgupta 1932:395).

Medicinal substances are categorized at the most general level according to their *rasa*, taste (*Caraka*, Su. 26.53–79; cf. *Susruta*, Su. 40).<sup>7</sup> Substances with specific combinations of *rasa* are held to act in specific ways upon the *dosas*. A physician infers a specific imbalance of the *dosas* from the patient’s constitution, symptoms, habitat, and the time of year. He then prescribes a specific diet or medicine that is

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<sup>6</sup> Dasgupta argues (intriguingly but not conclusively) that the influential Nyaya system of logic has its roots in Ayurveda (1932:395–402; cf. Chattopadhyaya 1986:33). Chattopadhyaya extends this claim, somewhat less plausibly, in arguing that the Vaisesika categories so central to Ayurveda originated in the medical schools as well (Chattopadhyaya 1977:142, 426). Hendrik Kern argued in 1896 that the Four Noble Truths of Buddhism have their roots in *Caraka*; a number of scholars have echoed his view, though more recent work discounts the claim (Zysk 1991:38; cf. Zimmer 1948:33 and 196n5). G. Jan Meulenbeld offers a useful summary of the secondary literature on these and related issues (1999:109–114, 336–345).

<sup>7</sup> This more general theoretical use of *rasa* (one of the Vaisesika qualities of matter) should be distinguished from the name for the first of the *dhatu*s.

chosen with regard to its *rasa*, so as to counteract the imbalance of the *dosas*.

The ayurvedic physicians recognized, however, that some substances did not have the effect they should have, given their *rasa*. That is, they recognized that their most basic concept of pharmacological categorization did not always reflect empirical facts. This seems a type of trial and error methodology but is not in itself scientific. Where the medicinal action of a substance did not agree with its *rasa*, the discrepancy was accounted for with the second-level concept of *vipaka* (post-digestive taste). That is, the action of the substance was still a result of “taste,” but of a taste that resulted from changes to the substance in the human body. *Caraka* and *Susruta* disagree over the *vipaka* of certain substances, which suggests that the inference of a substance’s *vipaka* from its medicinal effects was somewhat problematic (Meulenbeld 1987:10). The physicians recognized further that sometimes substances with the same *rasa* and the same *vipaka* still differed in their effects. This was accounted for with the third-level concept of *virya* (potency). In the case that two substances had the same *rasa*, *vipaka* and *virya* and still differed in their effects, this was accounted for with the fourth-level concept of *prabhava* (specific action).

This repeated invocation of higher-level concepts to explain anomalies is *ad hoc*. In its broader sense, the fourth-level concept, *prabhava* refers to a power, generally seen as inaccessible to reason, which is manifested in the effects of *rasa*, *vipaka* and *virya*. In its narrower sense, *prabhava* refers to a power, not accessible to reason, that a given substance has by virtue of its *svabhava* (nature) (Meulenbeld 1987:14). *Svabhava*, inherent nature, is the reason that each substance has the qualities or properties that it has: each substance is what it is just because it is that way. Chattopadhyaya translates *svabhava* as “laws of nature” and argues that the concept demonstrates the scientific nature of Ayurveda (Chattopadhyaya 1977:9, 175–179). This is misleading, given that *svabhava* is a quiddity beyond the reach of reason: the ultimate explanation for the behaviour of specific substances is that it is their nature to behave this way. Filliozat argues that Ayurveda is *not* empirical on these very grounds: this chain of concepts is “a dogma-

tism which interprets experience” not a theory responsible to empirical evidence (Filliozat 1964:30).

The series of concepts, *rasa*, *vipaka*, *virya* and *prabhava* show that ayurvedic theory recognized pharmacological anomalies but dealt with them, ultimately, by placing them beyond rational explanation. These concepts demonstrate a clear interplay between empirical observation and theory, but one that is stipulative not scientific. When the facts did not fit the theory, the theory was saved by appeal to a concept beyond empirical observation; it was not modified to more accurately reflect the facts. The fact that observations led ultimately not to theory modification but to an appeal to an irrational concept of nature collapses any analogy with modern science (cf. Meulenbeld 1987:4; Filliozat 1964:29–30).

A separate argument for the scientific status of Ayurveda rests on the epistemological concept of *yukti*. According to *Caraka*, there are four means of attaining knowledge: reliable testimony, perception, inference, and *yukti* (Su. 11.21–25; Wujastyk 2003:25; Sharma 1994:72). *Yukti*, as a term for “reason,” has stood in tension with “authoritative tradition” at several points in the history of Indian thought (Halbfass 1988:207, 278–79, 389, 536n16, 541n94). However, as defined in *Caraka*, the concept is unique to Ayurveda: “When from a number of events, circumstances, or observations one comes to regard a particular judgement as probable, it is called *yukti*. . .” (Dasgupta 1932:376n1). *Caraka* says little regarding the definition or application of *yukti*. *Yukti* “perceives things as outcomes of [a] combination of multiple causative factors” (Su. 11.25). As examples, *Caraka* mentions forecasting a harvest from the condition of the seed, ground and weather, reasoning that fire will be produced when two pieces of wood are rubbed together with sufficient vigour, and predicting the efficacy of therapeutic measures based on specific symptoms. Chattopadhyaya argues that *yukti*, which he translates as “rational application,” indicates the scientific nature of Ayurveda (1977:7, 207, 314ff., 390). Gerald Larson echoes this claim when he translates *yukti* as “heuristic reasoning” and claims that “what the medical practitioners are trying to get at with their notion

of *yukti* [is] an empirical and, indeed, experimental scientific (in the modern sense) approach to reality and experience” (1987:250–51).

Although *yukti* is another example of an impressive attentiveness to empirical observation, there are problems with the claim that the concept made Ayurveda scientific. First, the characterization of *yukti* is too sketchy and ambivalent to support such a claim. Second, the most important classical medical commentator, Cakrapani, (as well as the non-medical commentator Santaraksita) and the respected historian of Indian philosophy Surendranath Dasgupta, question the status of *yukti* as a separate means of attaining knowledge: they argue that it is properly subsumed under the more general case of inference (Dasgupta 1932:375). *Caraka* equates the two at a different point (Vi. 4.4). Third, even granted the value of such a conception of causal inference within an empirical medical tradition, there is no reason to see this as a properly scientific characteristic. The concept of *yukti* is another indicator of the medical tradition’s attentiveness to empirical data but not an indicator of a scientific relation between these data and medical theory.

In sum, the strong claim that Ayurveda was scientific fails, though the centrality of empirical observation is obvious. Ayurveda simply does not manifest characteristics of modern science in anything more than a vague analogous sense. To say that ayurvedic physicians were “working scientists” who developed “the scientific method” (Chatopadhyaya 1986:34) or that Ayurveda manifested an “experimental scientific (in the modern sense) approach to reality and experience” (Larson 1987:251) is simply wrong. This is true whether we consider materialism, empiricism, quantification, experimentation, verification and falsification, or theory modification as characteristics of science and scientific method. The claim that Ayurveda was scientific reduces to the claim that it was broadly empirical. Let us turn now to the corollary that it was non-religious.

### *Religion in Ayurveda*

Religious ideas are found throughout the ayurvedic texts. This section considers the place of four of these — the sacred cow, karma,

religious views of the self, and magical cures — and concludes that Vedic elements are too central to be discounted as marginal but that brahminic elements are not so central. We find no categorical opposition between science and religion; rather we will need to look for a more nuanced tension between this empirical medical tradition and certain religious elements. That is, the claim that all religious elements are external to Ayurveda fails, but the possibility remains alive that the texts do reflect historical tensions between physicians and brahmins.

