



The Knowledge of Anatomy and Health in Āyurveda and Modern Medicine: Colonial Confrontation and Its Outcome

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Abstract:

In my paper I shall argue that Western medicine has passed through epistemological and paradigmatic shifts from Bedside Medicine to Hospital Medicine to Laboratory Medicine. The singular act of post-mortem dissection differentiated Hospital Medicine from Bedside Medicine and established its unquestionable authority over Indian medical knowledge systems. In Āyurvedic knowledge, there is no single conception of the body, but a dominant one – a bodily frame – through which *doṣa-s*, *dhātu-s* and *mala-s* flow. On their behalf, Āyurvedics were caught within a two-edged sword. First, since antiquity treatment of a disease could be efficiently resolved by *tri-doṣa* theory and *marmān-s*, without having any modern anatomical knowledge. Second, to establish Āyurveda as a valid and eternally “modern” repository of knowledge, learning modern anatomy became mandatory for high caste Āyurvedics to usurp it from the lower-caste practitioners. Consequently, a shift from traditional philosophy of *tri-doṣa* theory to “modern” notion of organ localization of disease occurred. It reconstituted the philosophical matrix of Āyurveda through this “modernization” of Āyurvedic knowledge of anatomy.

Key words: Āyurveda, anatomy, modern medicine, health, Indian medicine, epistemological encounter, colonialism.

**Resumen:****El conocimiento de la anatomía y la salud en medicina ayurvédica y medicina moderna: enfrentamiento colonial y sus resultados**

En este artículo discutiré que la medicina occidental ha atravesado cambios epistemológicos y paradigmáticos desde la medicina a la cabecera del enfermo a la medicina hospitalaria a la medicina de laboratorio. El acto singular de la disección post-mortem ha diferenciado la medicina hospitalaria de la medicina a la cabecera del enfermo y ha establecido su incuestionable autoridad sobre los sistemas de conocimiento médico indios. En el conocimiento ayurvédico, no hay una única concepción del cuerpo, sino una dominante –un marco corporal- a través del cual fluyen *doṣa-s*, *dhātu-s* y *mala-s*. Por su parte, los ayurvédicos quedaron atrapados frente a una espada de doble filo. En primer lugar, desde la antigüedad el tratamiento de una enfermedad podía ser eficientemente resuelto por la teoría *tri-doṣa* y *marman-s* sin tener ningún moderno conocimiento de anatomía. En segundo lugar, para establecer a la *Āyurveda* como un depósito de conocimiento válido y eternamente “moderno”, se volvió obligatorio para los ayurvédicos de castas altas aprender anatomía moderna y usurparla de médicos de castas inferiores. Consecuentemente, se dio un cambio de la tradicional filosofía de la teoría *tri-doṣa* a la noción moderna de localización de la enfermedad en el órgano, lo cual reconstituyó la matriz filosófica de la *Āyurveda* a través de la “modernización” del conocimiento anatómico ayurvédico.

Palabras clave: Āyurveda, anatomía, medicina moderna, salud, medicina india, encuentro epistemológico, colonialismo.

Reception: May 2009

Final version: July 2009



Some Introductory Remarks on Āyurveda: Social and Philosophical Implications

Āyurveda is the name given to a complex of South Asian healing practices that have been traced back so far as 600 B.C. Ethnographers argue that the phenomenology of health in Āyurveda, particularly its formulations of person and illness, are culturally distinct from biomedicine (also referred to as modern medicine or allopathy). They note that psychic and somatic components of health, which are isolated from one another in biomedical paradigm, are integrated in the Āyurvedic paradigm (Langford, 1995, p.330-366). Instead of conceiving the body as solid and bounded (as in biomedicine), Āyurveda conceives the body as fluid and penetrable, engaged in continuous interchange with the social and natural environment. It is a living tradition which has provided (and still providing) healing and physical relief to millions of people across the ages. It has its own explanatory model. It is based on unique and specific nature of philosophical explanations and reasonings, the predominant one of which is *tri-doṣa tattva*. *Tri-doṣa tattva* does not need either organ localization of disease or any precise anatomical knowledge, when compared with modern medicine. Nor does it need any physiological explanation (which maps temporal swings within the space of the body) consistent with modern medicine and anatomical knowledge. In its own way *tridoṣa* theory explains disease causation, assuming human body (microcosm) to be in harmony with the universe (macrocosm). Similar examples can be had from Greek experiences too. Edelstein, while commenting on "The History of Anatomy in Antiquity", emphasizes, "in general, they explain disease by the humors in the body and by the way these are combined. Such a theory makes it unnecessary to take the internal organs or their form and character into account" (Edelstein, 1987, p. 266).

Long ago, Filliozat observed that it is certainly much more important to note that the Āyurvedic authors have recognised numerous problems posed by life and by the inter-play of pathological functions or by their alterations and that they have sought to solve them by means of rational explanations, on the basis of data obtained from observations available to them, as can always be done by the Physiologists, Biologists and the Pathologists with the help of data gathered by them (Filliozat, 1964, p.x). The existence of Āyurvedic medicine being actually practiced in Indian society is a glaring fact. To emphasize, the health and life of a part of this society depend on it and on the manner in which it is practiced. Moreover, the interest in this study is, therefore, not simply retrospective, "as if it were a mere historical fact without any importance for the present, like the medicine of Greek or Egyptian or Mesopotamian antiquity" (Filliozat, 1964, p.xiii). It gives evidence of a rational scientific spirit, rarely seen in other civilizations of the world. But these explanations have for their basis a



knowledge, as yet rudimentary and incomplete in so far as the real conditions of the production of these phenomena were concerned.

Finally, it is also, and above all, practical as it has a social presence, which can never be overlooked. Filliozat (1964), Zimmermann (1999), Rahul Peter Das (2003a), Wujastyk (1998), Scharfe (1999), Bhattacharya (2004, 2008), and, above all, Meulenbeld (1999, IA) have cautioned against reading back into ancient Āyurvedic texts and their context-sensitive meanings from the post-renaissance, scientific revolution period. Filliozat tersely remarks, "One should not plead a good cause with bad arguments" (Filliozat, 1964, p.xi).

Two more issues may be put forward for consideration. First, Āyurveda literally means "the knowledge (*veda*) of the life span (*āyus*): it teaches how one may utilize the span of life apportioned by nature – traditionally taken to be a hundred years – fully and optimally" (Das, 2003b, p.32). Āyus, in Meulenbeld's note, consists of body, sense organs, *sattva*, and *ātman*. This combination, according to P. V. Sharma, finds a parallel in the five sheaths (*pañcakośa*) of life in the Vedanta philosophy (Meulenbeld, IB, 1999, p.8). Moreover, Āyurveda also teaches how to behave in private as well as public life, even how to conduct one's sexual activities. For Das, as such, āyurveda has to apply itself mostly to medical matters, and thus it is justified to speak of it as 'medicine' provided one regards this term as an approximation and not as an exact equivalent of what one normally understands as medicine (Western medicine) today (2003b, p.32). Meulenbeld notes, "in my view, Indian medicine is thoroughly embedded in the culture of the subcontinent and cannot adequately be studied and understood without acquaintance with its history and ways of thought" (1999, IA, p.2). In this sense, to stress, Āyurveda connotes Indian subjectivity (Kakar, 1998). And, here lies the most interesting part of exploration into the history of Āyurveda and its cosquent encounter with modern medicine arriving at this subcontinent in the garb of colonial medicine.

Second, Āyurveda is a canvas over which struggle among so many layers of dissident philosophical schools and explanations are inscribed. At its final moment the dominant Brāhminic thought has won over (Meindersma, 1992, p.299-306; Maas, 2009, p.125-162; Zysk, 2000; Wujastyk, 1998, p.20-23). Meindersma argues that characteristic for the older theory (in Caraka) is the idea that psychic functions originate from the four *mahābhūtas*. "Essential for the latter theories is also that one no longer relied on *pratyakṣa* (direct apprehension) as only *pramāṇa* (valid knowledge), but had to apply *anumāna* (inference) in addition" (Meindersma, 1992, p.300). Philip Maas contends, "in a synchronic perspective on



Āyurveda, the diversity of medical contexts accounts for such a broad range. In a diachronic perspective, however, one may safely assume that quite a number of different body concepts were current at the time of the CS's (Caraka-saṃhitā) composition" (Maas, 2009, p. 140). He also makes a hint that Suśruta's *marmān*-theory to be a synthesis of different and partly overlapping systematic anatomical concepts, among which the theory of bodily constituents as the most comprehensive one served as the model for the specific arrangement of bodily constituents in the *marmān*-theory (Maas, 2009, p.142). It may be useful to mention here that the doctrine of humoral pathology or "at any rate the first beginnings of it can be traced so far back as the time of the *Rigveda*" (Ray, 1903, p.xxxv).

In a most recent article Meulenbeld has made some keen observations regarding Āyurveda – (1) statements that appeared to jeopardize the *tridoṣavāda* caught the eye of the commentators and gave them much food for thought in their effort to avert any danger to the prevailing theory. The obvious meaning of some discordant utterances was twisted until concurring with the system, (2) passages which were ambiguous and susceptible to various interpretations were made to conform, and, more importantly, (3) a conspicuous aspect of the reasonings met with is the tendency to avoid the acceptance of any bodily constituent as a factor capable, independently of *doṣa*-s, of initiating physiological and, more especially of pathogenetic process (Meulenbeld, 2008a, p.16-31).

To add a final remark in this regard, though Āyurveda represented Indian subjectivity to a great extent, in it "the masculine grammatical gender is used throughout for all physicians and patients...the gaze remains unwaveringly male" (Wujastyk, 1998, p. 23).

Theory, History and Anatomical Knowledge: Some Preliminary Notes

Andrew Cunningham comments: "A full, or even adequate, discussion of the 'kinds' of anatomy would be in effect a history of anatomy, and a partial history of medicine, biology and natural philosophy" (Cunningham, 1975, p.1). In European context Cunningham traces the "kinds" of anatomy from "popular" and "demonstrative" to "philosophical" to, finally, modern anatomy. While describing the history of anatomy and medicine, like other branches of knowledge, men need a theory, for the phenomena that come under observation are so numerous that in default of a theory they would elude our grasp. Medicine must be guided by a theory, for otherwise medical doctrine could not be handed on from teacher to pupil. Such was the opinion of Henry Sigerist (Sigerist, 1912, p.15). But, during the formative period of



modern medicine, theorization was not an acclaimed issue. John Abernethy, a very influential figure of the late eighteenth- and early nineteenth-century anatomy and surgery in British medicine, wrote: "There was a time when medical men entertained so determined a dislike to the word *theory*, that they could scarcely tolerate the term" (Abernethy, 1814, p.4., emphasis added). He goes further: "When also in the prosecution of our anatomical enquiries, we as it were analyze the body, or reduce it to its elementary parts (...) we become lost in astonishment that such important ends can be effected by apparently such simple means" (Abernethy, 1814, p.15). Interestingly, though talking about anatomical dissection at its most crude and experimental level he did not fail to take note of the Great Chain in Christian belief. He let us know, "Mr. Hunter, who so patiently and accurately examined the different links of this great chain, which seems to connect even man with the common matter of the universe, was of this opinion" (Abernethy, 1814, p.17). Theorization was a contested area in French medicine too. No other than a person like Laennec (the inventor of stethoscope and one of the greatest physicians of nineteenth century) regarded theories as only aids to memory. In his course of 1822, he even went so far as to say that only facts constituted science (Ackerknecht, 1967, p.3-33).

The study of medicine in ancient India was the first momentous step forward from *daiva-byāpāśraya bheṣaja* to *yukti-byāpāśraya bheṣaja*. Scholars have found,

"The interest of the Vedic Indians seems early to have been attracted to the consideration of questions connected with the anatomy of the body. Thus a hymn of the Atharvaveda enumerates many parts of the body with some approach to accuracy and orderly arrangement." (Mcdonnel and Keith, 1912, Vol. II, p.358)

It is understood that the study of the body and its parts was of much importance in ancient Indian medical tradition. We find in *Caraka-saṃhitā* – *Sarvvadā sarvvathā sarvvaṃ śārīraṃ veda yo bhīṣaka / Āyurvedaṃ sa katsarnyena veda lokasukhapradam //* (Śārīra-Sthānam, 6.19)¹. It also teaches us, "Detailed knowledge of the human body is conducive to the well-being of the individual...It is because of this that experts extol the knowledge of the details of the body." (Sharma and Dash, 1977, Vol. II, p.426)

¹ The physician who is always conversant with the various aspects of the entire body, is the very person who is proficient in the āyurveda which can bring about happiness to the humankind.



