Introduction

> The practice of medicine of the ancients was an art, and not a science, and dignity it did not acquire until it was based on acquaintance with anatomy and physiology. – (Leidy, 1859).

Since antiquity the study and practice of medicine hinges around a few ontological and epistemological questions. What is health? What is disease? What is body? Why the body of mine gets afflicted? For almost 150 years the dominant model of disease we have had in Western developed societies has been that many diseases are caused by some *encounter* of the human body with some dangerous element (or a *failed* encounter with some necessary element) 'out there' in Nature. (Cunningham, 2002) "To become a patient is to establish a healing relationship with another who articulates society's willingness and capability to help." (Marinker, 1975: 84).

From the puzzles about the body, even about any one of its cells, it is a short ride to riddles concerning the ultimate causes of the universe and enigmas about the meaning of existing in time. (Sullivan, 1989) As a result, the questioning of medicine can never be restrained, because the sickbed is maelstrom of forces that are historical as well as organic. If society and science view medicine or art of healing in an all-encompassing way, the problems, and, more importantly, the solutions will be understood following this line of thinking. If, on the other hand, science and society view medicine as an industry and a market commodity, the problems and solutions will be understood as industrial and mercantile in nature.

To understand disease inside the body one has to grapple with the knowledge of the body. The physical examination, medical imaging and other procedures, as well as the elements of the medical history, all generate clinical data that pertain to anatomical entities in the human body. Dissection-based anatomical analysis facilitated the classification of bodily components, the development of a vocabulary for describing the body with clarity and precision and mapping the bodily organs and their surface projections, which would be later used in physical diagnosis. (Older, 2004)

Against this background, it is useful to remember, "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)

Hence, anatomical knowledge becomes a window to locate history, evolution and progress of medicine when two cultures of medicine are poised vis-à-vis. Such was the scenario in India of which I shall talk about in my dissertation. India's own systems of healing had to face a formidable and domineering system of medicine from the British.

Two ancient, rich and distinct paradigms of medicine and health are – (a) Greco-Roman-European, and (b) Āyurvedic. Both these systems have differently dealt with the above mentioned questions. Modern European medicine is a definite disjunction from the Greco-Roman lineage, occurring during the 16th-18th centuries. Humoral theory of Greco-Roman medicine was replaced by pathological anatomy and organ localization of disease. Anatomy has a long and checkered past as a scientific discipline. Its heyday came in the 19th century, with the development of quick, effective surgical techniques on the battlefield and, later, the introduction of anesthesia, when knowledge of the structural intricacies of the body began to have practical significance for doctors.

Against this background, this thesis does not aim to deal with any 'hard' clinical anatomy, nor is it an attempt to scrutinize vertically or horizontally the history of medical knowledge in India. Rather, this thesis tries to put a modest attempt to look into the issues of encounters in anatomical knowledge as contained within both ancient Indian medicine (Āyurveda in my discussion) and modern medicine introduced in India through the British. An important mention may be made here. In 1823, H. H. Wilson commented on the medical and surgical sciences of the Hindus, "they attained as thorough a proficiency in medicine and surgery, as any people, whose acquisitions are recorded, and as indeed was practicable, *before anatomy was made known to us*, by the discoveries of modern enquiries."(Wilson, 1823: 207) It becomes self-evident from this observation that the benchmark of distinction of European medicine from all other traditional and indigenous medical practices is anatomy. Throughout this dissertation, we shall try to explore this issue.

During doing study, the locus of this research work passes through some historical facts which have not yet been adequately taken into consideration. It might be more

propitious for us to look into issues involved with medical and anatomical encounters at the level of epistemology of both modern medicine and Āyurveda. Briefly, 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. (Das, 2003) Besides Āyurveda there are two other important streams of Indian medical practices being practiced for centuries, namely Unani and Siddha.[1]

This dissertation does not deal with those two systems. Modern medicine is understood to be the medical practices following the introduction of Western medicine and patronized by the British government. More specifically, after the foundation of Medical College in Calcutta in 1835 anatomical dissection was introduced in medical curricula. In the present study modern medicine is representative of that period. European colonialism established itself decisively in the Indian subcontinent in the period from 1770 to 1830 through modern regime of disciplinary power (somewhat in tune with Foucault), though, coming at the colonial margin, this disciplinary power (including medicine) would "at the same time be compromised, and, even, subverted, by the need to maintain a specifically colonial form of power." (Chatterjee, 1996)