The first dimension of religion in Ayurveda is the prominent place of cows in the texts. The issue here is the extent to which Ayurveda broke with Vedic tradition (where arguments that Ayurveda was truly scientific hold as a corollary that any Vedic, and brahminic, elements were marginal). The secondary literature reveals a spectrum of views, from continuity to discontinuity. Filliozat holds that “Ayurveda is the legitimate heir to the [*Atharva*] Veda, but it has developed to a large extent the patrimony thus received” (1964:188). Dasgupta notes parallels between the concepts of Ayurveda, especially those of the *Caraka*, and the *Atharva-Veda*, and he states, “it may not be unreasonable to suppose that the Atreya school, as represented by Caraka, developed from the *Atharva-Veda*” (Dasgupta 1932:279). He suggests that the *Susruta Samhita* might represent a tradition with a different provenance. Ultimately, though, Dasgupta emphasizes discontinuity between the Vedic and ayurvedic traditions, stressing the uniqueness of *Caraka*’s materialistic view of the causes of disease (1932:301). Chattopadhyaya emphasizes discontinuity, arguing explicitly against Filliozat (Chattopadhyaya 1977:251–269). For Zimmermann, Ayurveda parted ways with the Vedic tradition from which it emerged because it represents a “movement of thought toward . . . concrete and biogeographical realities” (1987:216). Zysk explains the transition from Vedic to Ayurvedic medicine as a Kuhnian paradigm shift, though he notes that the persistence of magico-religious elements jars with such an emphasis on discontinuity (1991:5, 117). However, as Zysk notes, evidence to support the independent development of ayurvedic theory is missing (1991:119).

However, the case of the cow casts important light on this issue. Ayurveda is ambiguous about the cow. Two views stand in obvious tension. On the one hand, cattle products (beef, milk, urine, and dung) are to be taken internally for medicinal purposes (cf. Chattopadhyaya 1977:389).<sup>8</sup> For example, after giving birth, women should consume a paste made, in part, from “a portion of the right ear of the untamed and alive bull . . . cut and smashed in a stone mortar” (*Caraka*, Sa. 8.41). On the other hand, the cow is to be treated with all the respect due from orthodox brahmins.<sup>9</sup> How are we to interpret a text that holds that cows are to be both eaten and not harmed?

The apparent contradiction is resolved if we accept that the religious elements are earlier survivals or later impositions (Chattopadhyaya 1977:15, 380–387; cf. Zimmermann 1987:186). On this view, divine proscriptions and bovine prescriptions have no common ground. However, the contrast between religious/orthodox and empirical/medical references to cattle is not as sharp as this argument demands. This is not to deny that some passages may well be later brahminic additions. But the majority of passages discussing the therapeutic use of cows clearly echo Vedic tradition and in a manner that makes intrinsic sense within the conceptual framework of Ayurveda itself. Comparison with Vedic views suggests that reverence for the bovine was part of earlier tradition that Ayurveda developed but did not leave behind.<sup>10</sup>

The Vedic idea that all food is “cooked” in the body is axiomatic in classical Ayurveda. In the Vedas, the cow was a potent symbol of the “cooking of the world,” the creative role that sacrifice had in shaping

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<sup>8</sup> See, for example, *Caraka*, Su. 1.68–69, 5.11, 14.25–26, 27.80, 27.218; Vi. 8.136, Sa 8.9; *Susruta*, Su. 45.18ff., 45.81–83, 46.47, 46.115, 46.132; Ci 1.82, 3.44–45, 5.13, 5.34, 9.22–23, 10.15, 11.12, 23.15, 26.20–21.

<sup>9</sup> See, for example, *Caraka*, Su. 8.18, 25.28; Ni. 7.11; Vi. 8.6, 8.11–13; In. 12.71–80; Ci. 9.94; *Susruta*, Su. 29.12; Ci. 24.78.

<sup>10</sup> Although eating cows was clearly problematic for the orthodox brahmins, this wasn’t necessarily true for the Vedic tradition. There are suggestions in the *Rig Veda* that cows were eaten at least on special occasions such as marriages (Srinivasan 1979:19, 73; cf. Wolpert 1989:28). This reinforces the possibility that, even in allowing consumption of beef, Ayurveda developed in continuity with Vedic tradition.



and maintaining the world and its processes (Zimmermann 1987:207, 220). Ayurveda elaborates this cosmic cooking in order to characterize individuals and their relation to their physical environment (Zimmermann 1987:207). For example, several themes important to both Vedic and ayurvedic texts converge in the relation between the cow and its milk. According to the *Rig Veda*, the cow manifests a fundamental ambiguity because it is raw (needing further preparation to be converted into food) yet it produces a cooked food, milk, which is ready to consume (Srinivasan 1979:51, 119, 135). “Cow” is used in the Vedas as a metaphor for “rays of light,” “rays of dawn,” and “dawn” because of the animal’s bright and light-like milk (Srinivasan 1979:45, 118). This connection between the cow and the sun extends to the sacrificial fire (Srinivasan 1979:52, 120–121). Agni, the god of the sacrificial fire, is frequently referred to as a cow or a bull (Srinivasan 1979:81, 142). In Ayurveda, cow’s milk is an elixir *par excellence* because it has the qualities of the vital fluid, *ojas*, the necessary essence of all bodily constituents (*Caraka*, Su. 27.218, 30.9–14; cf. *Susruta*, Su. 15.25–31; Narayanaswami 1990; Tilak 1989:76). The same term is found in the *Atharva Veda*, where Agni is *ojas* and is asked to give *ojas* to the worshipper (Dasgupta 1932:293). Vedic sacrifice sustained the cosmic and social order, and ayurvedic therapies sustained the fluid equilibrium of the human body.

The claim that ayurvedic passages valuing the cow are inauthentic is untenable, given that the Vedic metaphor of cooking is basic to the conceptual framework of Ayurveda. In this case, the alleged rift between science and religion in the ayurvedic texts threatens to throw out the baby with the bathwater — or cooking with the cow. It is one thing to label certain passages as inauthentic; it is something else to call into question the guiding metaphor of the entire system of thought. There seems to be no reason to discount these passages except the assertion that they are non-empirical: the circularity is obvious.

It might be argued that Ayurveda drew on but radically transformed Vedic ideas, using them either as technical terms for new empirical concepts or as new guiding metaphors to frame these (cf. Goonatilake 1992:222). But this is a truism. The metaphor of cooking necessarily

took on a different significance in the light of the physicians’ experience with the material process of the human body and the effects of diet, climate, and medicinal substances. This is really just to assert that Ayurveda drew on but went beyond its Vedic roots, that the two traditions are both continuous and discontinuous. To say that this ancient medical tradition was both somewhat empirical and reflected religious themes of its times is a far cry from showing it to have been science and not religion. It merely asserts Ayurveda to be what it obviously was, a post-Vedic North Indian medical tradition. It appears necessary to think of layers rather than of one static text, but the boundaries between these layers are not sharply defined.

A second dimension of religion in Ayurveda is the concept of karma. The ayurvedic view of karma is cited both as an example of religious ideas grafted onto rational ones and, contrarily, as an example of the extent to which Ayurveda is rational. Dasgupta argues that the ayurvedic view of karma was uniquely rational in its denial of determinism (Dasgupta 1932:402–403; cf. Weiss 1980). Zysk agrees that it was an authentic element of the medical tradition (1991:30). Chatopadyaya, on the other hand, argues that karma was a later imposition on the text by the “brahminic counter-ideology” (1977:186–189).