In *Suśruta-saṃhitā* (all the verses of *Suśruta-saṃhitā* have been cited from Trikamji's edition. Trikamji, 2008) –

*pratyakṣato hi yadr̥ṣṭam śāstradr̥ṣṭaṅca yadbhavet /
samāsatastadubhyaṃ bhūyo jnānavivardhnam //*² (Śā, 5.48) Bhishagrajna (1963, p.172) explains:

“The different parts or members of the body as mentioned before including even the skin cannot be correctly described by any one who is not versed in Anatomy...For a thorough knowledge can only be acquired by comparing the accounts given in the Sāstras (books on the subject) by direct personal observation.”

Vāgbhata (600 A.D) informs us - *ṛṣipraṇīte prītiścenmuktvā carakasusrutau / bhedādyah kiṃ na paṭhyante tasmād grāhyaṃ subhaṣitam //* (*Aṣṭāṅgahṛdayasaṃhita*, Uttarasthāna, 40.53)³ In Meulenbeld's translation, “The foremost criterion for the acceptability of teachings is not that they have been composed by sages, but the well-chosen way of expressing them (subhāṣita) (40.88)” (Meulenbeld, 1999, IA, p.472). These passages imply that there are attempts at theorization in *Caraka*-, *Suśruta*- and *Aṣṭāṅgahṛdayasaṃhita* (*A.h*)-s with regard to anatomical knowledge as well as knowledge of health and healing. In Hoernle's view, the object of *A.h* was “to gather up into a harmonious whole the more or less conflicting medical systems current in his time, especially those contained in the Compendia of Charaka and Suśruta.” (Hoernle, 1994, p.6)

During later period, Mādhava (the most eminent eighth century-Āyurvedic physician) made brilliant nosological classification of diseases. He also attempted at theorization for the less qualified āyurvedic practitioners – “This very (book) will enable physicians, lacking various treatises and possessing little intelligence, to discern a disorder with ease.” (Meulenbeld, 2008, p.29). Hence, the aphorism goes thus – *nidāne Mādhavaḥ śreṣṭhaḥ sūtrasthane tu Vāgbhaṭaḥ / Śārīre Suśrutaḥ prauktaścarakastu cikittite //*⁴

² The practical knowledge along with theoretical knowledge is very essential. Whatever is seen while doing practical study and going through Śāstra, adds the knowledge, when both are applied together.

³ Simply put, it implies that Vāgbhaṭa bases his theoretical presuppositions and premises on Caraka and Suśruta. He argues that if all the treatises could be acceptable only having the merit of being composed by ṛṣi-s (sages) then why people, in stead of reading texts by Caraka and Suśruta, do not read books by Bheḍa etc.?

⁴ Mādhava excels in pathology, Vāgbhaṭa for fundamental postulates or medical theory, Suśruta in the knowledge of the body, and Caraka is best known for medicine and treatment.



To limit our study within the realm of anatomy, we shall specifically look into encounters in anatomical knowledge as contained within both ancient Āyurvedic and modern medicine. In this paper modern medicine is understood to be the medical practices following the introduction of Western medical knowledge by the British. European colonialism established itself decisively in the Indian Subcontinent in the period from 1770 to 1830. More specifically, after the foundation of Medical College in Calcutta in 1835, anatomical dissection was introduced in medical curricula and, consequently, an altogether different paradigm of knowledge emerged in Indian context. Introduction of Western medicine, especially modern anatomical knowledge arising out of Paris hospitals (and from experiments of William Hunter in England), in the late 18th century had made indigenous knowledge of the body and health marginal. Arguably, the lack of precise anatomical knowledge in Āyurvedic texts was the fundamental reason for its giving way to Western medical superiority. One of the most eminent English-trained Āyurvedic practitioner Gananth Sen vehemently complained of this lack. He asserted that Āyurveda's "renaissance" took place through Madhusudan Gupta's first cadaveric dissection at Calcutta Medical College in 1836 (Sen, 1943).

Possibly it would not be an exaggeration to say that the knowledge of anatomy has made medicine "modern". Before the advent of anatomical knowledge, medicine made use of a two-dimensional body – **symptom > illness**. In this conceptualization symptom and illness both lie on the same plane. Patient's history alone was the primary source of diagnosis. Though the bodily organs were described, detailed and used to explain disease causation no pathological anatomy was known. Accurate localization of diseases inside the body was inconceivable. As an outcome of emphasis on dissection and experimentation medicine, during the late eighteenth and early nineteenth centuries, made its journey from Bedside Medicine to Hospital Medicine to Laboratory Medicine (and, now, Techno-Medicine). Disease began to be seen to being located within a three-dimensional body – **symptom > illness > sign**. The depth of the body – the 3rd dimension – was added to the two-dimensional frame of the body (symptom > illness). Doctors were, then, to extract sign, i.e. pathology inside the body. A new norm and epistemological structure began to emerge. "Every time the stethoscope was (and is) applied to patient, it reinforced the fact that the patient possessed an analysable body with discrete organs and tissues which might harbour a pathological lesion" (Armstrong, 1999, p.24). In a more recent observation it is learnt that "the experiences of French medical doctors had in 1832 marked the turning point, in France, between Ancient World interpretations (miasmas and the like) and modern understandings of disease causation" (Watts, 2007, p.340).



To note, in our specific context, what David Arnold views as the journey of “enclave medicine” to “public health” in India can otherwise be viewed as the journey from Bedside medicine to Hospital medicine of Indian kind (Arnold, 1995). To speak briefly of Hospital medicine: “Actually it was only in the hospital that the three pillars of the new medicine – physical examination, autopsy, and statistics – could be developed” (Ackerknecht, 1967, p.15). Not only so, this new type of medicine was also “the closing hour of medical medievalism” (Ackerknecht, 1967, p.33). In this new paradigm “clinicians no longer simply saw sick individuals, they saw disease.” This was born out of political and economic changes. “Political transformation is seen as laying the groundwork for medical change” (Hannaway and La Berge, 1999, p.5). The transformation of eighteenth-century hospitals into “curing machines” was itself a complex occurrence involving shifts at many levels. The increasing hospitalization of the poor during the eighteenth century was certainly related to the process of urbanization and industrialization (Rose, 1999, p.59).

In India, all these components were almost completely and fully utilized through the introduction of modern hospitals. It made the complete disjuncture with hitherto existing medical practices prevailing over the subcontinent. For this paper, only autopsy or medical knowledge gained from anatomical dissection will constitute the focal point. During the rise of the first hospitals in Calcutta reports of favourable outcomes were deluging local newspapers. One example can be adduced here. In the 22 June 1839 issue of *Jiñānānveṣaṇ* (Quest for Knowledge) there was a reporting about the establishment of Medical College and other hospitals which will have (1) 80 beds, (2) efficient physicians having their training in anatomical dissection, and (3) marvellous outcome of “English” treatment vis-à-vis ignorant and harmful indigenous treatment (Bandyopaddhyaya, 1994, p.37-44). It may not be superfluous to note that hospitals for the British and other European army men, traders, administrative personnel and others were built as early as mid-eighteenth century. There was intimidating number of deaths amongst the European population in Calcutta. In 1707 there were 1200 Europeans in Calcutta. Next year the figure dwindled to 700 only. Four hundred and sixty people were buried. During the eighteenth century average death per year was 164. Within the period of 1757-1758 in Calcutta Hospital, located within the premises of the Fort William, 1140 patients were cured who underwent treatment in this hospital (Roy, 1998). So, hospital/Hospital medicine was a dire necessity for the colonizing British people. Though, as a by-product, it came out to be a boon to the Indian population, especially because of the fact that surgery was the most neglected part of indigenous medical practice. It was only done by low caste and illiterate people to the most of whom it was a family craft. In September 1792 Le Galsi’s Inn was opened in Calcutta. Surgical practices began to be performed (Roy, 1990).

In Indian context, Bedside medicine may be regarded to be inclusive of both traditional Indian practice within domestic setting as well as early pre-dissection European medical practices in India. For our purpose, coming back to anatomical knowledge, the following pictures may elucidate the points of differences in the perception of anatomical figures in early modern Europe and post-Vesalian anatomical perception.

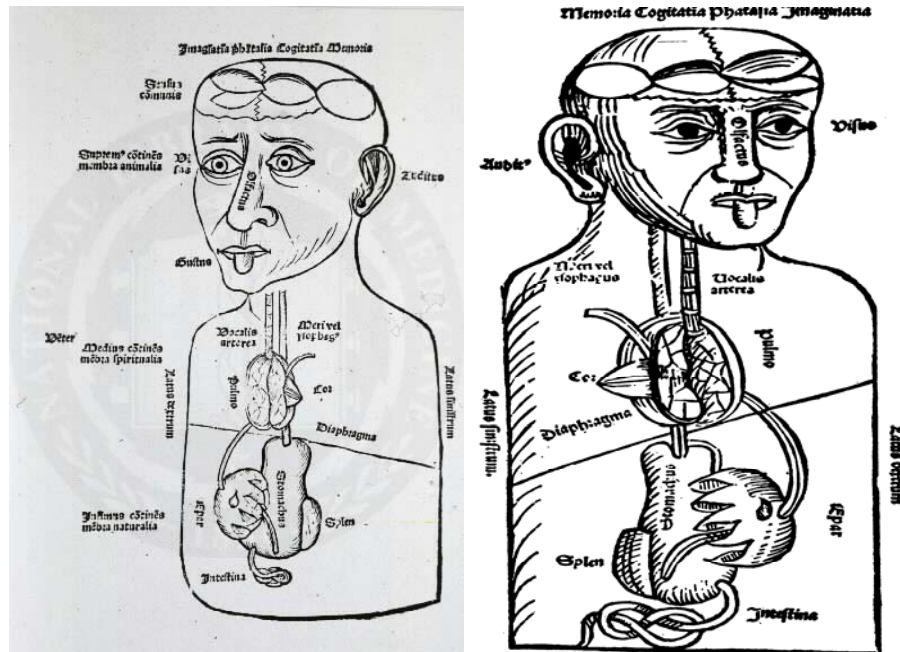


Fig 1. Situs figure from 1513 edition of Peyligk's *Compendiosa capituli phisici Declaratio*, published in Leipzig. Note extreme conventionalism of brain ventricles and viscera. Five-lobed liver clutches at the stomach as if with fingers, and is counterbalanced by spleen. Intestines are intertwined (sic.) in an elegant knot, and diaphragm is reduced to a line. Traditional heart-lung representation is so corrupt as to be virtually unidentifiable. The heart, cor, is shown on left of figure, the lung, pulmo, on right. Both are presented on a background of the stomach. The trachea, usually known as "harsh artery" because of its coarse cartilaginous structure and air-carrying (i.e. arterial) function, is here called "vocal artery," vocalis arterea (sic). An important thing to note is that the localization of organs inside the body is two-dimensional, all lying on the same plane.

Details of the pictures

Order Number: A013188. **Author:** Peyligk, Johannes. **Title:** Anatomy of the human body. **Publication Inform.** Leipzig: Melchior Lotter, 1499. **Physical Desc.** 1 print: woodcut. **Notes:** Old Negative no. 66-385. **Summary:** Human figure, half-length, with some of the abdominal internal organs, the senses, and sections of the brain identified.

References: Schullian and Sommer, Catalogue of Medical Library, 351 incunabula and manuscripts in the Army. **Illustrated In:** Compendium philosophiae naturalis, sig Q1 verso.