Though this research work is concerned with medicine, institutionalization of colonial medical science and some partial accounts of anatomical details of the body (rather than with philosophical issues involved with modern medicine and Āyurveda), it does not pertain to scientific study per se. Following Frits Staal, this approach is scientific to the extent it is based upon the assumption that Āyurvedic medical practices "can be studied like other objects and are not beyond the pale of an investigation that is empirical and rational and therefore akin to science." (Staal, 1996: 1)[2] To note, while making any

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[1] Āyurveda does not mean any homogeneous structure. From the classical period (roughly, some centuries B.C to a few centuries A.D.) to the intermediating periods of various redactions it has undergone significant changes. Two basic constituent features remained unchanged throughout the ages – (a) disease perception through *tri-doṣa* theory, and (b) avoidance of any anatomical dissection or taking case history of a patient. Moreover, since the period of Āyurvedic revivalism during nationalist movement to the present time different Āyurveda-s have come up. Arguably, the three principal strands of such Āyurveda-s are 'modern' Āyurveda, *śuddha* Āyurveda, neo-āyurveda or 'New Age' Āyurveda.

[2] Some of the importatnt scholars, besides Staal, are Dominik Wujastyk, G. Jan Meulenbeld, Rahul P. Das.

attempt to explore into the history of anatomical encounters it is almost inevitable to read the old texts in the light of post-Enlightenment, post-Vesalian and post-Harverian mindset. Wujastyk makes us aware of this problem. (Wujastyk, 1998) Specifically speaking on botanical terms, Meulenbeld has drawn attention into puzzling inadequacies to locate "botanical equivalents of Sanskrit plant names". (Meulenbeld, 2009) He traces the problem to create the significance of a scientifically looking pharmacopoeia for the Indian Āyurvedici in their competition with western medicine. In a more scathing note. "A keen observer among the moderns...will be shocked at the amount of intellectual dishonesty and chicanery with which the Ayurvedic texts have been treated to make them resemble the modern texts." (Das, 2003: 6)

Anatomical Knowledge – Rise of Hospital Medicine – 1794 – Colonial India

Quotations from one of the most celebrated textbooks of medicine have got some bearing with the present study. An attempt is made here to 'anatomize' medical knowledge (as is understood today). It is also an attempt to understand the specific intellectual history of dissemination of scientific knowledge of medicine – the specific contingencies of power and agency – which determined why and how āyurveda and Unani now flourish as parallel 'disciplined' forms of medicine, whereas 'Hindu chemistry' was virtually stillborn. (Chatterjee, 1996)

"The hospital is an *intimidating environment* for most individuals. Hospitalized patients find themselves surrounded by air jets, buttons, and glaring lights; invaded by tubes and wires; and beset by the numerous members of the health care team—nurses, nurses' aides, physicians' assistants, social workers, technologists, physical therapists, medical students, house officers, attending and consulting physicians, and many others. They may be transported to special laboratories and imaging facilities replete with blinking lights, strange sounds, and unfamiliar personnel; they may be left unattended for periods of time; they may be obliged to share a room with other patients who have their own health problems. It is little wonder that *patients may lose their sense of reality.*" (Harrison's, 2008: 8)

A few facts can be extrapolated from the above mentioned statement – (1) hospital remains an intimidating environment for most individuals (not 'patients', to note),

and (2) patients become too vulnerable to lose their sense of reality. It can be assumed that doctors, in such instances, become the only tenuous link between the 'reality' of hospital and that of patient's domestic setting. Medicine is the intervening agent between the two realities of the patient. An Indian instance can be cited here. Charles Lushington, while he describes the details of the first General Hospital of Calcutta about two hundred years ago, comments, "The idea of entering a Hospital for relief, though it is usually administered with skill and humanity, is repugnant to the feelings of the meanest individuals, and excite a sensation of *forlornness* even in the minds strengthened by education." (Lushington, 1824: 292)

Losing 'sense of reality' in 2007 makes sense with 'forlornness' of 1824. In both cases the patient is divorced from his/her domestic setting and rendered to be measurable and reparable under the authority of medicine. Rise of Hospital medicine as described by Erwin Ackerknecht is a milestone in the history of medicine. (Ackerknecht, 1967) Before the rise of Hospital medicine not only did the bedside physicians believe that external nature and human thought worked the same way and by the same principles, they also believed that this structure could be displayed through the use of unaided senses. (Fredriksen, 2002) During this phase, diagnosis was made by the elucidation of symptoms, and treatment was based on *a priori* theory applied with heroic vigour. (Newman, 1958) Along with Hospital medicine there came up the absolute importance of anatomical knowledge. For example, "You will perceive that my observations are chiefly limited to a detail of the most important *pathological* observations made in our *wards* during the preceding months." (Graves, 1837: 523)