Karma in *Caraka* explains both certain causes of disease and the formation of the fetus. In both cases, however, karma is only one factor among several. *Susruta*, in fact, does not mention karma in its section on the etiology of disease (Weiss 1980:93). The ayurvedic view of karma is less deterministic than other South Asian views, allowing that actions in this life can override karmic influences from previous lives: “A weak *daiva* (actions during the previous life) get subdued by a strong *purusakara* (action during the present life). Similarly, a strong *daiva* subdues *purusakara*...” (*Caraka*, Vi. 3.33–34).<sup>11</sup> This shifted emphasis from one’s behaviour in past lives to one’s behaviour

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<sup>11</sup> Max Weber’s deterministic and socially conservative view of karma has left a distorted legacy: “. . . the inescapable on-rolling *karma* causality is in harmony with the eternity of the world, of life, and, above all, the caste order” (Weber 1958a:121). Ayurveda is the clearest counter-example to Weber’s overly deterministic view of

in this life (Weiss 1980:110). In addition, physical circumstances and medical therapies can override karmic influences. That is, the physical and mental constitution of the individual is not solely a result of karma: the constitutions and actions of the parents, time of year, and even the diet of the pregnant mother are held to be contributing factors. Both these dimensions of Ayurveda's view of karma make room for the view that diet, medication and the proper use of mind and senses in this life can have an effect on health and disease. Hence, there seems to be no need to argue, as Chattopadhyaya would have it, that karma is a later religious imposition.

Although the ayurvedic concept of karma opens the door for an empirical therapeutics, the concept is used in a way that counts against the claim that Ayurveda was scientific. Karma is used to explain diseases that do not fit the pattern of an imbalance of the *dosas* and cases where the disease is resistant to treatment: "Notwithstanding this success of Ayurveda in assimilating a karma doctrine, from an etic perspective it manifests an abandoning of empirical medical methodology in the face of insurmountable illness" (Weiss 1980:109–110).<sup>12</sup> Karma, like the concepts of *prabhava* and *svabhava* discussed above, is used in an *ad hoc* manner to explain anomalies.

A third dimension of religion in Ayurveda consists of religious views of the self.<sup>13</sup> Ayurvedic texts focus primarily on the constitution and ailments of the physical body: "The body constitutes the root cause of the well being of the individual. . . . Leaving everything else, one should maintain the body. For if there is no body, there is nothing that can be made available to the individual" (*Caraka*, Ni. 6.6–7). However,

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karma (cf. Weiss 1980). For other more nuanced South Asian views of karma see Doniger 1980 and Keyes and Daniel 1983.

<sup>12</sup> E.g., "disorders which are not corresponding to the vitiation of *dosas* are found to have been caused by the wrath of god etc." (*Caraka*, Sa. 6.27, trans. Sharma 1994).

<sup>13</sup> It would be misleading, of course, to search for a modern Western sense of "self" in Ayurveda. A number of studies have explored aspects of distinctly different dimensions of self-perception, self-formation, and social agency in modern South Asian cultures (Derné 1995; Roland 1991; Trawick 1990; Daniel 1987; Carrithers *et al.* 1986; Ostor *et al.* 1982; Kakar 1978).

this material, embodied conception of the human self is not the only one found in the classical texts: the religious doctrines of *karma* and rebirth, *moksa*, and union with *Brahman* are present in the texts and offer alternative views. For example, Ayurveda is the science of *ayus* (“life” or “longevity”), but *anubandha* (that which transmigrates from one body to another) is a synonym for *ayus* (*Caraka*, Su. 1.41–42). Once again, discussion centres on whether these other views can be shown to be extraneous.

The human object of medical knowledge and practice is discussed in terms taken largely from the Vaisesika and, to a lesser extent, the Samkhya philosophical schools (e.g., *Caraka*, Sa 1.17, 53). Mind, soul, and body together constitute *Purusa*, the subject matter of Ayurveda (*Caraka*, Su. 1.46–47). *Prakrti* is the source of creation, and the other components of *Purusa* evolve from it under the influence of a disequilibrium of the three fundamental principles (*gunas*): *sattva*, *rajas*, and *tamas* (*Caraka*, Sa. 1.67–69; cf. *Samkhya-karika* 25). Even here, in the most material and empirical discussion of the constitution of human beings in *Caraka*, we find a view that is not exclusively so.

In addition to this philosophical view, not widely used in *Caraka*, the text has other less materialistic views. Three are especially relevant. First, *Caraka*’s section on embryology states that the combination of soul, mind and the five fundamental “subtle” elements is that which transmigrates (Sa. 2.31; cf. 2.35–37, 3.1–3, 8, 18). Second, *moksa* (salvation or liberation from the karmic cycle) is repeatedly stated to be a goal of life in *Caraka*. Knowledge of one’s true nature as identical with all the universe is said to lead to union with *Brahman*, and ayurvedic knowledge is included as one of the paths to salvation (*Caraka*, Sa. 5.11–12, Su. 25.40; cf. 1:435). Third, the fetus is said to be a result of two factors: the union of father’s semen and mother’s blood, and the admixture of the *atman* (true self or universal mind) with the subtle body (the immaterial body that transmigrates). The latter is the means whereby the individual’s *karma* affects the fetus. *Atman* is the eternal sustainer of consciousness (*Caraka*, Su. 11.13); but it senses only when in contact with the sense organs, and it knows

only through its constant association with mind (*manas*) (*Caraka*, Su. 1.46–47, Sa. 1.75–76, 3.18–19; cf. Dasgupta 1932:310, 369).

*Caraka* describes human nature in conflicting ways: as embodied, as transmigrating, and as identical with the universe and *Brahman*. We must ask whether the non-materialistic views are inauthentic additions. These views reflect later brahminic rather than earlier Vedic religious beliefs. Simply noting this fact offers no support for the hypothesis of brahminic intervention in the medical texts. After all, *Caraka* is explicit that different views of human nature are relevant in different contexts, with the material view most important for medicine (Sa. 1.132). The possibility remains, however, that these distinct views of the human person reflect a tension between the ayurvedic physicians and brahminic orthodoxy.

A fourth dimension of religion in Ayurveda is the other Other of science: magic. The Ayurvedic texts abound with diagnostic and therapeutic claims that seem superstitious or magical. *Caraka*, for example, in addition to its frequent emphasis an empirical observation and materialistic explanation, contains many such passages: to cite just a few, astrological timing is vital throughout (e.g., Ni. 7.14; cf. *Susruta*, Sa. 10.41, Ci. 13.8); clouds that obscure the moon or confused birds indicate an unhealthy region (Vi. 3.7–8); dreams and omens are important signs (e.g., Ni. 7.6, In. 1.3); wearing appropriate jewels is curative (e.g., Ni. 7.16; cf. *Susruta*, Ci. 24.40); ethical actions such as paying respect to crossroads and not stepping on the shadows of kin results in health (Su. 8.18–19); a small statue of a man will help change the sex of a fetus to male (Sa. 8.19; cf. *Susruta*, Sa. 3.15, 10.2). *Susruta* tells us that the use of a certain oil can allow one to live a thousand years (Ci. 6.17; cf. 28.6), that wearing shoes protects one from evil spirits (Ci. 24.47–48), and that the sounds of drums treated with a certain substance “destroy the effects of even the most dreadful poison” (Ka. 3.12). There is no obvious contradiction in claiming that Ayurveda was part empirical and part magical. That is, the presence of these passages are consistent with the claim that Ayurveda was largely empirical in a weak sense, but not with arguments that it was scientific.