Also see, French R. K. (1978). The thorax in history. 4. Human dissection and anatomical progress. *Thorax* 33(4), 439-456 (Fig 3)



Defining the anatomical site of the lesion is crucial if the physician is to resolve the problem effectively and compassionately. Therefore, a sound knowledge of anatomy is essential from the beginning of a modern medical education. The singular act of cadaveric dissection in Indian medical curricula brought about changes in the perception of body, health and illness not only among the rank of medical practitioners themselves (found in the difference between "Native" doctors and qualified practitioners of the Medical Colleges), but also within the Āyurvedic practitioners and modern doctors. In a more general observation,

"The Victorians set out, in addition, to order and classify India's 'difference' in accordance with scientific systems of 'knowing'. (...) The study of India was thus made part of a larger scholarly enterprise in which the Victorians, as children of the Enlightenment, sought rational principles that would provide a comprehensive, and comprehensible, way of fitting everything they saw in the world around them into ordered hierarchies." (Metcalf, 1998, p.67)

The Kabirajas, confident of getting no encouragement from a foreign Government, kept themselves aloof from the modern scientific world. They did have a sceptic look towards the State policies (Mukhopadhyaya, 1974, Vol. II, p.18; Kumar, 2006; Basu, 1998; Harrison, 1994). "Oral evidence by Dr. G. N. Mukerjee, B.A., M.D., F.A.S.B, dated the 6th November, 1923" was taken by the "Ayurvedic Committee, Bengal". One of the questions to Mukerjee was – Who were the Native Doctors? Why did native doctors die long ago?

Mukerjee answered – Because the graduates of the Medical College came out, and it is a fact that the better qualified seniors always try to oust the juniors and less qualified medical men in practice (Mukhopadhyaya, 1974, Vol. II, p.46).

The answer is quite self-evident about the actual state and the prevalent hierarchical division of medical practice in Bengal and India. He also pointed out to the existence of "third class", "second class", and "first class" medical practitioners (Mukhopadhyaya, 1974, Vol. II, p.46-47). Dr. Buchanan found in the province of Behar (Bengal was no exception) medicine was taught by some Pundits, some of whom also, although they were grammarians, practised the art (Martin, 1838). In 1926, Girindranath Mukhopadhyaya specifically noted,

"The traditional system of training of Kabirajes which lasted for many centuries in Bengal, has always been literary in character. The Vaidyas learn their medical science mainly from books and from *oral tradition* from the Gurus – the learned physicians of the



time, who generally taught a number of students *without fees*. Similar practice still exists in the `Tols." (Mukhopadhyaya, 1974, II, p.14, Emphasis added)

We should take into account – (1) the question of *oral tradition*, and (2) transmission of knowledge and education *without fees*.

T. A. Wise, while reviewing Hindu medicine, wrote: "This Hindu nation left no history, as they considered life a transitory state of trial and suffering, and of too little importance to occupy the attention of rational beings" (Wise, 1867, p.xvii). Whitelaw Ainslie noted, "It is much to be lamented that it was ever necessary to include the sciences...in the sacred writings of the Hindoos. (...) India is still sunk in a state of empirical darkness" (Ainslie, 1826, Vol. II, p.v). Through such tropes the history of a nation is enmeshed within the history of medicine itself. It was commented, "Amid the voluminous writings from the Hindoos, we find the most lamentable deficiency of historical records" (Murray, H., Wilson, J., Greville, R. K., Jameson, R., Ainslie, W., Rhind, W., Wallace, W. & Dalrymple, C, 1832, Vol. II, p.209). Through such manoeuvres and accounts history seems to be divided both vertically and horizontally to make room for a new History where "India appears to exist outside history, whereas Britain is understood as the agent of history...Indeed, history is the sign of the nation-state, of modernity, as much as the denial of history is the sign of the colony, of tradition" (van der Veer, 2001, p.4). Another point should be mentioned here. During the eighteenth and nineteenth centuries there occurred a shift in medicine in its focus from *health* to *normality*. To quote Foucault, "Nineteenth century medicine (...) was regulated more in accordance with normality than with health (...) these concepts were arranged in a space whose profound structure responded to healthy/morbid opposition" (Foucault, 1994, p.35). Throughout the entire period following European renaissance and industrial revolution there emerged capital, competitive market economy, working class and predominance of technology in social life (Jewson, 1974, p.369-385; Waddington, 1973, p.211-224; Lawrence, 1988, p.171-192). Such a milieu of acquiring knowledge did lead to an objective mode of learning in social life and psyche (Weisz, 2003, p.536-575). It was altogether different from the Indian mode of learning. These specific phenomena prepared the canvas over which the new knowledge of knowing the body could be written for the first time and, possibly, for ever in human history. "From an art in the 1800s that still relied on the position of stars in heaven, bleeding, leeching, and cupping, there evolved nosological systems of diseases, reasoning based on sound pathology and physiology, and finally triumphant microbiology" (Vandenbroucke, 1998, p.12-16).



Anatomical Knowledge in Āyurveda and Colonial Enterprises

Following Alexander's invasion of India the great Roman geographer, philosopher and historian Strabo writes:

"There is a class of physicians, according to Megasthenes, among the Germanes (Brāhmīns) who rely most on diet and regimen, and next on external applications, having a great distrust of the effects of more powerful modes of treatment. They are also said at that early period (about A.D. 300) to have employed charms in aid of their medicines." (Wise, 1860, p.xiii)

He was most likely talking of Āyurvedic practitioners of that period who relied more on the balance of diet, physical system, and ethico-moral component of a person than on one's bodily structure and anatomical details. An observation with regard to the nature of anatomical knowledge in India may be worthwhile to remember at this point. Recent researches provide evidence "that could be taken to show that in ancient India too (like ancient Greece) certain peculiarities of animal anatomy were falsely taken to be valid for humans also...since it was assumed that the (internal) anatomy of all mammals (including humans) were the same" (Das, 2003a, p.507).⁵

In Āyurvedic knowledge, one should note, there is no singular conception of the body, but a dominant one – a bodily frame, through which *doṣa-s*, *dhātu-s* and *mala-s* flow. *Tri-doṣa* theory, resembling "humoral" theory of Greek origin which was the predominant concept of Western medicine till the beginning of the nineteenth century, explained disease causation. By 600 A.D. Āyurvedic anatomical practices were in complete disuse (Dasgupta, 1991, Vol. II, p.433). Though, possibly, there were regular practices of surgery in Indian society it was most likely was not done by high-caste, learned Āyurvedics. Again, surgical practices were based not on the knowledge of anatomical organs, but on regional anatomy and *marmān-s* (lethal/vital spots) (Kutumbiah, 1999, p.32-33). Only some particular types of surgeries like venupuncture (*śīrāvedha*) could be done with precision (Thatte, Tiwari and Twari, 1981, p.181-188). Whatever be the actual practice, we must not read back these texts

⁵ According to modern anatomical knowledge, the number of bones and muscles in a human body is figured like this: at birth a newborn baby has approximately 270 bones, whereas on average an adult human has 206 bones (these numbers can vary slightly from individual to individual). There are approximately 639 skeletal muscles in the human body. However, the exact number is difficult to define because different sources group muscles differently.



having their own context-sensitive meaning with our present state of context-specific, “scientific” notion of Harverian physiology or modern medical anatomy. Meulenbeld has discovered at least 8 different meanings of *kloman* which seems to indicate a part of the lungs (Meulenbeld, 2008, p.457-458). Though it remains uncertain what these terms originally meant to our ancestors, following colonial epistemological encounters all these terms were metonymically reconstituted to fit to the dominant paradigm of modern anatomy.

It may be mentioned at this juncture that besides the *Br̥hatrayīś* (the Great Threesome, comprising Caraka, Suśruta and Vāgbhata) there are also *Laghutrayīś* (the Lesser Threesome, comprising Mādhava, Śārṅgadhara and Bhāvamiśra) in Āyurvedic medical tradition. Mādhava (8th century A.D.) did a very rational and comprehensive nosological classification of diseases (Meulenbeld, 2008). Mādhava’s treatise was intended for the less merited practitioners for their easy access to classification of diseases and, consequently, for proper treatment. It becomes apparent from this observation that the general quality of āyurvedic practitioners had declined during the period of Mādhava. At a later period, *naḍī parikṣā* or pulse examination was systematically introduced by Śārṅgadhara. Bhāvamiśra developed this very art. He also “made the subject more objective and practicable” (Rai, Tiwari, Upadhyaya and Chaturvedi, 1981, p.77-88). But, on careful reading, one may infer that all these new additions to classical Āyurvedic knowledge were based on external examination only and, that too, grounded on scanty knowledge of the internal organs. There is a definite lack of knowledge concerning the structure of the body which lies beneath the rib-cage (Zysk, 1986, p.687-705).

In Japan’s experience Kuriyama observes: “The essence of changing one’s outlook was learning to conceive of the body anatomically” (Kuriyama, 1993, p.21-43). He further stresses, “That perception and attention are intimately related is both a commonplace of academic psychology and a fact of daily experience” (Kuriyama, 1993, p.40). For example, muscle was an elusive conceptual ground in Western medical tradition for a long time. With the gradual emergence of dissection, references to muscles in the sources increase dramatically. While the term *mys* appears only 14 times throughout the whole of the Hippocratic Corpus; Galen used it over 460 times in his writings. More than simply cutting up bodies, dissection requires a particular mind-set that developed exclusively in the West. Societies with long established traditions of animal sacrifice never dissected, it can be assumed, simply because they did not think that it would in any way improve their understanding of the body or disease. Analogy, therefore, to everyday objects, such as



cupping glasses and sponges, was sufficient for gaining an understanding of internal structure (Shanks, 2002, p.58-81).

H. H. Wilson observed, "the divisions of the science (i.e. Āyurveda) thus noticed, as existing in the books, exclude two important branches, without which the whole system must be defective – Anatomy and Surgery" (Wilson, 1864, Vol. III, p.270). Ainslie, another British physician devoted to the making of pharmacopoeia, attempted "to the best" of his ability "to supply what has long been wanted, a kind of combining link betwixt the Materia Medica of Europe and that of Asia" (Ainslie, 1826, Vol. I, p.x). On the one hand, deplorable lack of anatomical and surgical knowledge of the Indians were being pointed out time and again and, on the other, a new enterprise to make a complete and nation-wide survey of drugs and remedies of plant origin (materia medica) were undertaken. The second one was intimately related with the homogenizing enterprise of the making of a nation state. In Urdang's insightful analysis related to Europe, "it was for the sake of uniformity in the preparation of drugs and the adaptation of the formulas concerned to the special needs and resources of the political units involved that the official pharmacopoeias came into existence" (Urdang, 1946, p. 46). Making a national pharmacopoeia was not only intended to make a unified Indian nation, it did also make a canvas over which profits for the Empire could be efficiently measured. It was reported at the Amsterdam Exhibition of 1883 that 'Dhadka grass (unidentified)' would yield a good amount of paper. At the "wholesale rate of 6*d.* per lb. in Calcutta would represent an income of £84,000 per year...mills (the Bally mills) have a capital of £96,000, so that in two years by the above arrangement such a capital could be recovered" (Mukhopadhyaya, 1883, p.67). In another estimate, "the total revenue of the Government plantations of cinchona in 1881-82 amounted to £27, 221 (inclusive of £14,118, leaving a net profit of £13,033" (Hunter, 1883, p.305).

Besides the British accounts there are plenty of other accounts (e.g. French) too (Raj, 2006). Here is an account of O. R. Bacheller who, by training, was an M. D and an American missionary doing his job in Orissa. In his account, "every European in India being looked upon as a superior being, is supposed to understand more or less of medicine, and is often called upon to prescribe for the sick" (Bacheller, 1856, p.174). He emphasized, "the blacksmith, with his tongs, serves as dentist, and the barber, with his razor, as surgeon; since these are the only persons supposed to have tools adapted to the practice of these professions" (Bacheller, 1856, p.174). This description of Indian surgical practices can better



be understood with a late-eighteenth or early-nineteenth century text from Orissa that has been detailed below.