In the first edition of *Harrison's*, already quoted above, there was a cautionary note, "Tact, sympathy, and understanding are expected of the physician, for the *patient is no mere collection of symptoms, signs, disordered functions, damaged organs, and disturbed emotions*. [The patient] is human, fearful, and hopeful, seeking relief, help, and reassurance." (Harrison's, 2008: 1) Such statements inform us about a different situation where person of the patient is always at the risk of being reducible to pathology inside the body. In more recent time, Dr. Groopman talks about a great case, "key elements of "a great case": the initial misdiagnosis, the confluence of disparate symptoms and signs of an unusual disease, the instance when standard therapies can be paradoxically harmful,

the complex coordination of medical and surgical management." (Groopman, 2004) The concept of a 'great case' leads to necessary clinical detachment that, in practice, physicians, and especially surgeons, has always had to learn to cope with the more revolting aspects of their art. (Payne, 2007: 1) Quantification in medicine is part of the growing trust in numbers that has gradually affected all aspects of social life during the past centuries. More narrowly, it is part of a process of objectification in clinical medicine that has been going on since at least the eighteenth century. It has been most evident in diagnosis, which has come to depend less and less on patients' accounts or physicians' subjective judgment and more and more on objective signs that, in theory at least, transcend subjectivity and compel agreement among qualified observers. (Weisz, 2005)

Perhaps it would not be much irrelevant to mention that 'subjective' decision to tackle an 'objective' case is still a grey zone of medicine – a zone of uncertainty. Even during the 1950's treatment of hypertension was quite empirical, more dependent on individual choice than based on standardized therapy. Three major physicians in the realm of anti-hypertensive treatment were Walter Kempner, Reginald Smithwick and Wilkins. Kempner prescribed a diet composed primarily of rice and fruits. It caused ketosis, weight loss and a decrease in blood pressure. (Chobanian, 2009) Chobanian comments, "The full diet was difficult to follow... some patients with severe hypertension benefited and survived until effective drug therapies became available." (Chobanian, 2009: 878)

The first part of the title 'Anatomical Knowledge' does need some clarification. It is inclusive of both Āyurvedic anatomical knowledge and that of modern medicine within its ambit. Why so much focus is being laid on anatomical knowledge? One attempt to answer this question may be explained thus. Anatomical dissection, in Euro-American experience, was far from being butchery. It became the quintessential epistemology of scientific, 'civilized' man, a systematic and careful division and reduction of the material world. It was also a triumph of mind over matter, reason over emotion. Anatomy, it was asserted, provided a geography of embodiment that could produce morally ordered, physiologically self-governed 'individuals' – and a morally ordered, physiologically self-governing society. "Dissection was a potent method of producing and disseminating

knowledge – a powerful technology for operating upon the human body – but also a powerful metaphor." (Sappol, 2001: 2-3) Possibly, it would not be an exaggeration if one says that it is the knowledge of *anatomy* that has made *medicine modern.* That is why *New England Journal of Medicine*, while "Looking Back on the Millennium in Medicine", places **Elucidation of Human Anatomy and Physiology** in the first place among the ten most important achievements of medicine. (Brenner, 2000)

To remember, the body (in Western culture) since Aristotle's time was worthy of attention for its own sake, not merely as a means of achieving medical purposes, and anatomy became a discipline, with its own methods of procedure, and formalized within a framework of teaching. (French, 1978) No other curricular component has figured as prominently as anatomy in modern medical education. Around 1800 one began to follow Bichat's (1770–1801) maxim "open up a few corpses", as Foucault laconically remarks. (Foucault, 1994: 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: 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: 532)

In the domains of eighteenth and nineteenth-centuries anatomy and physiology, general anatomical facts were extracted from observations and considered as possible causes in an Aristotelian perspective.