The texts themselves seem at times explicitly to acknowledge the value of different approaches that, at first sight, seem as scientific, magical, and religious (or as properly Ayurvedic, Vedic, and brahminic) (Chattopadhyaya 1977:18, 367). *Caraka* holds that the views of different traditions — e.g., medical, ritualistic (Vedic), and spiritual (brahminic) — are appropriate in different circumstances (Vi. 8.54; cf. Su. 25.26–29). It also distinguishes three types of therapy: therapy based on reasoning (“administration of proper diet and medicinal drugs”); spiritual therapy (using mantras, charms, and gems); and psychic therapy (emphasizing “withdrawal of mind from harmful objects”) (Su. 11.55; Wujastyk 2003:33).

Given the complex intermingling of empirical and magical passages and the texts’ explicit acceptance of these tensions, the view that Ayurveda was scientific in a modern sense begs some problematic footwork. One approach would be to assimilate these passages with Vedic tradition, to say that “magical” and “Vedic” are equivalent (cf. Zysk 1991:118). The Vedas, above all the *Atharva Veda*, contain many similar passages. There are two problems with this: it adds to the difficulty of excising these passages as inauthentic by revealing a more pervasive and complex relation to Vedic tradition; and the variety of “magical” elements transcends Vedic models. For example, even in passages where the “rational” nature of the ayurvedic texts is emphasized exclusively, a look at the source text often indicates a striking admixture of magical elements whose origin is not obviously the Vedas (e.g., *Caraka*, Su. 8.18–29; cf. Dasgupta 1932:420–421; Chattopadhyaya 1977:144–145). Another approach would be to suggest that the texts reflected contemporary popular beliefs at these points, rather than the Vedas themselves: the later history of Ayurveda demonstrates the inclusion of such elements (Leslie 1976). However, any attempt to discard “non-science” from the texts would leave us with even more complex strata of non-empirical elements to explain away, yet with insufficient evidence to do so.

A third option would be to argue that many of the magical elements were a best guess empiricism appropriate to the times, formally

empirical but substantively inaccurate (cf. Chattopadhyaya 1977:158, 172–173). For example, *Caraka* tells us that

Ayurveda has eight branches, viz., 1. Internal medicine, 2. Science of diseases specific to supra-clavicular region, viz., eye, ear, nose, mouth, throat, etc., 3. Surgery, 4. Toxicology, 5. Science of demonic seizures (Psychology), 6. Pediatrics, 7. Science of rejuvenation and 8. Science of aphrodisiacs. (Su. 30.28)

Is the “science of demonic seizures” to be taken as science, religion, or magic? Given that modern psychology has lagged behind the physical sciences, we might give the benefit of the doubt to ancient physicians labouring to explain the human mind in empirical terms. Ayurvedic discussions of insanity reflect a curious mixture of empirical aspects — symptoms of insanity caused by an imbalance of the *doshas* or by traumatic events include noises in the ears, spasms, incoherent speech, inappropriate anxiety or outbursts, loss of appetite, and continual anguish — and “magical” or “religious” aspects — certain dreams, “riding undesirable vehicles,” and the desire to injure cows or brahmins are all symptoms of insanity caused by demons, by going to a crossroads alone, by improper scriptural recitation or interpretation, by visiting a sacred tree or temple in an unclean state, or by the influence of inauspicious planets (*Caraka*, Ni. 7.7–14). Arguing that magic and religion fill in the gaps where empirical science has not yet reached would be one approach to maintaining, in principle at least, the line between scientific and “magico-religious” elements of the texts. After all, the former are more prominent in discussions of “endogenous” insanity and the latter of “exogenous.”

However, there are three problems with the attempt to excise “magical” elements by considering them a sort of proto-empiricism. It addresses only a small subset of such elements. It is circular by virtue of too rigid a view of science, taking parts of the text at face value when it suits the argument and discounting others. And, most importantly, it takes for granted that the concepts of science, religion, and magic can be used uncritically in historical and cross-cultural contexts. If we press the ayurvedic texts through a conceptual colander designed to filter out the non-empirical, we can conclude nothing apart from the

fact that this medical tradition, like most, if not all, others, contains some empirical elements.

In sum, the argument that Ayurveda was non-religious fails, as did the argument that it was scientific. The Vedic metaphor of cooking is too central to exclude. Other magical and religious elements are too prominent and explicitly acknowledged simply to explain them away, barring support from a thorough redaction analysis. However, certain elements (e.g., Upanishadic conceptions of the self) are not as central. Here the argument that the texts reflect later brahminic impositions seems at least tenable. Yet the argument that all religious and magical elements are extraneous to Ayurveda proper fails. The line between science and religion simply cannot be drawn through these ancient medical texts as Chattopadhyaya, Zimmermann, Zysk and others suggest. If there is a tension between elements of the text, this is not a categorical opposition between science and religion, but between the general empirical bent and a very specific subset of religious passages. This leads us to ask why so much effort has been expended to apply the inappropriately general categories of science and religion to these texts. Perhaps there is something more here than a simple misapplication of modern western categories.

### *Ideological Roles of “Science”*

The general import of the arguments we have considered is that Ayurveda (1) was historically rooted to some extent in the “magico-religious” Vedic tradition, (2) developed independently as an “empirico-rational” tradition, and (3) was later assimilated by the “orthodox” brahminic tradition. The trajectory is a plateau, up from religion to shine briefly as a beacon of proto-scientific empiricism, then down to religion again. An implicit valuation of science over religion haunts this debate. If “scientific” Ayurveda supposedly *stands out* from its “religious” background, we should question not just the positive evaluation of the former but also the negative evaluation of the latter.

In 1613 Jesuit missionary Roberto Nobili included “Aiur vedam” in his list of the sciences of the brahmins, and he drew an implicitly



ideological line through each of the various *scientiis quas Brahmanes tractant*. (At this time, of course, “science” was a general term for a system of thought.) On the one hand, Nobili sifted his sources for what he considered to be religion, and he found in the concept of Brahman a reference to the “one, true, immaterial God, at least as far as it was possible for him to be known through the natural light of reason” (Halbfass 1988:40). On the other hand, Nobili considered the majority of brahminic teachings, which did not echo his Christian conception of religion, to be “primarily secular, natural wisdom; the role of the Brahmins and their function, as well as their customs and insignia, were mundane and social in nature, not religious; they were ‘wise men,’ not idolators or temple priests” (Halbfass 1988:41). The seventeenth-century Jesuit missionary had a vested interest in finding “religion” at the heart of Hindu “science.”

Is it possible that twentieth-century quests for “science” in Ayurveda reflect a symmetrical concern to find reflections of another dominant Western worldview at the heart of Hinduism? These questions lead us to consider the possibility that attempts to pan scientific gold from religious silt in the ayurvedic texts reflect orientalist assumptions.<sup>14</sup>

Three important points emerge here. First, academic writings on India and Hinduism have taken shape in a space of contact between South Asia and the West, in which space the West has had greater power, political and economic, throughout most if not all of the last century and a half when the majority of such academic writings were produced. Second, the concepts of religion and science — along with related terms such as Hinduism and rationality — have been interpreted and defined in a variety of ways in these discourses, and these struggles over the basic terms of debate cannot in good conscience be separated from struggles for economic and political power (cf. Benavides 2001).<sup>15</sup> Third, all sides of these debates are complex, with

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<sup>14</sup> On orientalism see Tibawi 1964, Said 1979, Inden 1986.