Travelers' Accounts and Understanding of Anatomical Education in India

Adhering to the practice of writing new texts based on classical ones is evident even in the late-eighteenth or early-nineteenth century text *Abhinavacintāmaṇi* (AC). Jan E.M. Houben has critically read and explained the text (Houben, 2007, p.63-88). Houben finds, "in fact, the AC seems remarkably 'classical' in its approach, in spite of the exchanges with other systems and developments in medical knowledge contemporaneous with the author" (Houben, 2007, p.85). It contrasts with the view taken by Dominik Wujastyk or Sheldon Pollock (Pollock, 2002, p.431-439; Wujastyk, 2005, p. 95-118). Taking into consideration the date of composition of AC and the particular historical phase of the prevailing Āyurvedic practices of that period, Houben asks two fundamental questions – "(1) whether, and, if yes, to what extent, this text participates in the new developments in India, and (2) to what extent it participates in the 'post-classical' (post-Aṣṭāṅga-hṛdaya) tradition of Āyurveda of more than a millennium" (Houben, 2007, p.67).

More evidence can be cited here. Brian Hatcher and Michael Dodson refute the very concept of paradigmatic rupture of classical (medical) learning as put forward in the *Sanskrit Knowledge-Systems Project on the Eve of Colonialism* under the stewardship of Sheldon Pollock (Hatcher, 2007, p.333-361; Dodson, 2005, p.809-835).

Coming to the central question of this paper, finding inferiority of Indian anatomical knowledge started not only from pre-colonial period or "On the Eve of Colonialism" when, according to Sheldon Pollock and others, *vernacularization* of Indian classical texts (not, to stress, *experimentation*) became one of the most important characteristics.

This very process, may be though not willfully, started much earlier. In Hiuen Tsang's account of A.D. 629 there is no mention of anatomical or surgical practices. According to him, Indian medical treatment is primarily based on balancing the body by abstinence from food and other herbal remedies (Beal, 1884). Another Chinese scholar and traveler I-Tsing (A.D. 671-695) provides quite good account of contemporary Indian medical practice. He too describes medical practice as being centered on fasting and setting the balance of the diseased body through various dietetic and herbal remedies. Only once he mentions of some



rudimentary surgical practice: "Cauterized with fire or with a puncture applied, one's body is treated just as wood or stone; except by the shaking of the legs and moving of the head, the sick differs not from a corpse" (Takakusu, 1896, p.129). During the period from 16th to 18th centuries all the medical men and travelers coming to India were quite vociferous while talking about the absence of anatomical knowledge among Indian people. Bernier informs us,

"It is not surprising that the *Gentiles* understand nothing of anatomy. They never open the body either of man or beast, and those in our household always ran away, with amazement and horror, whenever I opened a living goat or sheep for the purpose of explaining to my *Agah* the circulation of the blood, and showing him the vessels, discovered by *Pecquet*, through which the chyle is conveyed to the right ventricle of the heart" (Bernier, 1916, p.339).

He proceeds further: "Yet notwithstanding their profound ignorance of the subject, they affirm that the *number of veins in the human body is five thousand*, neither more nor less; just as if they had carefully reckoned them" (Bernier, 1916, p.339, emphasis added). We must notice that while Bernier is interested in transmitting anatomical knowledge through practical dissection of animals Indian people are frightened by the sight of it. Again, when he talks about anatomical structures and achievements of Harvey or Pecquet or Descartes Indians tell stories of Purānas. It may be extrapolated that there remains an undertone of European superiority in these accounts and these too are based on modern scientific knowledge of the body. He observes that the profession of medicine is a family art and business and not institutional in nature. To him, it is not a profession per se as in Europe, rather it is a family art. "The embroiderer brings up his son as an embroiderer, the son of a goldsmith becomes a goldsmith, and a physician of the city educates his son for a physician" (Bernier, 1916, p.259). Commenting on Indian medical knowledge, John Fryer, a seventeenth-century British medical person who traveled in India and Persia for nine years, noted, "They are unskill'd in Anatomy, even those of *Moors* who follow the *Arabians*, thinking it unlawful to dissect human bodies...Pharmacy is in no better condition..." (Fryer, 1912, I, p.287). He also noted: "Custom and Tradition are only Venerable here; and it is Heresy to be wiser than their Forefathers..." (Fryer, 1912, I, p.180). He seems to have made a thoughtful conclusive remark, "But I believe rather we are here as Exotick Plants brought home to us, not agreeable to the Soil" (Fryer, 1912, I, p.180).

A. S. Altekar provides a brilliant and thorough study on ancient Indian education including medical education. Even in his vast work there is no mention of study of surgery or



anatomical education as a part of ancient medical education (Altekar, 1944). In Subba Reddy's study of health and medicine in Mauryan Empire there is no mention of surgical practice or anatomical study (Reddy, 1966). Suresh Chandra Ghosh's study shows that in *Epigraphia Indica* (inscription 182 of 1915) there is mention of the establishment of a teaching college by an affluent vaishya (tradesman caste of India) for studying Vedas, Sastras, Rupavatara (a grammatical work) and a hospital with one physician, one surgeon, two servants for taking drugs, two servants to serve as nurses and a general servant for the whole establishment to look after the health of the students and teachers. Another inscription of 1068 A.D. records a similar triple institution comprising a college, a hostel and a hospital. The staff of all these institutions included – (a) three teachers for teaching the three Vedas (Atharva Veda was not possibly included), (b) five for teaching Logic, Literature and the Agamas (the Holy Scriptures), (c) one physician etc. (Ghosh, 2001, p.111-115) Interestingly in this list too no account of surgery or surgeon (or anatomist) as a teacher is registered.

One author finds that besides osteology "the ancient Hindu physicians lacked profound and accurate anatomical knowledge. They have left more or less superficial, vague and imaginary description of the human anatomy, as found in their treatises... There is nothing astonishing in this" (Chakraberty, 1923, p.1). Talking about Indian anatomical knowledge the author explicitly states, "In a tropical climate, as a hygienic measure, cremation of the dead has been ordained as a religious duty from misty antiquity. So there was no regular chance for human dissection and to acquire the exact knowledge of human anatomy." (Chakraberty, 1923, p.2-3) Moreover, "Whatever knowledge they acquired, they obtained it from personal observation and experience from caring for the wounded and disabled on the battle-fields, from a comparative study of the animal anatomy from the sacrificial animals..." (Chakraberty, 1923, p.3) In ancient India, there is no record of the custom of human sacrifice in real practice, except the legend of Sunaḥśepa (*Aitareya Brāhamana*, VII.3), as the act was repudiated by all presiding priests of the Rājasūya ceremony.

To remember, in pre-Vesalian Europe too somewhat similar situation was experienced. "The 'knowledge' of the learned consisted of strangely metamorphosed relics of ancient learning in literary and pictorial forms" (French, 1978, p.439). Not only that, even zodiac signs and symbols would be used to describe the interior of the body. The following picture adopted from Johannes de Ketham's *Fasiculo de medicina* (Venice: Gregori, 1493) is an example in this regard.

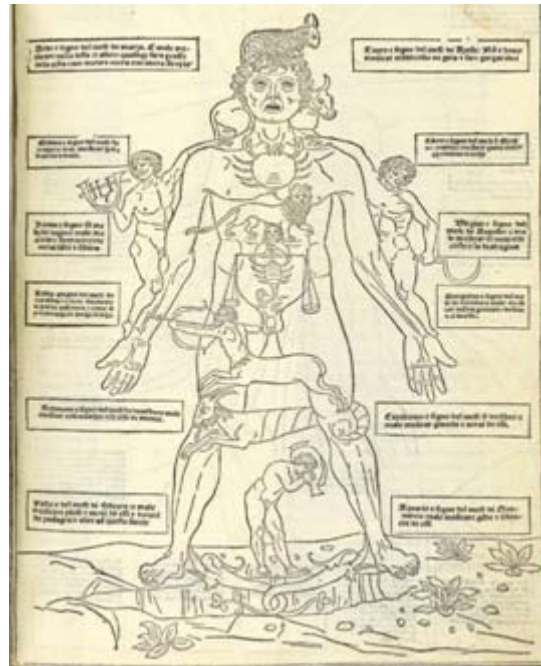


Fig. 2. Johannes de Ketham, *Fasciculo de medicina*. (Venice: Gregori, 1493). Everyone will see the crab-shaped stomach just below throat. In the text on the left side in Latin is written, "The Crab is the sign of June; avoid treating the stomach, the spleen, the lungs or the eyes." **Courtesy:** National Library of Medicine, US – *Historical Anatomies on the Web*.

To be brief, till the arrival of Vesalian anatomy (keeping Mondino and others in mind), Galen was the most dominant and authoritative figure in the history of anatomy and his texts were to become a substitute for direct observation. To study anatomy actually meant studying Galen. It has been proved through numerous scholarly studies that Galen had never dissected any human body. He had dissected monkeys and other animals, but recorded this knowledge to be gained from human anatomical dissection. Through skilled dissection and direct observation of anatomic structures, Vesalius showed where Galen was wrong, and more important, showed the importance of *seeing for oneself* (Dyer and Thorndike, 2000, p.969-979). This particular historical phenomenon did result in the paradigmatic shift from 'text-as-authority' to 'seeing for oneself'. Every singular part of the human body was to be described and detailed.

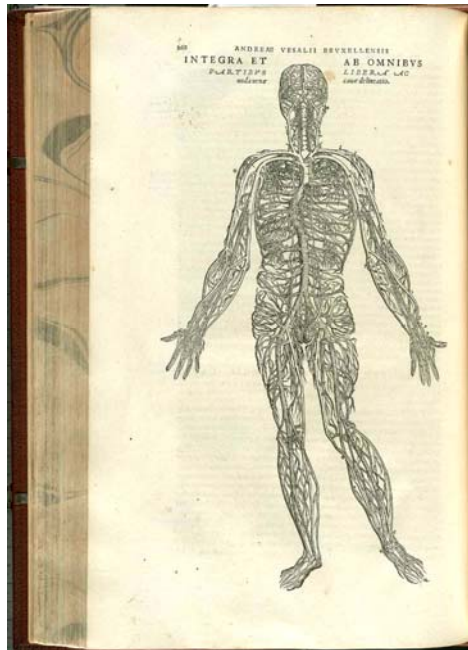


Fig. 3. This picture is taken from Andreas Vesalius's *De humani corporis fabrica libri septem* (Basileae [Basel]: Ex officina Joannis Oporini, 1543), 268. Any one can perceive the three-dimensional character of the body frame. All the lymphatic vessels are laid bare. **Courtesy:** National Library of Medicine, US – *Historical Anatomies on the Web*.

Coming back to the present paper, in Indian medical literatures the knowledge of the body proper was not only observation of physicians or surgeons (if we may say this) alone, it was also considerably derived from non-medical texts.

“There are twelve months in the year, and these twelve breathings in man, and these (two) now are one and the same; - there are thirteen months in the (leap-) year, and these thirteen (channels of) breathings in man, the navel being the thirteenth, and these (two) now are one and the same” and “there are three hundred and sixty nights in the year, and three hundred and sixty bones in man, and these (two) now are one and the same;--there are three hundred and sixty days in the year, and three hundred and sixty parts of marrow in man, and these (two) now are one and the same.” (Eggeling, 1900, SBE44, p.168)

Some of the most important texts directly contributing to the knowledge of anatomy in Āyurveda are *Atharva Veda*, *Satapatha Brāhmaṇa*, *Śāṅkhāyana Āraṇyaka*, *Maitrāyaṇī Saṃhita*, *Taittiriya Upaniṣad*, *Aitareya Brāhmaṇa*, *Aitareya Āraṇyaka*, *Vishnu Smṛiti*, *Yājñavalkya Smṛiti*, *Hārīta Saṃhitā* etc.