Furthermore, from a philosophical point of view, anatomy is not merely the structural biology of human species, which happens to be human. Because we are self-aware, the study of the human has a unique place in establishing the image we have of ourselves; ultimately, the *prosaic* descriptions of the bones, muscles, blood vessels and neural pathways are the context of our experience of life. (Gray's, 1995: 2) Changes in the culture of medicine have carried anatomy from a research science, to a training tool, nearly to a hazing ritual, to a vehicle for ethical and moral education. Physicians, scientists, and medical students, as well as observers such as sociologists and writers,

have been only intermittently aware of these cultural shifts. Yet anatomical dissection has been a remarkably persistent feature of medical education – indeed, it stands out as the universal and universally recognizable step in becoming a doctor. (Dyer and Thorndike, 2000)

During the first half of the 19th century, gross anatomy held an intellectual centrality to Western medical science, surpassing anything it enjoyed before or since. Science meant empiricism, epitomized by systematic empirical correlation of symptoms observed at the bedside with lesions found at autopsy. Not only that, privileged access to the body, gained through the knowledge of anatomy, marked a social, moral, and emotional boundary crossing that conferred new knowledge and reforged sensibilities. However, to note, corpses used in medical education are traditionally "depersonalized and biography-less" (Richardson, 2000). The dissecting room became a site of epistemological exhaustion – fixed and unchangeable. (Warner and Rizzolo, 2006) By the twentieth century, dissection has become the exclusive purview of scientists and a mandatory rite of passage for all doctors. "Anatomy has a long and checkered past as a scientific discipline...Today, the teaching of anatomy is at a crossroads. As an introduction to the language of medicine and an underpinning of the study of pathophysiology, anatomy remains an essential component of medical knowledge." (Schaffer, 2004)

Anatomists have always had to walk the thin line between scientific objectivity and public spectacle. (Korf and Wicht, 2004: 805) Along with the advancement of anatomical education the language of 'sympathy,' owing to its alleged gendered association with Victorian feminine sentimentalism, was marginalized. It was replaced by the term 'empathy.' To keep in mind, by the late 1960s, terms such as 'dehumanization', which once had belonged to the rhetoric of the radical left had been taken up by a section of anatomists. (Warner and Rizzolo, 2006: 410) However, interestingly enough, "even a precise anatomical knowledge could not prevent grievous errors of treatment." (Reiser, 1993) Nevertheless, not all these historical developments could prevent the march of horrific treatment and precise organ localization of disease hand in hand at least until the middle of the nineteenth century. For example, during the treatment course of a person named James Fraser, aged 24, 10 ounces of blood letting was done on the first day of

treatment in the year 1836. On the succeeding days (a) 20 ounces blood were cupped, (b) six leeches were applied to the temple, (c) 16 ounces of blood-letting along with a bolus of 6 grains of calomel and 12 of jalap given, (d) a blister and 12 leeches applied, and, finally, (e) "on the 9th day he left the hospital quiet well, though rather weak." (*The Edinburgh Medical and Surgical Journal*, 1836)

Medicine produces metaphors. On its turn, metaphors go on multiplying new metaphors. (Boyd, 2000; Leach, 1975)[3] However, problems may arise when a metaphor expands in a sphere where it is not challenged or complemented by other equally powerful metaphors which are also expanding. In that case the metaphor in question may go on expanding its application almost indefinitely. If health is "a way of tackling existence" in which "one is not only possessor or bearer but also, if necessary, creator of value, establisher of vital norms", then what constitutes health in one person may well, as Nietzsche said, "look like the opposite of health in another person." (Boyd, 2000: 15) In the 18th century, when doctors turned to mathematics to produce a Newtonian map of the body, the metaphor of hydraulic pumps was used to express human digestion and blood circulation. (Turner, 2006) Medical metaphors fill in the vacuum, especially, when religious or cultural metaphors get marginalized in contestation with the new emerging normative regime of science or medicine.

Anatomical metaphors became the call of the day following colonial medical encounters in Indian context. Terms and images plucked from the colonial language of medicine and disease began to infiltrate the phraseology of Indian self-expression (or, put otherwise, Indian subjectivity), to become part of the ideological formulation of a new nationalist order. (Arnold, 1995: 241) These terms and images were primarily moored on superiority of anatomical knowledge, excellence of surgical practices and, at a later period, diagnostic and therapeutic marvels.

The clinical observations and illustrations of earlier East India company surgeons like Charles Morehead, James Annesley, Peter Breton, E. A. Parkes and others derived

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[3] Leach comments, "Despite the obvious discrepancy from reality, the model of ideal good health which ordinary members of the public pick up, through the visual images of the Press and the TV screen and from the verbal suggestions of their doctors, is closely related to the classical ideal of the youthful Greek athlete."