<sup>15</sup> To define “science” purely in terms of theory, method, data, and their mutual relation (e.g., materialism, reductionism, replication, falsification) neatly sidesteps the question of science’s relation to power. It also fails to capture other important

a spectrum of representations of self and other and with frequent active appropriations of concepts from the other side.

A number of scholars have drawn attention in recent decades to a “tendency to read Indian history in terms of a lack, an absence, or an incompleteness that translates into ‘inadequacy’” (Chakrabarty 1992:5). And science is often that which India, or Hinduism, is said to lack: “The Indian mind is . . . [seen as] devoid of ‘higher’, that is, scientific rationality” (Inden 1990:264). Science has played a key role, for example, in (primarily Western) attempts to explain why the West has been progressive and dynamic in contrast to the conservative, static nature of Indian cultures: “People, in this view, take an active role in shaping their society only insofar as they or, more exactly, their leaders, have scientific knowledge of the physical and biological world and its analogue, the social world” (Inden 1986:415).

Indian scholars also drew on this valorization of science. Science came to be sharply opposed to traditional religious, social, and cosmological ideas in North India in the latter half of the nineteenth century (Baber 1996:197; cf. Sangwan 1988:217). The association between science and power was clearly recognized by the emerging western-educated urban elites: the *bhadralok* of Bengal, for example, “sought education in English and Western science in order to legitimize and consolidate their status in colonial society” (Baber 1996:235–236; cf. Raj 1991). Science was not simply imposed by colonial authorities on the indigenous population of India. Different groups of Indians, both Hindu and Muslim, of different social and regional backgrounds, appropriated the discourse and practice of science to a variety of ends (Sangwan 1988).

On the one hand, science was reshaped in the light of religion: theoretical science was privileged over experimental work. The Brahmin

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dimensions (e.g., social organization and context, implications of the concept of progress, relations to means of production and distribution, cf. Bernal 1965, 1:27–57). It is especially important to consider social and economic dimensions of science, in addition to its distinctive world-view, in discussions of non-western science (Jamison 1994).

elites — whose traditional status was due to their mastery of “clean” knowledge, above all the Vedas — sought to regain status through appropriating the new Western knowledge of science within their traditional paradigm of expertise: “For them science was experimental only in theory. . . . It is thus with the old image of knowledge *qua* clean knowledge that the *Bhadralok* sought those aspects of Western science that would best correspond to it” (Raj 1991:123).

On the other hand, religion was reinterpreted in the light of science:

Impressed and stimulated by scientific and industrial progress in the West, the [Western-educated Bangali] elite began to scrutinize indigenous religions and society in the light of scientific reason, not just rationality. Cultural traditions and social identities were realigned as the elite, infused and licensed by the sign of science, put science’s authority to work as a grammar of transformation to achieve the rearrangement of knowledges and subjects. (Prakash 1996:60)

Hinduism was reshaped in the nineteenth century: a convergence of science and religion produced an almost positivistic monotheism, a belief in the underlying oneness of all phenomena, with a new conception of Vedic tradition as based on the laws of nature (Prakash 1996:72–73).<sup>16</sup>

Attempts to prove that Ayurveda was properly scientific, and that religious elements are inauthentic, resonate in three ways with these discussions of science and religion in discourses on and in India. First, they assert a sharp distinction between science and religion. The quest for science in post-Vedic India presupposes its absence elsewhere, as if, in Ayurveda, we find the exception that proves the rule. This detracts from other aspects of ancient Indian culture: for example, the rationality of the logicians, the materialism of the Ajivikas, the empiricism of the Carvakas, and the empirical observations of the astronomers (cf. Wolpert 1989:86; Dasgupta 1987; Brockington 1981:74ff.; Seal 1982 [1915]; Prakash 1996:63ff.; Chattopadhyaya

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<sup>16</sup> Some scholars argue that Hinduism was not just reshaped but invented during these nineteenth-century developments (e.g., Frykenberg 1989; cf. Halbfass 1988:192, 260, 340) and also by the later consolidation of the field of comparative religion (e.g., Fitzgerald 1990; 2000:134ff.).

1982; contrast Chattopadhyaya 1977:3–4). Second, these arguments seem to presuppose the superiority of modern western science in the attempt to excavate something “rational” from ancient Indian traditions.<sup>17</sup> Third, the conception of science appealed to is too narrowly positivistic, ignoring complex struggles over interpretation and definition.

These considerations lead us to stand back and take a closer look at the implications of using the categories of science, religion, and magic to make sense of these texts in the first place. On the one hand, we might take these terms as somehow natural, allowing us to use them to compare phenomena across time and space. On this view, science is science, religion is religion, and magic is magic in all cultures at all times. A common variant on this view is to take the modern hard sciences and Christianity as normative for “science” and “religion” and to look for analogous features in other historical periods and cultures. On the other hand, we might emphasize varying interpretations or constructions of these terms, by different cultures or scholars. At the relativist extreme of the latter view, categories vary so much from context to context that no possibility of trustworthy comparison remains. The first alternative seems too naïve and the second too sceptical to justify any attempt to engage in research or discussion under their banner.

There is another possibility, “wherein concepts and categories emerge as creatures of history and necessity” (Benavides 1997:303). On this view, religion and magic and the distinction between their respective realms vary across history and cultures according to comparable and investigable processes. The categories are constructed, but similarities

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<sup>17</sup> In this way, the search for science in Ayurveda parallels nineteenth-century Indian reclamations of a “rational” religious tradition. After a long period of mixture with Islamic and folk-medical traditions, including a greater emphasis on spiritual elements, Ayurveda underwent a process of “secularization” in the late nineteenth and twentieth centuries (Leslie 1976:360). Arguments concerning the scientific nature of Ayurveda echo this period when “the Hindu élite relocated science’s authority in its ‘use in this world,’ not in its signification as a mark of western superiority” (Prakash 1996:81).

in the construction process allow us to pursue comparative studies. Benavides discusses “magic” and “religion,” but the emergence of science in the modern West cannot be distinguished from similar historical processes. For Weber, a key measure of historical processes of rationalization in western and non-western cultures was the disenchantment of the world, the degree of systematic organization of a worldview and the extent to which it eradicated magical thought (Weber 1958b:293; 1951:226; cf. Habermas 1981:205; Bird 1984). For Benavides, more specifically,

the emergence of categories involving the distinction between a realm identifiable purely as religious and one involving practices upon the physical world is an ever recurring historical phenomenon, having to do with processes that involve the centralization of power, the restriction of access to goods and the stigmatization of manual work. (1997:305)

In other words, conceptual tensions between “religion,” “magic,” and “science” often reflect social, political and economic tensions. Insofar as each of these terms can carry connotations of legitimacy or illegitimacy, they can play a role in processes of exclusion.

The hypothesis that historical shifts in the balance between concepts of religion, magic, and science reflect social, economic, and political changes is a productive one. More specifically, “the activities of the reformer and the skeptic become possible in interstitial situations”; the invention, “discovery,” or transformation of these concepts “can be seen as the necessary result of the dislocations produced by economic and political changes” (Benavides 1997:321; cf. Bourdieu 1991). This is not a zero-sum game, where an increase in the perceived legitimacy of one of these three terms is necessarily offset by the decrease of another’s. A specific approach recommends itself. In order to make sense of dramatic shifts in historical relations between “religion,” “magic,” and “science,” we can look for correlated social, economic and political changes.

This approach to historical conceptions of “magic” and “religion” has obvious relevance for the case of classical Ayurveda. The arguments we have considered all posit just such a dramatic shift: an abortive legitimization of science over against competing “magico-

religious” traditions. We are led to examine the context within which Ayurveda took shape, to see if the alleged divergence of “science” from “religion” reflected social or other tensions at the time.