In India, where oral instruction surpasses other forms, anatomy, which can be really learnt best only by direct examination, was certainly taught orally. The books contained only lists to help the memory. We cannot, therefore, always identify an organ, whose name is nevertheless employed both in the Vedic and Āyurvedic texts. Moreover, a certain number of names are found only in the Veda (Filliozat, 1964, p.140). Moreover, there does remain the problem of translation which Meulenbeld locates in this way, "There are also many versions with a tendency to overinterpretation, especially by the use of technical terms borrowed from contemporary medical science" (Meulenbeld, 2008, p.3). Another relevant issue in this regard is the question of burial or cremation in India. In *Vedic Index*,

"– Agni-dagdha. This epithet ('burnt with fire') applies to the dead who were burned on the funeral pyre. This is one of the two normal methods of disposing of the dead, the other being burial (*an-agnidagdhāḥ*, 'not burnt with fire'). The Atharvaveda adds two further modes of disposal viz., casting out (*paroptāḥ*), and the exposure of the dead (*uddhitāḥ*)...Burial was clearly not rare in the Rigvedic period: a whole hymn describes the ritual attending it." (McDonnell and Keith, 1912, Vol. I, p.8)

Burial of the children below the age of two years was the customary practice in India. So, for anatomists the scope of studying the human body was possibly limited to observing the children below two years of age (when all the bones have not been formed and the joints have not fused properly) or the injured and wounded in wars. Taken together, these might have led to false counting of number of bones and joints.

Kunte finds that the ancient Aryans possessed a kind of knowledge of anatomy, and physiology. In his analysis, "He killed the lower animals for his food, and, therefore, was able to distinguish between the lungs, the stomach, the intestines, the kidney and the other Viscera" (Kunte, 1902, p. 5). He also hints at gaining anatomical knowledge from the wounded and dead in wars. There was a sort of comparative anatomy too. "The principal anatomical parts of the human body and of the lower animals are described, and the foundation of comparative Anatomy was laid." (Kunte, 1902, p.8)

Additionally, the section of dissection in Śārīrastahāna in *Suśruta-samhitā* may be an interpolated part (*prakṣipta*) to the original text. Arguments in favour of this may be arranged in this way: (1) Among 120 chapters different subdivisions of chapters are arranged in the following order: 46 in the part of Definitive Aphorisms or fundamental postulates (*Sutra-Sthānam*); 16 in the part dealing with the Etiology of diseases or pathology (*Nidānam*); 10 in



the part explaining Anatomy and physiology of the human body (*Śārīra Sthānam*); 40 in the part of Therapeutics (*Chikitsitam*); and 8 in the part dealing with poisons and their antidotes (*Kalpa-Sthānam*). In addition to these the *Uttara-Tantram* consists of 66 chapters. Amongst these 186 chapters (including Uttara-Tantram) only a small portion of chapter V is devoted to the study of dissection and the technique to prepare a dead body for dissection. (Bhishagaratna, 1963, II, p.171-172). (2) It is taught that “a pupil, otherwise well read, but uninitiated into the practice (of medicine or surgery) is not competent to take in hand the medical or Surgical treatment of a disease” (Bhishagaratna, 1963, Vol. I, p.71). Learning practical surgery “should be taught by making cuts in the body of a Pushpaphala (*Benincasa cerifera* a kind of gourd), Alāvu (*Lagenaria vulgaris*), watermelon (*Citrullis lanatus*), cucumber (*Cucumis sativus*), or Ervāruka (*Cucumis melo*)” (Bhishagaratna, 1963, Vol. I, p.71), and not only that

“the art of venesection (Vedhya) should be taught on the vein of a dead animal, or with the help of a lotus stem. The art of probing and stuffing should be taught on worm (Ghuna) eaten wood, or on the reed of a bamboo, or on the mouth of a dried Ālāvu (gourd). The art of extracting should be taught by withdrawing seeds from the kernel of a Vimbi, Vilva or Jack fruit, as well as by extracting teeth from the jaws of a dead animal.” (Bhishagaratna, 1963, Vol. I, p.71-73).

And, finally, (3) This particular knowledge is applied in surgery only in terms of *marmān*. Real large-scale surgical practices are nowhere mentioned or described. In Meulenbeld’s translation, “The description of the whole body, given in this chapter, is a characteristic element of the surgical science, not found in the other divisions (of āyurveda)” (Meulenbeld, 1999, IA, p. 253). Again, “The vibhu (ātman), being extremely subtle, cannot be perceived with (normal) eyes, but only by means of (the sight acquired through) spiritual knowledge (jñāna) and penance (tapas)” (Meulenbeld, IA, 253). Combining prose and mnemonic verses was a “device at that which, at least originally, presupposed an oral transmission, and a corresponding knowledge, of the texts referred to” (Meulenbeld, 1999, IB, p.158, n.32). Another point should be mentioned here. “Bodily constituents are measurable in añjalis...Quantities mentioned are: ten añjali of watery fluid (udaka), nine of rasa as a fluid resulting from the digestion of the food, eight of blood...” (Meulenbeld, 1999, IA, p.44). Similar measurements consistent with natural phenomena are also found in all other Āyurvedic texts, including *Śāringadhara-saṃhitā*.

In *Śāringadhara-saṃhitā* –



jālāntaragate bhanau yat sūkṣaṃ drśyate rajaḥ / tasya triṃśattumo bhāgaḥ pamāṇuḥ sa ucyate // (Pū, 1.15)⁶ Similarly, regarding time or *kāla* in Indian Medicine *Suśruta-saṃhitā* enlightens us about the prevailing notion of time of the period. “The chapter six begins with an enumeration of units of time: akṣinimeṣa (the time required to produce a short syllable), kāṣṭhā, kalā, ahorātra (a day and a night), pakṣa (a fortnight), and māsa (a month)” (Meulenbeld, 1999, IA, p.205). In *Caraka-saṃhitā*, time (or, *kāla*) in relation to disease-production, is described as of two types: *nityaga* and *ābasthika*. – *Kālo hi nityagaścābasthika; tatrābasthiko vikaramapekṣate, nityagastu ṛtusatmyāpekṣaḥ* // (Vi. 1.2) *Nityaga* is thought to be related with season and *ābasthika* is related with disease. In *Suśruta-saṃhitā*, according to Bhishagaratna, time (*Kāla*) is represented thus:

“Time taken in articulating any of the short vowels (such as A, etc.) is called an Akshi-Nimesha. Fifteen Akshi-Nimeshas make one Kashtra. Thirty Kastrhas make one Muhurta. Thirty Muhurtas make one day and night”.

In precolonial India, measurable time had minimal role to play in the everyday life of the majority of the population. There is even mention smaller quanta of time measurement –

“And there are ten thousand and eight hundred 'muhūrta' in the year; and fifteen times as many 'kshipras' as there are 'muhūrta'; and fifteen times as many 'etarhi' as there are 'kshipra'; and fifteen times as many 'idāni' as there are 'etarhi'; and fifteen times as many breathings as there are 'idāni'; and as many spirations as there are breathings; and as many twinklings of the eye as there are spirations, and as many hair-pits as there are twinklings of the eye, and as many sweat-pores as there are hair-pits; and as many sweat-pores as there are so many drops it rains.” (Eggeling, 1900, V, 3.2. 12:3:2:55)

In colonial India, time measured with precision, and uniform over a defined space, was considered necessary for modern systems of regulation. “Time acquired new meaning and disciplinary authority through an equally abrupt entry of clocks and watches, and among some a sense of moving forward in consonance with its linear progress” (Sarkar, 2002, p. 283). Similar examples with regard to the disjunction between social time and the time required for the construction of an industrial society can also be had from English experiences (Thompson, 1967, p.56-97). In India, the subjective experience of life-cycle time could now be projected into a new *epistemic* domain rendering it objective, measurable and linear.

⁶ When the rays of sun enter through the window and the minute particles are observed thereby, the thirtieth part of that very particle may be called as an atom.



Clock-time replaced and reconstituted social time (Kalapagam, 1999, p.141-159; Thapar, 2006; Chakrabarty, 2001). As a counter-argument to “scientific” notion of time and space, one should remember “myths and stories might not only reimagine institutions such as the state by providing a poignant sense of its powerful interiority but also provide an alternative perspective on both space and time” (Mayaram, 2006, p. 12). To sum up, time was reconstituted into scientific clinical charts understood as *temporal* physiological changes, and morbid anatomy understandable as *spatial* pathological changes (Lee, 2000, p. 11-17; Reiser, 2000, p.31-36; Kern, 2000, p.3-9). To argue in modern terms, the nation was believed to live in an “empty homogeneous time” (Anderson, 1995). Following this logic, “other times” “are not mere survivals of a pre-modern past: they are now products of the encounter with modernity itself” (Chatterjee, 2001, p.401). Conceptualizing the body “anatomically” or conceiving of the body through a different paradigm in India was made possible not only through the introduction of modern medical education, hospital system or anatomical dissections, rather through a web of complex mechanisms – rewriting the history of social perception of time and space being one of them.

As an aside, two interesting incidents may be cited here. In Kautilya’s *Arthaśāstra* references are found for dissection to study the examination of contents of stomach for traces of poison (Mukhopaddhyaya, 1974, Vol. II, p.363). An anecdotal reference of cutting open the stomach of a person is found in a story of the Emperor Aśoka’s young wife Tisyaṛakṣitā: “It happened that Aśoka became very ill. Tisyaṛakṣitā commanded the doctors to send her a man suffering from the same disease; she had him killed, slit open his belly, and examined the stomach” (O’Flaherty, 1986, p.35). Another anecdotal, yet interesting, example may be cited here: *Rāmāyaṇa* is the epical text which has shaped Indian people’s subjectivity and societal orientation for generations. It is in some sense ‘text-as-authority’ per se. In the fifth *kāṇḍa* (*Sundara Kāṇḍa*) Sitā laments, “If Rāma the Ruler of the world does not come here, the evil Rāvaṇa, the king of Demons will cut off my limbs with his sharpened weapons, even as a surgeon would cut the limbs of a lifeless foetus” (Devi and Kishore, 5.28.6). This particular passage points to some facts – first, Rāvaṇa has been compared with a surgeon, and, second, surgeons cut the limbs of a lifeless foetus. Does it indicate that any kind of surgical (anatomical) practices was in vogue in the society of *Rāmāyaṇa*? We do not have any answer. But it keeps us pondering over the issue. At this juncture, a picture, famously known as the *Āyurvedic man*, may help us to understand superficial and inaccurate nature of anatomical knowledge in Āyurveda with regard to organ localization within the body.

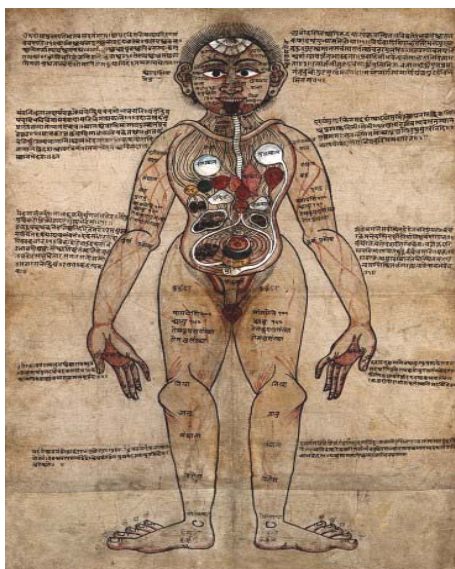


Fig 4. L0017592 Credit: Wellcome Library, London.

Anatomical study of a man standing with Nepalese and Sanskrit texts showing the Ayurvedic understanding of the human anatomy. Pen and watercolour c. 18th Century Size: 62.5 x 40.5 cm. **Collection:** Iconographic Collections. **Library reference no.:** Iconographic Collection 574912i. **Courtesy:** Wellcome Library, London. This picture is the 1st Āyurvedic illustration following Āyurvedic anatomical knowledge. All the channels and viscera are illustrated two-dimensionally on a single plane.