their claims to scientific objectivity and authority largely from their studies of morbid anatomy, pathological study and their attempts to relate the state of the diseased organs examined post-mortem to symptoms manifested externally during life. An example may be cited here. In a case of *Ischuria Renalis* (acute retention of urine) – presented by J. Bird on April 7, 1827, before the *Medical and Physical Society of Calcutta* – dissection was done after death and the ensuing treatment plan of future was "Would it not, therefore, be advisable, after bleeding the patient...applying a blister to his loins, to administer calomel in ten grain doses...? This certainly is the plan I would pursue in future..." (Bird, 1829) Medicine, during colonial period, was intricately related with metaphors of higher civilization, (Praksh, 2000) and invasion. (Otis, 2000) Anatomy seems to be emerging as a different sort of discipline if it is viewed from the perspective of its cross-cultural nature, evolutionary history and its evolution to become universal through the advent of modern or bio- medicine. Colonial domination over various regions and cultures has given it its distinct shapes. Many a time it has become a tool and technology too, for establishing superiority of Western medical culture specifically and the West in general. Quite apart from their excursions into trade, "the Surgeons of the Company were frequently employed on activities outside the practice of medicine." (McDonald, 1955) In the early days of the Company, the doctors went with the traders and were often of great assistance, "by virtue of their medical treatment which they could offer to rulers from whom concessions were required." (McDonald, 1955: 13) It will be revealed later that anatomical teaching in India, like English literature studies during colonial period in India, "prompted a series of experiments that could not readily be tried in England because of...firmly entrenched orthodoxies and traditions prevailing there." (Visvanathan, 1989: 7)

Though the British had come in contact with India for a long time they did not have any knowledge of Indian surgical craft. Contrarily, they used to scoff at the Indian practitioners for their rueful knowledge of anatomy. I would rather argue that witnessing a case of successful rhinoplasty might have drawn their avid interest in ancient Indian medical and surgical practices. B(arak). L(ongmate) wrote to the editor of *Gentleman's Magazine*, "A friend has transmitted to me, from the East Indies, the following very curious, and, in Europe, I believe, unknown chirurgical operation, which has long been

practiced in India with success: namely, affixing a new nose on a man's face." (*Gentleman's Magazine*, 1794) The first description of a case of forehead flap Rhinoplasty appeared in the *Madras Gazette* of 1793. A 'Maharatta' (Marathi) by the name of Cowasjee (though, he seems to be a Parsee) was a bullock cart driver in the employment of the English Army in the Mysore War of 1793. He was captured by Tipu Sultan's soldiers who cut off his nose and one of his hands for his treachery. Cowasjee joined the Bombay Army near Srirangapatnam with a cut nose. He was a "pensioner of the Honourable East India Company." It was reconstructed by "a man of the Brickmaker caste" of Satara near Poona. "Two of the medical gentlemen, Mr. Thomas Cruso and Mr. James Trindlay (Findlay), of the Bombay presidency, have seen it performed..." (Longmate, 1794: 891) He gave a vivid description of the operation. The procedure of surgery was also reported by him in the *Magazine* under the title "Curious Chirurgical Operation". His nickname was B. L. Suśruta's version has the skin flap being taken from the cheek; Cowasjee's was taken from the forehead. Subsequently, the details and an engraving from the painting were reproduced in the October 1794 issue of the *Gentleman's Magazine* of London. (Joseph, 1987) There were also drawings of the portrait of Cease with his repaired nose. B.L. commented, "This operation is not uncommon in India, and has been practised from time immemorial." (*Gentleman's Magazine*, 1794)

We shall see later such a specialized surgery by the Indian low-caste people was based not on anatomical knowledge of the body, but regional anatomy which was taught in *Suśruta Saṃhitā* through the knowledge of *marmans* (vital/lethal points).

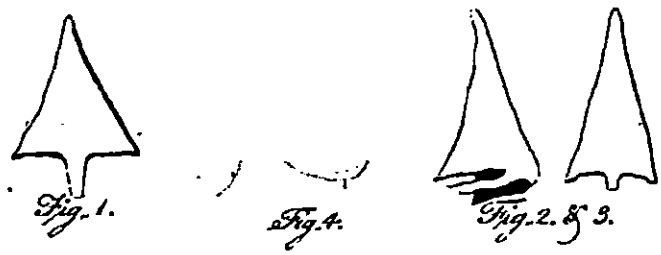

Fig. 1 [Drawings of the skin flaps used in the operation – copied from the *Gentleman's Magazine* 1794.]