*Physicians and Brahmins*

Classical Ayurveda took shape during a period when the social, economic, political, and religious landscape of North India was going through dramatic changes. The texts were written (at least initially) during the period of political fragmentation, increasing trade, and cultural enrichment between the fall of the Maurya and the rise of the Gupta Empires (Wolpert 1989:86). The religious landscape was rich: Vedic traditionalism, the elaboration of the Upanishads, the beginnings of devotional movements, the doctrine of karma yoga, and the codification of the major schools of philosophy gave “Hinduism” a varied texture. Jainism, Buddhism, and a variety of unorthodox traditions also flourished in the same time and space. Hence, it is misleading to posit a uniform post-Vedic culture as the “counter-ideology” that Ayurveda competed against (e.g., Chattopadhyaya 1977). This section considers the admittedly hypothetical possibility that tensions in the ayurvedic texts are best explained by social and economic competition between physicians and brahmins, not by conceptual tensions between the modern western categories of “science” and “religion.”

“Religion,” and by extension “magic” and “science,” delimit conceptual spheres that encompass contact between cultures as well as tensions within a given culture (Benavides 2001). For example, the eleventh-century Islamic scholar al-Biruni, discussing alchemy in the “Hind,” distinguished between magic and science: “We understand by witchcraft, making by some kind of delusion a thing appear to the senses as something different from what it is in reality. . . . Therefore witchcraft in this sense has nothing whatever to do with science” (1982:329). Among the examples of Hindu magic that he discussed, al-Biruni included “charms . . . intended for those who have been bitten by serpents” (1982:335). As noted above, exactly this sort of cure is found in the ayurvedic texts as well as the *Atharva Veda* (*Susruta*, Ka. 5.2–5; cf. Chattopadhyaya 1977:6). Where the magical aspects of

Ayurveda called into question its legitimacy from a later Muslim perspective, its empirical aspects appear to have placed it in tension with one specific stream of its contemporary religious context, the new orthodox, post-Vedic Brahmanism.

Throughout this paper, our attention has been turning from a general tension between science and religion to a specific tension between physicians and brahmins. The likelihood that *Caraka* has at least been reworked extensively, if it is not a compilation in its entirety, underlines the possibility that certain passages were later additions. Several passages are clearly in the interest of the upper caste: “Devotion to the gods and Bráhmaṇas [brahmins] . . . add to one’s good name, piety, wealth, progeny and duration of life” (*Susruta*, Ci. 24.43); “desire for inflicting injury upon the gods, cows, brahmins and ascetics” is a sign of insanity caused by the gods (*Caraka*, Ni. 7.11). It is arguable, in addition, that explicit references to *moksa* as the goal of life and *Brahman* as the true self are later impositions.

Some authors argue that the two primary ayurvedic texts manifest different degrees of brahminic influence. Filliozat argues that “the extremely brahminic contents of the *Caraka-samhita* . . . evokes the idea that its editor was . . . a Brahmin of a Vedic school” (1964:21). N. H. Keswani argues that “Susruta has tried to cast off whatever shackles of priestly domination remained at his time, and created an atmosphere of independent thinking and investigation” (cited in Chattopadhyaya 1977:35). However, this distinction is not persuasive. Both texts manifest significant brahminic elements, and the prevalence of a greater number of such passages in *Caraka* is easily explained by its more theoretical nature, in contrast to *Susruta*’s surgical emphasis (cf. Chattopadhyaya 1977:36). It is hard to credit *Susruta* with freedom from the “shackles of priestly domination” when confronted by a passage such as the following:

The god Brahma disclosed to the world the Atharva Veda together with the eight allied branches of Vedic literature and the science of medicine. And since a priest (Brahmana) is well-versed in the aforesaid branches of study, a physician should

act subserviently and occupy a subordinate position to the priest.<sup>18</sup> (*Susruta*, Su. 34.5)

A hypothetical social argument for the scientific nature of Ayurveda might assert that it manifested one of the key characteristics of modern science, engineering and medicine, namely professionalization. *Caraka* demonstrates three signs of rudimentary professionalization among physicians: an emphasis on correct training; explicit standards of conduct; and a sharp distinction between true physicians and quacks. The classical ayurvedic texts are clear that physicians are to be trained in certain specific ways, and to always carry out their practices in accordance with the principles of medicine: an excellent physician is one who has excellence in medical knowledge, extensive practical experience, and purity (*Caraka*, Su. 9.6, 1.120–133). Following these principles, an intelligent physician can go beyond the text to find appropriate cures not given there (*Caraka*, Su. 4.20). False physicians and fakes are distinguished from genuine physicians (*Caraka*, Su. 11.50–53; Wujastyk 2003:33). One section of *Caraka* lists the characteristics of acceptable medical texts, teachers, students, and methods of study: suitable medical texts are acknowledged by “reputed experts,” “free from contradiction,” equipped with definitions and illustration”; suitable preceptors are those “equipped with practical knowledge,” “pious,” and whose “knowledge is not overshadowed (by the knowledge of other scriptures)”; and daily study should be with “prayers to the gods, sages, cows, *brahmanas*, teachers, elderly and enlightened person and preceptors” and proceed to memorization of the text (Vi. 8.3–7). Once again, the same section of the text contains elements that can be read as “scientific” and as “religious.” An extensive list of professional standards of conduct is to be delivered to the students “in front of the fire, *brahmanas* and physicians” (*Caraka*, Vi. 8.13). Most significantly, the text enjoins respect for ayurvedic, religious and political authorities.

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<sup>18</sup> Sharma 1999:323 translates “the wise physician should abide by the advice of the priest.”



A second social argument for the scientific status of Ayurveda claims that the necessary conditions for its becoming an empirico-rational tradition were met when physicians cohered in the face of social marginalization. This argument seeks to bolster the claim that Ayurveda was scientific by demonstrating that ayurvedic physicians constituted a distinct social group marginalized in the face of an emerging brahminic orthodoxy. If it can be shown that the physicians were in tension with the dominant religious group, this adds plausibility to the claim that passages reflecting brahminic views and interests are inauthentic. This would be extremely persuasive support for the view that Ayurveda's scientific nature was cause and context of social tension with brahmins.

Zysk, for example, argues that physicians "existed outside the mainstream" of post-Vedic society, developing empirical techniques and knowledge through exclusive mutual interaction (1991:24).<sup>19</sup> The *Dharma-shastras* (collections of legal and social ordinances that emerged during the period of Ayurveda's formation, before the writing of the classical texts) have numerous passages that disparage doctors, linking them to unclean social groups (Chattopadhyaya 1977:212ff.). Manu, for example, states that "Doctors . . . and people who support themselves by trade are to be excluded from offerings to the gods and ancestors" (*Laws of Manu* 3:152; cf. 3:180; 4:212, 220).

*Susruta's* instructions on learning human anatomy by dissecting human corpses are cited both as evidence that Ayurveda was scientific and as a factor in the marginalization of ayurvedic physicians (*Susruta*, Sa. 5.50–56; Zysk 1991:37; Chattopadhyaya 1977:94–100; cf. Seal 1982 [1915]:37). Contact with corpses would have been considered

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<sup>19</sup> Chattopadhyaya argues that the esteem of physicians was high, then dropped sharply as brahminic orthodoxy emerged. This allows him to paint the orthodox "counter-ideology" as the arch-enemy of scientific Ayurveda (1977:232ff.). Zysk, however, counters that "Chattopadhyaya wrongly concluded that physicians in the early Vedic period were highly esteemed, an error resulting from his sole reliance on mythological references in the *Rgveda* rather than a more comprehensive picture. . ." (Zysk 1991:22).

extremely polluting, whatever its empirical advantages. The decision to pursue anatomical knowledge in this fashion could well have been a factor in the social marginalization of physicians.