We shall clearly find in this illustration a “body frame” (i.e. two-dimensional body) without any depth or volume or accurate localization of the internal organs (i.e. three-dimensional body) of modern anatomical knowledge and through this body frame *doṣa-s*, *mala-s* and *dhātu-s* flow. Wujastyk observes that the body to which Indian medicine addresses itself is the physical body as understood to the senses and to empirical examination (Wujastyk, forthcoming). Another point may be noted here. Though there are descriptions of bones and various organs inside the body their positions and functions are always described with respect to *tri-doṣa* theory (or speculative pathology) of the body. Even when Suśruta gives description of any operative procedure he does it with the aid of *marman* points. For example – “An incision should be made at the spot of a finger’s width remote from the Urvi, Kurcha-Śirā, Vitapa, Kaksha and a Pārśva-Marma...” (Bhishagratna, 1963, II, p.187). But, while counting on exact numbers of structures within the body both authors and redactors of the classical texts appear to be at wit’s end. One more point may be added here. Measurement of a person is normalized with respect to the individual in Āyurvedic texts. Measurement was taken with fingerbreadth of the individual as a Unit. Following this principle, there is “difference in the statement of the Suśruta and the Caraka regarding the



height of the whole body. According to the former it is 120 *arṅgulas* whereas according to the latter it is only 84 *arṅgulas*." (Sharma and Dash, 1977, II, p.275). It is easily understandable that even in the measurement of a human body there were differences of opinion which points to the fact that actual practice of anatomy might be more of a mythical nature than of fact.

Summarily, such mode of understanding of the bodily organs remained unchanged for centuries till the arrival of Western medicine when, as Meulenbeld precisely comments,

"The renaissance of āyurveda since about the middle of the nineteenth century...in the competitive struggle with Western medicine...led to the construction of a unitary and coherent model of Indian medicine, weaned from inconsistencies and untenable concepts, and, particularly, as free from magical and religious elements as possible. The ancient terms for physiological and pathophysiological processes, nosological entities, etc., were diligently re-interpreted to bring them into line with terms derived from Western medicine. These procedures resulted in the appearance of a type of āyurveda that can best be designated as navyāyurveda or neo-āyurveda." (Meulenbeld, 1999, IA, p.2)

Indigenous and Western systems had been congruent until the early nineteenth century, but pathological anatomy and other developments in Western medicine (briefly described above) had created a gulf that "not even the most ardent Orientalist could bridge." (Harrison, 2006, p.80) If there was an "Oriental Renaissance" in Western medicine, it was empirical in character, and lay in the rapid expansion of Europe's *materia medica* in the years after 1560. (Harrison, 2006, p.81)

Western Medicine and Its Evolution: A Very Brief Review

Western medicine has passed through epistemological and paradigmatic shifts as discussed above. But till the end of the 18th century or the beginning of the 19th century, it, in its theoretical content, was essentially guided by ancient humoral theory, which was not seemingly much different in its core from Indian medicine. But how was Western medicine both *epistemologically* and *ontologically* before the fully evolved structure as we experience now? Even legendary physicians like Boerhaave (1668-1738) or Sydenham (1624-1689) stressed on taking patient's history as the most important thing to learn. There is a



remarkable passage in Sydenham's *Treatise of the Dropsy* going through which one will find "he asserts not only his own strong conviction of the importance of a knowledge of minute anatomy to the practitioner, but also his opinion that what Hippocrates meant, was to caution against depending too much on, and expecting too much help from anatomical researches..." (Brown, 1866, p.83-84). In Sydenham's own words, "in all diseases, acute and chronic, it must be owned there is an inscrutable *Ti θειου*, a specific property which eludes the keenest anatomy" (Brown, 1866, p.84). Herman Boerhaave, another great 17th-18th century physician, taught his students, "Everything pertaining to the case must be listed; (...) Narration must be done carefully so that the order of events be unchanged; there must be arrangement according to the surging change of events, and each event must be recorded in its proper place" (Derbes and Mitchell, Jr., 1955, p.217-240). We find that both the medical stalwarts, Sydenham and Boerhaave, were more interested in patient's history taking than on pathological findings.

As a result, the body image conceived in medicine turned out to be two-dimensional. Treatment followed the suit. Around 1800 one began to follow Bichat's (1770–1801) maxim "open up a few corpses", as Foucault laconically remarks (Foucault, 1994, p.124). Illness and disease became not a matter of the whole body, but were located in body parts and their pathologies. Bichat taught, "You may take notes for twenty years from morning to night at the bedside of the sick, and all will be to you only a confusion of symptoms...a train of incoherent phenomena. (But start cutting bodies open and, hey presto), this obscurity will soon disappear." (Porter, 1999, p.307) According to him, we should "dissect in anatomy, experiment in physiology, follow the disease and make the necropsy in medicine; this is the three fold path, without which there can be no anatomist, no physiologist, no physician" (King and Meehan, 1973, p.514-544). It becomes apparent that a new norm and epistemological structure is prescribed. The patient's own account of illness was relegated – it was *subjective*. What the doctors saw and extracted defined the disease – it was *objective*. Anatomical knowledge was the benchmark to differentiate between the two paradigms of knowledge.

One example may be helpful. As late as 1777 in surgical lectures of Munro Primus the elaboration of the teaching material was made in this way – *Medicine is Commonly Divided into five parts:*

- 1st or an extract Knowledge of ye humane Bodys.*
- 2d or history of Diseases.*
- 3d or Signs of Disseases.*
- 4th or Means of preserving Health.*



5th or ye Method of Curing and healing Diseases which is performed by ordering a right Diet; by Pharmacy or prescription of Medicines; and by Surgery or Manuall Operations... (Wright-St. Clair, 1961, 286-290)⁷

Perhaps one of the most important methodological changes characteristic of early nineteenth century medicine was the shift from *observation* to *examination* (Waddington, 1973, p.211-224). Mr. Thomas Wakley, the famous editor of the *Lancet*, wrote in the February 8 issue of 1824 – “Without anatomy medicine and surgery cannot be acquired; and by these sciences, some of the greatest evils which afflict human life can alone be relieved” (Kandela, 1998, p.333-335). Some noticeable and infallible changes like the rise of Hospital Medicine, Galilean and Newtonian mechanistic logic, Cartesian philosophy, mandatory acquisition of anatomical knowledge and use of technologies like stethoscope, microscope and auscultation began to make their strides in the world of medicine. Enriched with these sea changes occurring within their world of medical knowledge Western medicine arrived at India. There was a mutual refraction of colonial and metropolitan medical theory. British people’s conceptions of their own biomedical identity were reformulated within a global context, as part of their own response to the experience of colonial disease. Moreover, “The British experience of disease raised questions about where colonial contact begins and ends as the imperial metropole with its heterogeneous, impoverished, and anonymous populations seemed more and more to be simulacrum of the periphery” (Bewell, 1999, p.12-13). It may be interesting to take into account that in the early days of the Indian Medical Service (IMS, which was a purely military service) doctors were not only involved with medical practice and profession, they were also directly engaged in the building of Empire. “In the early days of the Company the doctors went with the traders to the founding of the factories, and were often of great assistance, by virtue of the medical treatment which they could offer to rulers from whom concessions were required” (McDonald, 1956, p.1-5). Medicinal herbs of India were also of great interest to the British medical practitioners. While preparing the first *Materia Medica* of India Whitelaw Ainslie commented,

“It has long been a source of regret that there was no where to be found a correct list of what particular articles of the British *Materia Medica* could be procured in

⁷ It is interesting to note here that Āyurveda is also called *Aṣṭāṅga Āyurveda* because it has eight branches or divisions, though there are recent attempts to reorganize it. (Sharma, 1998)



the Bazars of Hindoostan, with their in the languages which are spoken in the Peninsula; or any arranged account of the Materia Medica of the Native Indians.” (Ainslie, 1813, p.1)

We should remember the intertwining of pharmacopoeia and the making of nation state (an idealized version) as discussed above.

To emphasize, what was counted as *knowledge* in Indian practice metamorphosed into mere information to the British knowledge. It could only attain the status of knowledge again if reified and verified by the knowledge centre in London. So, the journey was “knowledge” > information > reification/verification > “real” and “actual” knowledge. Bruno Latour makes a keen observation, “the first to sit at the beginning and at the end of a long network that what I will call immutable and convertible mobiles. All these charts, tables and trajectories are centuries old or a day old...” (Latour, 1999, p.227)

Introduction of Medical Knowledge in Colonial India: Encounter with Āyurveda

Many years after Bernier’s account, in his famous letter of December 11 1823 Ram Mohan Roy, one of the pioneers of Indian “Renaissance”, wrote to Lord Amherst, “this sum (i.e. fund allocated for Sanskrit and vernacular education in Bengal) should be laid out in employing European Gentlemen of talents and education to instruct the natives of India in Mathematics, Natural Philosophy, Chemistry *Anatomy* and other useful sciences...” (Roy, 1973, p.834, emphasis added). This letter perhaps sets the tune of the Bengali elite’s attitude towards Western education in India. Furthermore, in 1822 Ram Mohan Roy sent a selection of 10 “Hindoo crania” to be examined by Dr. George Paterson (Patterson, 1824, p.430-448). In an unusual letter to some J. N. Batten of Saharanpur on 1st January 1836 (the year of the first cadaveric dissection in India which was performed on 10th January), Dwarakanath Tagore wrote:

“My dear Batten,

Well done...I have converted at least 200 good Hindu boys by giving them the holy water that comes from Corbonell & Co., so that by and by they will all sing a chorus with me at some of the chapels.” (Tagore, 1836)

Besides Rammohan and Dwarakanath other pioneering men taking part in the introduction of scientific knowledge and anatomical education in the mould of Baconian,



positivist and utilitarian philosophy were Keshab Chandra Sen and Akshay Kumar Datta. According to Sen, "Anatomy and physiology, geology and astronomy, chemistry and zoology (...) living preachers that [spoke] forth saving wisdom" (Lourdusamy, 2004, p.52). Regarding Indian philosophers Datta woefully commented, "They were in want of someone to lead them. They were in need of one Bacon, one Bacon, one Bacon" (Ray Chaudhuri, 1996, p.52). As an aside, Luciene Febvre shows that even words like "concept", "absolute", "abstract", "concrete", "syntheses", "deduction" and "induction" were missing from the sixteenth century vocabularies. Even the word "system" came into usage only in the middle of the seventeenth century. "Rationalism" itself was not christened till very late in the nineteenth century (Tambiah, 1990, pp.88-89). Though the early nineteenth century was bearing the legacy of "humoral" medicine, experiments and verification of texts went hand in hand. Even in a paper where with humoral medicine's spirit "animal and earthy matter" of the human bones were examined it was examined through objective and rational light of modern science. (Rees, 1838, p.406-413)

The decision to establish a Native Hospital in Calcutta was taken in 1792. It was reported in *Calcutta Gazette* on 18th October 1792 – "The institution of the hospital for such of the natives as Providence is pleased to inflict with sickness or casualty, reflects additional credit on the characteristic of humanity..." (Seton-Karr, 1865, Vol. II, p. 355). The reason behind this effort is worth noticing. During those early years of British colonization in Calcutta new industries were being established. It resulted in huge number of injuries like lacerated wound, fracture of bones, serious damage of the limbs. "The establishment of an Institution for the relief of Natives suffering from accidents and sickness was proposed to the community in the year 1792." (Lushington, 1824, p.294) Native Hospital outdoor initially started from the 1st September 1794 on Tuesdays and Fridays. Its purpose was to primarily give medicines to the injured from accidents. Consequently, arrangements were done for people ready to undergo surgical treatment (Lushington, 1824, pp.294-301). The number of patients suffering from accidental injuries was as follows: 1794-95 – 67, 1795-96 – 108, 1796-97 – 182. (*Calcutta Gazette*, 1795-1797)

"Those individuals only who require Surgical aid, are received into the Hospital as house patients, for any length of time." (Lushington, 1824, p.296) It must be noted that from this time onwards Indian patients, so far being treated within their domestic settings, began to experience a new era of being interned within hospital for medical help and treatment. In 1803, inoculation for the cowpox was administered to the applicants at the Hospital. Patient's perception of the body began to be metamorphosed. They gradually began to realize that the



body did not solely belong to them the state was all set to inscribe its marks of civilizing process on that indigenous body.