It was admired by other travellers too. "I MUST by no means omit one branch of European surgery, that has of late been practised with great success by a *Poonah* artist, who has lately revived the *Tailacotian* art, differing only in the material...The sufferer applied to the great restorer of Hindoostan noses, and a new one, equal to all the uses of its predecessor, immediately rose in its place. It can sneeze smartly, distinguish good from bad smells, bear the most provoking lug, or being well blown without danger of falling into the handkerchief." (Pennant, 1798: 237) We should note the term "Poonah artist." The skill of the 'surgeon' was so admirable to Pennant that the person has been likened with an artist. Longmate's letter appears to have fired the imagination of the English surgeon Joseph C. Carpue (1764-1846) who initially practiced the Indian method of rhinoplasty on cadavers, and waited until a suitable patient presented himself. Carpue performed his first two rhinoplasties in 1814 and 1815. In 1816, Carpue published the results of these attempts in his landmark work: "An account of two successful operations for restoring a lost nose from the integuments of the forehead." (Carpue, 1816; Graaf, 2009)

Fig. 2

Fig. 2 Cowasjee's portrait with the reconstructed nose.

[**Courtesy:** Wellcome Library, London. **L0017597 Credit:** Wellcome Library, London. Indian method of the restoration of the nose by plastic surgery, from article by B.L. to Mr. Urban, concerning Cowasjee, a man who had his nose reconstructed with the aid of plastic surgery. **Line engraving** 1794 By: **Longmate From:** Gentleman's Magazine By: **B.L. Published:** 9th October 1794 Volume 64, part 2, facing page 883.]

Before 1794 the most remarkable work on India by the East India Company was *A Code of Gentoo Laws*. Its purpose was specifically stated, "From hence therefore may be formed a precise idea of the Customs and Manners of these People, which, to their great injury have long been misrepresented in the Western World...In a Tract so untrodden as this, *many Paths must be attempted before we can hit upon the right.*" (Halhed, 1776)

All the major books on Indian or Hindu medicine were published after it. J F Royle found in 'Hindoo' medicine "much fanciful Anatomy, imaginative Physiology, and absurd attention to numbers..." (Royle, 1837: 48) One of the earliest works on materia medica of India/Hindu was of W. Ainslie (1813). H. H Wilson's much discussed work "On the medical surgical sciences of the Hindus" was published in 1823. *Commentary on the Hindu System of Medicine* by T. A. Wise came out in 1845. Hence, it may not be a wild guess that the impetus to know of Indian medicine and surgery was an outcome of the just mentioned report in *Gentleman's Magazine* 1794. Albrecht Weber noted regarding Indian surgery, "in this department European surgeons might perhaps even at the present day still learn something from them, as indeed they have already learned from them the operation of *rhinoplsty*." (Weber, 1892: 270) Arthur Macdonnell too was of the same opinion, "In modern days European surgery has borrowed the operation of rhinoplasty...from India, where Englishmen became acquainted with the art in the last century." (Macdonell, 1900: 437)

Besides rhinoplasty other two much discussed Indian surgical crafts were perineal lithotomy and indigenous couching. I shall provide some evidences on these two Indian techniques later on. It must be mentioned that in the realm of medicinal treatment, in their initial years, colonial masters were not much superior to their Indian counterparts. It was

the realm of surgery where they reigned supreme. Their surgical excellence was solely based on accurate and precise anatomical knowledge of the body where Indians and Āyurvedics were lamentably deficient.

William Carey, while producing the Bengali grammar, observed that the advantage of being able to communicate useful knowledge to the heathens, with whom they were having a daily intercourse was confessedly very important, especially to point out their mistakes. (Carey, 1818: vi) Charles Trevelyan jubilantly noted that European anatomy had also been introduced and in the Sanskrit college of Calcutta, European anatomy and medicine had nearly supplanted the native systems. (Trevelyan, 1838: 7) He also noted, "We shall be perfectly content if native students should be found to think as justly , and write as beautifully, in English, as Buchanan, Bacon, and various others did in Latin; or, to come nearer our own times, and in a professional walk, as Harvey, Sydenham, Boerhaave, Haller, Heberden, and Gregory did, in the same language." (Trevelyan, 1838: 215)

William Hunter spiritedly observed that modern English education had created a new nexus for the active intellectual elements in the population. It was a nexus which was beginning to be recognized as a bond between man and man and between province and province, apart from the ties of religion, of geographical propinquity, or of caste: a nexus interwoven of three strong cords, a common language, common political aims, and a sense of the power of action in common – the products of a common system of education. (Hunter, 1891: 1) It is obvious from the observation that a new kind of state making was in the process, the nation state. 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) 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: 270) 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...An own pharmacopoeia became gradually a matter of national ambition, a part and a proof of national sovereignty and unity." (Urdang, 1946) In Indian context, producing new pharmacopoeia was related with bringing about homogeneity amongst numerous synonyms of Sanskrit names and their regional variations. (Ainslie, 1826, Vol. I: xi; Vol. II: v) He noted too, "medicine in India is still sunk in a state of empirical darkness." (Ainslie, 1826, Vol. II: v)