However, this argument assumes that actual practices reflected textual injunctions. Basham holds that dissection was extremely rare until well into the nineteenth century, citing concerns with pollution and a general lack of the very practical knowledge that supposedly rendered Ayurveda scientific: “The complete ignorance and uncertainty of even the best-educated Indians of earlier times about the nature and functions of the various organs of the body is hard to realize nowadays” (1976:29; contrast Sangwan 1988:215). The classical texts’ statements that dissection *should be* carried out do not necessarily imply that it was; we cannot discount the possibility that ayurvedic physicians acted differently than the texts suggest (Obeyesekere 1991:422). It is hard to reconcile textual injunctions to learn by dissection with major gaps in anatomical knowledge presented in the texts: the heart was held to be the seat of consciousness, and the lungs were not mentioned (Zimmer 1948:161–169); even *Susruta*, with its elaborate surgical knowledge, fails to mention the brain, spinal cord, or pancreas (Sa. 5; cf. Bhishagraatna 1991:iii). With regards to the skeleton, however, both *Caraka* and *Susruta* are very accurate. This might suggest that ayurvedic physicians respected the taboo against touching corpses but made observations of skeletons (Zimmer 1948:175–177, cf. Basham 1976:27–29). It is not clear that dissection was practised to the extent necessary to cause the alleged marginalization of physicians, a marginalization held to be a social precondition of their development of a “science” of medicine.<sup>20</sup>

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<sup>20</sup> There is another way in which this argument for the marginalization of physicians fails to consider possible alternative explanations. The view that Ayurveda emerged in opposition to and was later absorbed or repressed by brahminic orthodoxy considers only external influences. However, counter to Zysk’s view, it is arguable that Ayurveda (like the religious traditions with which it was allegedly in competition) *failed* to establish itself as an independent empirical tradition because it *lacked* the proper social conditions. Max Weber argued that modern empirical science emerged after a long history of rationalization processes, primarily of the world-views of salvation

Nor is it clear that the social status of physicians in post-Vedic society was low or marginal. *Caraka* clearly places medical studies within the traditional caste system, citing its value for each of the three highest castes: “Ayurveda is to be studied by *brahmanas* for providing benefit to all creatures, by *ksatriyas* for protection and by *vaisyas* for earning livelihood” (*Caraka*, Su. 30.29). *Susruta* ranks the king’s physician almost on a par with his priest (*Susruta*, Ka. 1.5, cf. Basham 1976:32). Some ayurvedic physicians had powerful clients (Jaggi 1973:74). In general, ambivalence of social status appears to have been the case down to recent times, with physicians subject to both respect and denigration depending on circumstances (Basham 1976:32–39). The argument that marginalization of ayurvedic physicians provided the conditions for their developing into “working scientists” is not supported (Chattopadhyaya 1986:30; cf. 1977).

To sum up, the texts show clear evidence of rudimentary professionalization among ayurvedic physicians. However, this is not enough to establish the degree of isolation from their social context that would support Zysk’s claim that they developed scientific methods through exclusion and marginalization. On the contrary, many elements of this

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religions. A certain type of rationality, a certain way of consistently motivating action, was characteristic of this historical trajectory. In Weber’s terms, Ayurveda manifested practical but not substantive rationality: orienting action with reference to individual interests not overriding normative principles (cf. Kalberg 1980:1164–1165). Ayurveda is inner-worldly but not ascetic: it seeks a long life of healthy happiness, but no larger goal demands allegiance. For Weber, only substantive rationality can provide the necessary conditions for institutionalization of values and for the resulting maintenance of a methodical way of life. That is, for a world-view to become established it needs a shared firmament of values to link beliefs and interests to social actions in a sustainable way. Lacking this, Ayurveda did not possess the necessary internal conditions to survive as an independent empirical tradition. It did not provide a framework of values that could serve as a motivational locus for people to organize their actions and lives around. On this view, Zysk’s “hinduization” process was, perhaps, not a result of conflict but of a lack of adequate social and moral conditions for stability and continuation. Ironically, from a Weberian perspective, Ayurveda may have suffered from an *absence* of rationality.

professionalization bear directly on the nature of relations between the physicians and other members of their society.

The denigration of physicians in the *Dharma-shastras* supports the view that tensions existed between brahmins and physicians. This was likely due in large part to the impurity of physicians’ contact with those outside the brahminical fold. I will end by considering another possible bone of contention between physician and priest, the obvious one of compensation for services rendered.

The brahmins were not securely ensconced in a divinely ordained and stable monopoly of religious goods. The emergence of “the Ideal Brahman” has been a central factor in the historical emergence of “Hinduism” as an object of academic study: but the resulting picture of a static social and religious order, with priestly brahmins holding supreme rank in a rigid caste society originally ordained by the Vedas, does not reflect the historical facts (Van der Veer 1989). The key factor in this valuation of the brahmins (both in the “religious” texts written by the brahmins themselves and in the “orientalist” texts written by western scholars, both of which have had significant normative impact) has been the reification of a certain economic ideology. At the time Ayurveda was developing, the brahmins were not a powerful entrenched monopoly, but they were well positioned to corner a large slice of a growing market of religious goods.

The key concept in the religious economy of Brahminism was *dana*. Etymologically, *dana* is derived from the verb “to give,” and it refers to “the act of giving, bestowing, granting, yielding and prestation, irrespective of what is being given and when” (Thapar 1976:37). *Dana* was, and is, the payment due for ritual services rendered. In the Vedic period, it was closely linked to ritual sacrifice financed by wealthy patrons (Thapar 1976:39; cf. Kane 1975, 2:837ff.; Gonda 1965:212). In the period we are interested in, kings and other royalty became the most visible donors, because of their wealth and the status they gained by granting and protecting endowments made to brahmins and religious institutions (Talbot 1988:2ff.). This most visible of the gifting relations that supported the brahmins misses the level at which we might expect to find competition between physicians and priests.

Three shifts in the nature of *dana* bring this potential for competition between physicians and brahmins to the fore. First, in the late Vedic period, *dana* shifted from “a channel of redistribution of wealth” to “a channel of deliberate exchange” (Thapar 1976:42). Second, a reciprocity between *dana* and merit arose in the classical period, perhaps influenced by the spread of Buddhism: giving to appropriate recipients, defined in terms of moral worth and caste, came to be seen as resulting in merit for the donor (Thapar 1976; cf. Kane 1975, 2:115). Brahmins were the most worthy recipients, but only if they are morally upright and well educated in the Vedas (Kane 1975, 5:937–938; cf. 2:116, 746, 845–6; Gonda 1965:226). Third, *dana* was increasingly set forth as a worthy form of behaviour for householders. This was explicitly enjoined in the *Dharma-shastras*, where *dana* is held to be the special duty of householders (Kane 1975, 2:837; cf. Gonda 1965:216). The same texts that told householders to give to brahmins told brahmins to accept nothing from physicians (Chattopadhyaya 1977:213).

The brahmins were broadening their market of ritual services during precisely the period when ayurvedic physicians were seeking to support themselves by offering medical treatments. This overview of the religious economy highlights the distinction between the two streams of “religion” that are present in the ayurvedic texts. The Vedic tradition provided the central metaphorical framing for Ayurveda, but this conceptual relation had little practical bearing on the livelihood of the physicians. The orthodox brahminic tradition, on the other hand, was changing in a manner that brought its experts in great economic and social competition with the physicians.