It may be profitable to argue that the emerging discourse of colonial medicine, particularly anatomy (not to speak of other areas of sciences), seems to be a “derivative” discourse, not “original” one, like many other branches of knowledge in colonial India (Chatterjee, 1986). Another issue may be of some interest. Indian medical education system was perhaps a test laboratory in some senses where new educational policies like state-owned medical education were first implemented before its introduction in England. Finally, the study of medicine was constructed entirely in mimicry of professionalized modern medicine “reinforced now by the elements from Western medicine” and, consequently, there occurred “professionalisation of Āyurveda and its consequences, such as the establishment of Āyurvedic colleges” (Meulenbeld, 1995, p.1-10). Here, it can be argued that It was *derivative* in two senses – first, the very act of acquisition of modern medical knowledge was implanted on India, not arising out of India’s normal course of socio-cultural-economic development; and, second, specifically invoking modern anatomical concepts and terms to fit into ancient Āyurvedic notions of the body to make Āyurveda modern and compatible with the changing academic and social milieu. It was primarily due to the fact that “new prestige for European surgery seems to have spilt over into the beginnings of an influx of western medical ideas into India” (Pearson, 1995, p.170). Peter Breton, a Surgeon to the East India Company, made some important observation with regard to anatomical knowledge in Indian texts. In 1825, he noted,

“they [i.e., the “Asiatics”] have no distinct words for nerve and therefore call it Nus, Asub, Shirra, etc. in common with Ligaments and Tendons...they know not the distinction between an Artery and a Vein and consequently the appellation of Rug and Shirra are indiscriminately applied to both. The Hindee word Rug and Shirra according to the Soosrut, a Sanskrit work on Anatomy and Pathology, means blood vessels or tubular vessels of any kind.” (Breton, 1825, p.1)

In the altered social ethos the cultural hierarchy of colonial medicine assigned low status to subjective symptoms, which were to be legitimated by objective findings. So the importance of subjectivity (which was represented to a great extent through Āyurveda) gradually began to disappear from the new hegemonic medicine.



In the construction of Western medical hegemony over Indian healing practices indexical parts of the symbols and signs were insidiously reconstructed. Time was privileged over space. Time was no longer simply the medium in which all histories occurred, it gained a historical quality – progressive, linear and, no doubt, scientific. It connoted both social time and clinical charts marking changes of patient's profile over an abstracted flat sheet of medical history. With regard to medical time, unlike Āyurveda, vicissitudes in temporal marks of the "present" and "normal" were to be understood as physiological processes. In pathological anatomy the same kind of temporal marks of disease was an inscription of the "past" and its present was the pathological marks nascent within the volume of the body. Consequently, perception of "cyclical time" represented through both imbalance of *doṣas* inside the microcosmic body and seasonal changes in the outside macrocosmic world was epistemologically dislocated. As a result, it was reconstituted into scientific clinical charts understood as *temporal* physiological changes, and morbid anatomy understandable as *spatial* pathological changes. (Lee, 2000, p.11-17)

The singular act of post-mortem dissection and its marvellous use in organ localization of disease differentiated Hospital Medicine from Bedside Medicine as well as established its unquestionable authority over Indian medical knowledge system. Western medicine in its early colonial phase was bereft of any significant therapeutic superiority over the competing indigenous healing traditions of India. But, to emphasize, it excelled in surgery based on correct anatomical knowledge and organ localization of disease (West Bengal State Archives, 1839). Contrarily, it finally produced fairly good treatment outcome particularly in cases suffering from abscesses, tumours, fracture of bones, lacerated wounds etc. It helped in generating an awful respect for the "new" medicine (Bhattacharya, 2004, p.31-54). Dissection was required in every session in addition to six terms of anatomy. "But to permeate the consciousness of the Indian masses, applied science in the form of surgery (anatomy) and the treatment of diseases (botany and chemistry) had to be successfully practiced by the doctor-scientists trained in Western methods" (Gorman, 1988, p.295). Dr. H. H. Goodeve, while delivering introductory lectures in 1848, remarked,

"in less than two years from the foundation of the college, practical anatomy has completely become a portion of the necessary studies of the Hindu medical students as amongst their brethren in Europe and America. The practice of dissection has since advanced so rapidly that the magnificent rooms erected four years since, in which upwards of 500 bodies were dissected and operated upon in the course of last year, now amounting to upwards of 250 youths of all...religions, and castes...as the more



homogeneous frequenters of an European school.” (Centenary Volume Committee, 1935, p.14)

Think of the scenario! Paupers, street-dwellers and the most wretched people who had no other recourse to treatment than to be lodged into hospitals were the principle source of supply of cadaveric bodies. Buckland wrote, “...a large proportion of the corpses, instead of being burnt, were either thrown into the river, or consigned for dissection to the Medical College hospital, to be afterwards disposed of in the same way” (Buckland, 1901, Vol. I, p.296).

Though the first dissection was greeted with gun-salute, it also resulted in some amount popular furore (Gorman, 1988, p.285; Shastri, 2007, p.105). George Smith writes, “How did Duff’s Brahmin students and those of the Hindu college stand the test of time for the first dissection? (...) the college gates were closed to prevent popular interruption of the awful act!” (Smith, 1879, p.217-218) If we consider the actual practice of dissection the following account may be recollected. According to Mr. J. W. Kaye,

“In 1837 – the first year of which a record was kept – sixty bodies were dissected before the students. In the next year it was precisely doubled. In 1844 the number had risen to upwards of 500. The College (i.e. Medical College, Calcutta) was popular. There was evidently a strong desire on the part of the native youths for medical and surgical knowledge.” (Deb, 1977, p.70; Smith, 1879, p.218)

Another report reads thus,

“Flourishing the state of Medical College of Bengal...It was deserving of mention that from the month of November, 1846, to that of March, 1847, being a period of only five months, nearly 500 bodies had been dissected by the native students; - an astonishing number, when the prejudice to be overcome is considered.” (London Medical Gazette, 1847, p.126-127)

In Richardson’s estimate, bodies taken under the Anatomy Act (the first ten years from 1832-33 to 1841-42) for London hospitals only are – 135, 141, 194, 206, 184, 209, 156, 168, 178, and 110 respectively. (Richardson, 2000, p.293) There appeared well-marked professional hierarchy at two levels – between indigenous practitioners and western-trained physicians on the one hand, (Gupta, 1998, p.368-378) and, between English and Indian physicians on the other.



One example, I hope, would clarify my argument. Soorjo Coomar Goodeve Chuckerbutty was a bright student of Medical College. He was possibly the first Indian doctor to use the knowledge of morbid anatomy in diagnosing *typhus* fever in 12 cases in 1864. He also used his anatomical knowledge in post-mortem examination to find changes in internal organs in 63 fatal cases of cholera (Sen Gupta, 1970, p.183-191). Such a correlation between manifestation of disease and its anatomical pathology increasingly made indigenous knowledge of healing marginal, particularly because of its premises being based on: (a) paradigm of speculative pathology, (b) primary emphasis on prognosis (instead of “cure” in modern practice), and (c) un-standardized, non-uniform patterns of pharmacopoeia. Marginalization was further accelerated by addition of newer examination tools like stethoscope (opposed to pulse watching in traditional practice) and “marvels” of surgical practices. It was admitted that the rule among “the natives of Bengal seems to be to resort to Western systems in the first stages of the diseases, it being the general belief that the ancient Hindu system is slow in giving relief to the sufferer” (Dutt, 1922, iii).

“Practical therapeutics” gained from knowledge of dissecting a cadaver (no more a human being but an object to be anatomized and aggregating facts about an “animated corpse”) led into “clinical detachment.” It was poised against “psychologized” epistemology of Āyurvedic practices. The intersubjective network between patient-physician-community relationships underwent metamorphosis (Obeyesekere, 1993, p.160-176). The body became the *written* surface and the *writing* instrument for the emergent medical hegemony. During its formative period Western medicine was fraught with tensions and contradictions, primarily, at three levels: (1) to establish/legitimize authority and superiority of Western medicine over indigenous ones; (2) to ensure transmission of institutionalized European scientific medical education in vernacular; and (3) to make it negotiable with the local cognitive world. But, after the introduction of anatomy as a separate, distinct and mandatory discipline in medical curriculum in 1835 everything changed in favour of modern medical education.

A conceptual system of medicine ceases to be vital and creative when its major legitimizing circumstance, its particular context of social ideology and social structure, vanish, either in reality or in the aspirations of a population (Unschuld, 1993, p.46). Traditional Indian society constituted the epistemological root – the legitimizing context – of Āyurveda. After the advent of modern medical knowledge, the students who studied allopathy had much better chances in life than those who studied old Tols (Gupta, 1998, p.367-378). The gravitation of educationists towards Positivism and of Positivists towards education helped shape a social



milieu on a more practical level where it was possible to obtain a job with a B.A or a F.A degree. (Forbes, 1999)

On their behalf, Āyurvedics were caught within a two-edged sword. On the one hand, since antiquity Āyurveda was concerned more with prognosis (and less with diagnosis) of a disease and it could be efficiently resolved by *tri-doṣa* theory without having any knowledge of actual anatomy of internal organs (Zimmermann, 2006). Anatomical knowledge, dissection and surgery had been relegated to the lower castes of the society. High caste Āyurvedic practitioners were content with philosophy, theory and herbo-chemical knowledge and practice of Āyurveda. Besides classical texts, there are abundant references regarding this practice (Bernier, 1916, Vol. I & II; Fryer, 1912, Vol. I, II & III; Forbes, 1813, Vol. I, II & III; Jacquemont, 1835). On the other, if Āyurveda was to be established as a valid and eternally 'modern' repository of knowledge of the body, health and healing, learning of modern anatomy became mandatory for high caste Āyurvedics. Assimilation of modern Western anatomical ideas to explain internal dynamics of Āyurveda and to judge all ancient works in the "scientific" and "civilized" light gradually became the call of the day. Such an effort is perhaps aptly illustrated in a 1924 book *Śārīr Parichay* (Introduction to Anatomy), purportedly to resurrect old Āyurvedic knowledge of anatomy, written by the eminent English-educated *kaviraj* Gananath Sen (Sen, 1924). In this book Gananath had sketched out a journey from atlas to cadaver to dissection for properly gaining anatomical knowledge. He instructed that to gain comprehensive knowledge of a difficult subject like anatomy one must first learn from atlases and *gurupadesha* (advice from guru), "then through dissection that knowledge has to be testified. If one does not have any knowledge of the subject from the beginning only dissection cannot yield any fruitful result" (Sen, 1924, p.2). Throughout the book he reproduced diagrams and figures from different textbooks of anatomy taught in medical colleges. Ancient Āyurvedic anatomical terms of entirely different connotations were conflated with modern concepts. In his book, he quickly turned to discover examples of "germ theory of disease" even in ancient Āyurvedic texts. Here "germ theory" acted as a *metonymy* of power. As a result, he, perhaps inadvertently, opened up a space of Foucauldian clinical *gaze*. Through this new mode of conceptualization there occurred first, a spatial shift in perception from macrocosmic-microcosmic arrangement of the "Indian" body to the circumscribed, three-dimensional anatomical space, and second, a shift from traditional philosophy of *tri-doṣa* theory to "modern" notion of organ localization of disease. It was no wonder that the philosophical matrix of Āyurveda was dislocated through this "modernization" of Āyurvedic knowledge of anatomy. Gananath's epistemological inquiries were surreptitiously assimilated and reconfigured by metonymic language-metaphors of modern anatomy. Consequently, the



Āyurvedic body as a self-reflexive and active agency began to metamorphose into an inert dead body – an “object”. It can be understood through Peircian concept of index-symbol-icon. An index is a sign that is contiguous with and determined by its object. So it is the material aspect of the sign. The indexical relation can best be described as a metonymic relation. This metonymic relation is neither a priori nor absolutely essential. Metonymic relations are made through action and explained mytho-historically. (Mines, 1997, p.33-44) Such a process was in operation and the Sanskritik connotations of organs described in Āyurveda were evacuated of their meanings. That very vacuum was filled in by modern anatomical meanings. Hence, context-sensitive character of Āyurveda was metonymically refigured by context-free, universal logic of modern medicine. (Sengupta and Sengupta, 1902; Sharma, 1983) Two examples may be helpful at this point.