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 6d. 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." (Mukhopaddhyaya, 1883: 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: 305)

It is ironical to find what was counted as *knowledge* in Indian context got transformed to be mere *information* to the colonial enterprise of knowledge. It could only attain the status of knowledge again if reified and verified by the knowledge centre in London. So, the journey may be thought of as Indian '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: 227) Latour's analysis becomes more relevant if try understand early colonial enterprise about Indian knowledge. Regarding the journal of the *Asiatic Society* of Bengal it was said in 1833 that "the *Asiatick Researches* comprehended the sum of our knowledge of the classical literature of India; the European

inquirer into that literature began and ended his investigation with this work." (Chtterjee, 1996: 12)

While talking on Europe and technology in the twentieth century David Arnold comments that equating technology with industrial technology as evolved in Europe and North America, saw the establishment of modern technology in Africa and Asia as primarily a legacy of colonial intervention, a boon bestowed by technologically advanced civilizations on societies considered 'backward', even 'primitive'. (Arnold, 2005) These technologies were seen to be modern, progressive and largely benevolent: they constituted a supposedly objective rationale, if not for a dying colonialism, then for the intervention of a superior civilization. Moreover, thinking about technologies of the body thus leads to fundamental questions about the production and performance of European and local identities: there is, after all, no more intimate site of identity than the body. If anatomical knowledge is a part of this new technology, and it does appear to be so, the greatest hurdle and fiercest resistance it had faced was from Āyurvedic practitioners in India. So, methodologically speaking this thesis will try to locate anatomical knowledge within the specific context of ancient India (Āyurveda), pre-colonial India (early interactions and exchanges between two competitive notions and cultures of the body), and colonial India (when modern anatomical knowledge emerges to be the only valid truth about the body) respectively.

A few more queries may be put forward to understand the problem posited in this dissertation. How and why were the colonies such a critical site for the inscription of ideas about European-ness and non-European-ness in bodies, and to what extent did decolonization change these inscriptions? Did encounters between technologies of different origins, valences, and hegemonic aspirations (for example, 'Western' medical ideas vs. ideas of 'alternative medicine') produce different conceptions of bodies? (Arnold and Hecht, 2004)

Body – Paradigmatic Change in Perception

Before the advent of anatomical knowledge, the working model of the body in medicine was of two-dimensional nature – **symptom > illness**. In this conceptualization both **symptom** and **illness** seem to 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 – $_{\text{symptom}} > ^{\text{illness}} > _{\text{sign}}$. **Depth** or volume of the body – the 3rd dimension – was added to **symptom > illness** perception whereby the body appeared to be truly three-dimensional *in nature*. Doctors were, then, to extract sign, i.e. pathology inside the body. Though situated against the background of Aristotelian and Hippocratic tradition of 'humour' and philosophical syllogism, anatomical study was fortified by two different methods incorporated within the field of diagnosis – (1) Auenbrugger's percussion of chest, and (2) Laennec's mediate auscultation by stethoscope (distinct from im-mediate auscultation). Both these methods, though the first one directly relying on touching the body, and the other premising on distancing it, were to be verified by pathological signs from within the volume of the body. A new norm and epistemological structure began to emerge. Emergent new power of the physician was noted as a source of apprehension as far back as 1826 (just ten years after the introduction of stethoscope). "It has been said that the use of stethoscope may be injurious, by leading the physician to know too much of the danger in a bad case; so as to him despond and *reign the patient* to his fate too soon." (Scudamore, 1826: 12) 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) Earlier, in his *De Sedibus et Causis Morborum* (*On the Seats and Causes of Disease*), published in 1761, Morgagni correlated previously recorded symptoms of disease with anatomical lesions uncovered at autopsy.

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: 340) The study of morbid anatomy was at that time beginning to

revolutionize medicine, autopsies were performed and cases of massive albuminuria and dropsy, which were associated with diseased kidneys, were reported. (Foster, 1959)

Three pictures only 50 years apart – pre-Vesalian and post-Vesalian – can help us to get at the issue.