Physicians and brahmins were competitors. On the one hand, there was overlap in terms of relevant expertise. The degree of this overlap depends, to some degree, on the degree to which Vedic (“magical”) cures were part of the ayurvedic toolkit. In addition to the above arguments that Vedic elements cannot all be excised, the fact remains that “magical” diagnoses and cures are prominent through the ayurvedic texts, for example in *Susruta*’s otherwise admirably empirical section on toxicology (Ka.). And these passages are clearly distinguishable from those expressing brahminic views.

On the other hand, competition in a more profound sense may have emerged from the fact that Ayurveda shifted emphasis from an other-worldly to a this-worldly economy of human goods in a more profound sense than the *Dharma-shastras*' emphasis on the aesthetic and material spheres of *kama* and *artha*. This is illustrated by the space that the ayurvedic concept of karma carved out for this-worldly causal explanations. Aside from competition for the opportunity to exercise their profession, Ayurveda proposed a competing theodicy, a possibility of this-worldly salvation based in part in empirical observation and experience. This can hardly have escaped the notice of the brahmins who were actively working to corner the market in salvation.

In the light of strictures and scriptures that set out the brahmins' place in a developing religious economy, we must turn to the ayurvedic texts in order to compare the economic placement of the physicians. Here we encounter a curious, though enlightening, silence. The classical ayurvedic texts say nothing of fees, not a word regarding remuneration or gifts (cf. Jaggi 1973:74). We would expect to find some discussion of the economic integration of physicians whether their profession was entirely independent of or in sharp conflict with the brahmins. The absence of any account of a competing sphere of circulation of goods lends indirect support to the claim that the texts were edited by parties sympathetic to the brahmins, edited in a manner that minimized any reference to competition with the religious economy of the priests. One rare passage that hints at payment for medical services underlines this point even more sharply. One of the precepts to be passed on from master physician to students (in the presence of brahmins) states, “If you want to achieve success in your medical profession, earn wealth as well as fame and attain heaven after death. You should in all circumstances pay for the well-being of cows, brahmins, and all other living beings” (*Caraka*, Vi. 8.13).

The fact that no term equivalent to “science” emerged to frame both sides of this debate in the classical texts of the two parties illustrates a key point. Benavides suggests that “religion” emerges historically as a category within which traditions or cultures can negotiate their similarities and differences; the opposition of “religion” to “magic,” for exam-

ple, can function to reify the struggles for legitimacy that are implicit in such negotiations (2001; 1997). Concepts of “religion,” “magic,” and “science” can work in two directions, unitarily as umbrella terms encompassing the negotiation of similarity and difference, or differentially to claim legitimacy for one set of beliefs and practices over against another. In the present, “ayurvedic science” must refer not to a foreshadowing of modernity but to the space of an abortive struggle for legitimacy in post-Vedic India. This recognizes both the tension between physicians and priests and the fact that the development of Ayurveda’s alternative worldview did not proceed to the point where ‘science’ emerged as a “realm within such differences becomes visible” (Benavides 2001:106). Ayurveda appears to be “scientific,” not in a modern sense, but in sense similar to that in which medieval alchemy came to be seen as “magical.” The key issue was not the presence of empirical characteristics in a worldview that seems truer or more objective nearly two millennia later. The important issue was rather that Ayurveda presented a competing worldview to the brahminic orthodoxy that was attempting to extend and consolidate its position in the post-Vedic economy of salvation.

### *Conclusion*

Classical Ayurveda was not scientific, in a modern western sense, despite claims to the contrary. It manifested a number of empirical characteristics, above all an emphasis on observation in diagnosis and therapy. It also produced a theoretical view of health and disease that privileged materialistic and this-worldly explanations. However, it did not manifest the defining characteristics of modern science: thoroughgoing materialism, purely empirical observation, experimentation, falsification of hypotheses and theories, rational quantification, a developed conception of proof, or logical concepts instantiating a scientific relation between theory and data. In addition, again despite claims to the contrary, Ayurveda lacked the social preconditions of modern science.

Nor did Ayurveda clearly distinguish between what we would now call “science” and “religion.” The many religious and magical

elements are not necessarily extraneous, marginal, or inauthentic. Vedic metaphors of cooking and magical views, for example, are much more common than references to brahmins or appeals to brahminic concepts (e.g., *moksa* and *Brahman*), and the former are more closely integrated with empirical passages (e.g., *Caraka*, Su. 7, 1.41–43; Vi. 3.36, 8.6–8; Sa. 8.59–66; In. 1.3). Other magical and religious elements are too prominent, too intermingled with empirical passages, and too explicitly acknowledged as part of Ayurveda to allow them to be simply explained away. However, there does seem to be good reason to credit the claim that *some* of the religious elements of the classical ayurvedic texts were added by parties sympathetic with brahminic orthodoxy. Such passages are only a small portion of the non-empirical elements of the text, and they are relatively rare and confined.

The entire issue of whether, or to what extent, Ayurveda was science or religion is misleading. Religion, magic, and science are not natural kinds. Why should we assume that these classical south Asian texts were ever intended to express the sort of unitary viewpoint suggested by these terms? *Caraka* states explicitly that holding rigorously to any single point of view leads to confusion: “Those who consider the varying controversial aspects of the truth as established facts go on moving in circles, like a person sitting on an oil press that moves round and round” (Su 25.26–28; cf. Larson 1987:251). Appropriately, *Caraka* considers a dream of riding on the wheel of an oil press to be a symptom of impending insanity (Ni 7.6).

“Religion” and “science” are modern western concepts. As such, they have the potential to import normative and ideological issues into discussions of “science and religion” in non-western and/or non-modern cultures. Moreover, this empty game of conceptual categorization distracts attention from more relevant social and economic issues. Looking for parallels to modern science tends to privilege ancient “science” over against its “religious” background without attending closely enough to the struggle for legitimacy implicit in this recognition and negotiation of difference in post-Vedic India. In addition, once the categories of “religion” and “science” are recognized as framing struggles for legitimacy, it becomes harder to distinguish the historical strug-



gles, allegedly the object of study, from struggles implicit in academic allegiances to theoretical perspectives and to their institutional affiliations (cf. Benavides 1997:305, 330). Attempts to unveil science as the authentic core of Ayurveda participate themselves in struggles for legitimacy.

Three practical points emerge that might be of value for studying science and religion in a non-western context. First, the attempt to clarify terms (e.g., “empirical” and “rational”) forces us to work in a more reflective manner and to be more sensitive to issues of translation and commensurability (cf. Tambiah 1990:111ff.). Second, we must go beyond categorizing phenomena simply as like or unlike western science. We can conclude, for example, that Ayurveda is empirical insofar as observation shapes diagnosis and therapeutic practice but not in the stronger sense that it leaves room for theory modification in the light of empirical anomalies. Moreover, this conclusion does not commit us to seeing empirical characteristics as excluding religious characteristics. Third, it is important to take account of social, economic, and ideological issues, allowing for a broader basis of comparison. Naively positivistic views of science and naturalistic or Christian-centered views of religion are clearly inadequate for historical and comparative work.

In the end, we are left with a reminder that terms such as “science,” “religion,” and “magic” involve many complex dimensions. They are not simple objective labels; rather, they frame a series of tensions between competing worldviews and academic perspectives. Comparative studies of science and religion in non-western cultures would be best served by attending to this complexity, lest we circle endlessly on the oil-press of rhetorical posturing.

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