In *Śārṅgadhara-saṃhitā* –

nabhisthaḥ prāṇapavanaḥ spr̥ṣṭva hṛtkamalāntaram / kanṭhād vahirvinyāti pātum viṣṇupadāmṛtam // (Pū, 5.43-44). In this passage, during nationalist revival, *pātum viṣṇupadāmṛtam* was translated to be equivalent to external air or oxygen. Though, more correctly, complying with the textual meaning it can be translated in another way to have a better meaning. Wujastyk translates, “The breath of life located in the navel, touches the inside of the lotus of the heart, and then exits from the throat to the outside to drink the nectar of the sky (or Vishnu, in my translation)” (Wujastyk, 1998, p.325). Such was the epistemological reconstitution of terms and, consequently, knowledge to make it consistent with positivist colonial scientific logic and reasoning.

In *Suśruta-saṃhitā* –

sapta śīrāśatāni bhavantiḥ yabhiridaṃ śārīramārāma iva jalahāriṇibhiḥ kedāra iva ca kulyabhirūpasnihyatehnugr̥hyate cākuñcanaprasāraṇādibhiviśeṣaiḥ / drumapatrasevanīnāmiva tāsāṃ pratanāḥ / tāsāṃ nābhimūlaṃ tataśca prasarantyūrdhamadhastiryak ca // (Śā, 7.3)⁸ Dominik Wujastyk notes, “*Suśruta-saṃhitā* does not use a concept of fluid circulation, but rather works with a centripetal fluid distribution starting from the navel” (2008, p.211-248). But this concept was completely reconstituted in mimicry of modern anatomy following colonial confrontation.

⁸ There are 700 ducts. The body is irrigated these, just like a garden by water channels, and a field by ditches...their ramifications are like veins on the leaf of a tree. Their root is the navel. From there they spread out upwards, downwards and horizontally. (Thatte, 2005, p.140)



It should be evident by comparing the pictures given below.

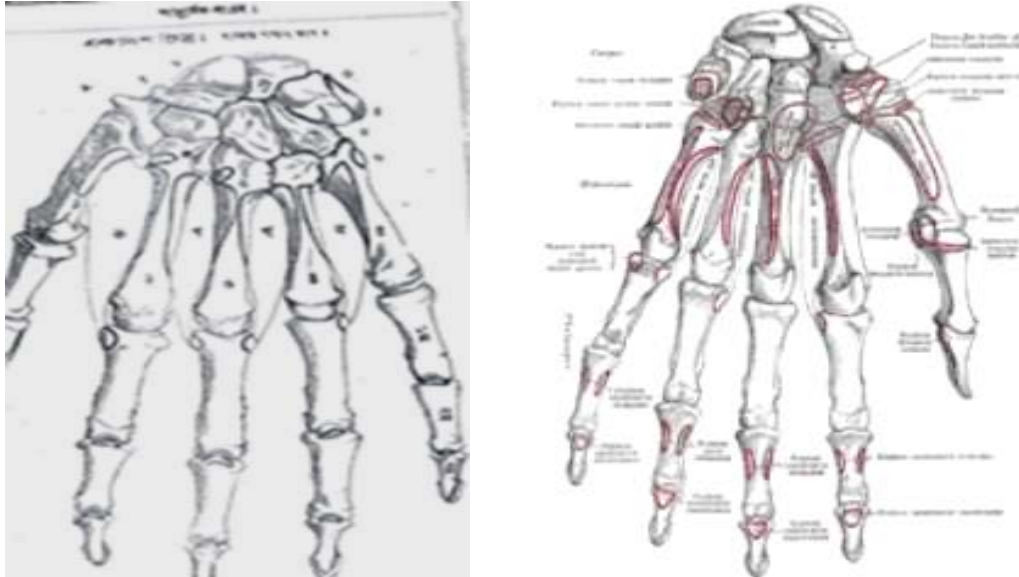


Fig. 5. Picture on left is taken from Sengupta and Sengupta, 1902), p.18. The picture on right is from *Gray's Anatomy*, 1887. T. Pickering Pick was the editor of this edition and colour printing was introduced for the first time.

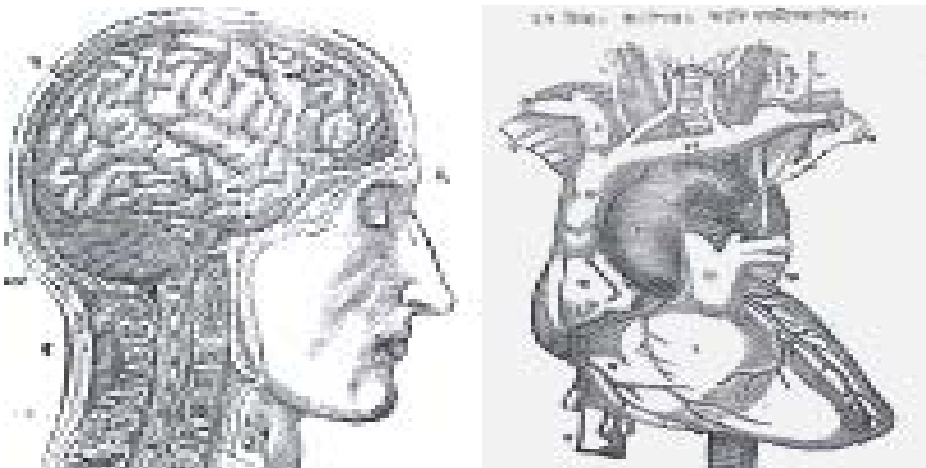


Fig. 6. In Āyurveda the brain is one of the most unexplored areas. It is most likely due to the fact that the medical men could not open and observe the organ. The heart too occupies an undefined position – *puṇḍarīkena sadṛśam hṛdayam syaddhomukham*. But in “modernized” Āyurvedic textbooks they are confidently represented in the way as are shown in the pictures provided here from different “modern” Āyurvedic textbooks published during the late eighteenth- and early nineteenth-centuries.



As a result of such contestations between Western and indigenous medicines there emerged a space split open – the all-powerful Western therapeutics and indigenous ontology of health. Contesting, yet vanquished, indigenous population and practitioners tried to inscribe their presence inside this space – oftentimes as “mimicry”, more often through rejection of Western medicine – and resorting to indigenous healing practices, particularly in case of chronic diseases (which is till date a dark area of modern medicine). More specifically, its resistance to “modern” medicine was not merely against the “scientisation” of the human body “but also against the colonial project of the hegemonisation of cultural consciousness” (Quaiser, 2006, p.319).

In one scholar’s observation, the modern Vaidya or physician caste does not also appear in the more ancient Saṃhitā-s such as those of Manu and Yājñavalkya. Manu mentions physicians in the same category as meat-sellers or liquor-vendors, and Yājñavalkya classes them with thieves, prostitutes and others, whose food cannot be taken (Bose, 1894, p.20; Chattopaddhyaya, 1977). Western medical practice provided the way to rise over the social stigma of physicians inscribed on them by the Brahminic society. But they had to pay for it. Subjectivity of the rising and modern Indian physicians was reconstituted. They began to perceive both the body and health in the light of post-enlightenment Europe. “Indianness” was to be fought with modernity. Within the interstices of modern health perception and treatment of diseases a space was split open through insinuation of Indian ontology of health and “Indianness” of the body (Bhattacharya, 2004, p. 31-54).

To sum up, in my paper I have argued that Western medicine has passed through epistemological and paradigmatic shifts from Bedside medicine to Hospital medicine to Laboratory medicine (and, now, Techno-medicine). Having gained modern knowledge of anatomy, instead of previous two-dimensional perception of the body disease began to be perceived to being located within a three-dimensional body in modern medicine. The singular act of post-mortem dissection differentiated Hospital medicine from Bedside medicine and established its unquestionable authority over Indian medical knowledge systems. In our theorization, Bedside medicine is inclusive of both traditional Indian practice within domestic setting as well as pre-dissection European medical practices in India. To note, throughout the entire period following European renaissance and industrial revolution there emerged capital, competitive market economy, working class and predominance of technology in social life which lead to an objective mode of learning in social life and psyche. It was altogether different from the Indian mode of learning. These specific phenomena prepared the canvas



over which the new knowledge of knowing the body and health could be written for the first time and for ever in human history. The study of medicine in ancient India was the first momentous step forward from *daiva-byāpāśraya bheṣaja* to *yukti-byāpāśraya bheṣaja*. There are attempts at theorization in both *Caraka-* and *Suśruta Saṃhitā* with regard to anatomical knowledge as well as knowledge of health and healing. In Āyurvedic knowledge, there is no single conception of the body, but a dominant one – a bodily frame – through which *doṣa-s*, *dhātu-s* and *mala-s* flow. *Tri-doṣa* theory, resembling “humoral” theory of Greek origin which was the predominant concept of Western medicine till the beginning of the nineteenth century, explained disease causation. By 600 A.D. Āyurvedic anatomical practices were in complete disuse. Āyurvedic surgical practices were based not on the knowledge of anatomical organs, but on regional anatomy and *marmān-s* (lethal/vital spots). Later on, new additions to classical Āyurvedic knowledge were grounded on external examination and scanty knowledge of the internal organs. A good testimony to the decline of anatomo-surgical practice in Āyurveda is through scrutinizing the texts of various foreign scholars like Hiuen Tsang or I-Tsing. Travel accounts of Bernier, Manucci, Fryer, Jacquement, Ward etc. provide a tangible comparative study of anatomical knowledge between India and Europe. One major problem of understanding Āyurvedic texts is to read back the context-sensitive vocabulary with our modern context-specific medical knowledge. Finally, on their behalf, Āyurvedics, following colonial/modern medical encounters, were caught within a two-edged sword. First, since antiquity treatment of a disease could be efficiently resolved by *tri-doṣa* theory and *marmān-s*, without having any modern anatomical knowledge. Second, to establish Āyurveda as a valid and eternally “modern” repository of knowledge, learning modern anatomy became mandatory for high caste Āyurvedics to usurp it from the lower-caste practitioners. Consequently, a shift from traditional philosophy of *tri-doṣa* theory to “modern” notion of organ localization of disease occurred. It reconstituted the philosophical matrix of Āyurveda through this “modernization” of Āyurvedic knowledge of anatomy.

Gananath Sen used to tell his students in a lighter vein about the present state of Āyurvedic knowledge –

Mālākāścakarmakārah nāpito rajakastatha/

*Bṛddhārandā biśeṣaṇa balāu panca cikitsakā//*⁹ (Thakur, 1994, p.1)

⁹ In the age of Kali or *kali yuga* there are five physicians – garland maker, blacksmith, barber, washer man and old widow (in slang).



Possibly no other expression can better express both epistemological and ontological characteristics of “modern” Āyurveda which finally became an Indianized replica of modern Western medicine. Excepting the states of Kerala, Tamilnadu and part of Maharashtra all other states are following this dictum of “modern” Āyurveda set into motion by Āyurvedic practitioners like Gananath Sen, Upendranath Sengupta, Gangadhara Kaviraj, Shiv Sharma, P. S. Varier (Varier, 2005) and others. Varier’s *Aṣṭāṅgaśārīraṃ* is declared as a “concise and complete text book of human anatomy and physiology in Sanskrit with commentary and illustrations compile for the use of āyurveda colleges.” It was first published in 1925. All the diagrams and illustrations are taken from standard text books of modern anatomy. The same type of illustrations we have seen in the works of Gananath Sen and Upendranath Sengupta too. We should keep in mind that there did remain a counter-hegemonic school of opinion represented by B. G. Ghannekar, Vijaykali Bhattacharya etc., who tried to interpret some parts (not all) of modern anatomy in the light of *tri-doṣa tattva*. They endeavoured to anchor to the original meanings of terms employed in Āyurveda. But this opinion was not a cup of tea for the period.

This dictum of Āyurveda is carried forward in modern day health practices too.



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Acknowledgments

I deeply acknowledge my indebtedness to academic and other sorts of generous help I have obtained from Dominik Wujastyk and Rahul Peter Das. They have munificently provided me with huge amount of books, journals and other materials failing which this paper would not take its present shape, especially at this rather marginal area of India. I also owe to the Indian National Science Academy. By way of giving me the Research Associateship it has helped me in a big way to facilitate this research work. This paper partly derives from my PhD dissertation under the guidance of Prof. Samar Deb. A preliminary version of this paper was presented at the conference of the International Association of Historians of Asia, Jawaharlal University, November 2008.