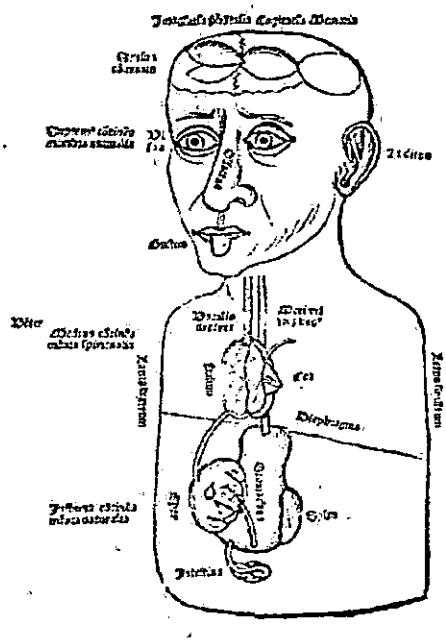

Fig. 3 Two-Dimensional Body of 1499

[Five-lobed liver clutches at the stomach as if with fingers. Intestines are intertwined in an elegant knot. Traditional heart-lung representation is so corrupt as to be virtually unidentifiable. Both are presented on a background of the stomach. Importantly, the localization of organs inside the body is two-dimensional, all lying on the same plane. **Title:** *Anatomy of the human body.* **Creator:** Peyligk, Johannes, 1474-1522, author. **Publication Information:** Leipzig: Melchior Lotter, 1499. **Appears in:** Compendium philosophiae naturalis, sig Q1 verso. **Copyright Statement:** The National Library of Medicine believes this item to be in the public domain. **Order No.**: A013188.
Courtesy: National Library of Medicine, *Historical Anatomies on the Web*, US.]

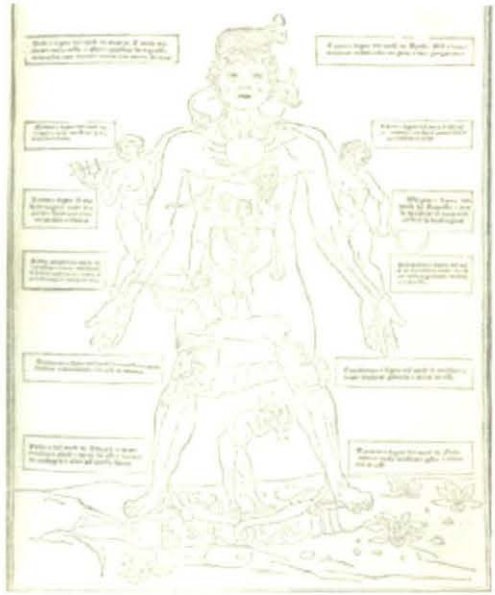

Fig. 4 Zodiac man

['Zodiac Man.', **Johannes de Ketham.** *Fasiculo de medicina.* (Venice: Gregori, 1493). Medical astrology was based on the belief that the body's 'microcosm' corresponded to the 'macrocosm' of the planets and stars and gave order to the seemingly random course of life and health. The book is remarkable as the first illustrated medical work to appear in print. On left side in Latin, "*The Crab is the sign of June; avoid treating the stomach, the spleen, the lungs or the eyes.*" Also, written, "*Libra. When the moon is in the sign of Libra, it is good to bleed... it is bad to treat the stomach and the kidneys.*" **Courtesy:** National Library of Medicine, *Historical Anatomies on the Web*, US.]

Fig. 5 One page (p. 419) from *De corporis humani fabrica libri septem*. (Basel: Johannes Oporinus, 1543).

[Vesalius's *De corporis humani fabrica libri septem* is one of the most influential medical texts ever printed, not only because of the scientific methods used to produce it, but because of the artistic renderings of the anatomist's findings. The famous woodcut illustrations of *De fabrica* influenced the depiction of anatomy for centuries and were often copied outright. In this picture (p. 606 of *De fabrica*) human brain is perfectly illustrated with its clearly evident three-dimensional nature. **Courtesy:** *Historical Anatomies on the Web*, National Medical Library, US.]

Perhaps one of the most important methodological changes characteristic of early nineteenth century medicine was the shift from *observation* to *examination*. (Waddington, 1973) 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) Alliance of nosography with anatomy and physiology, this mutual exchange of instruction, formed one of the characteristic traits of the period. (Beclard, 1823; Henderson, 1829) It becomes apparent that a new paradigm 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 – nay, two worlds apart.

Āyurveda – Anatomical Knowledge – Body

In Indian context, Vedic *daiva-vyapāśraya-bheṣaja* (magico-religious medicine) got transformed into Āyurvedic *yukti-vyapāśraya-bheṣaja* (empirico-rational medicine). (Chattopadhyaya, 1977) Mode of reasoning and understanding of disease metamorphosed – the causes of disease could be explained with *tri-doṣa* theory and was understood to being located inside the body. This phase is "marked by a distinctive change in medical thinking, indicative of an epistemology rooted in empirical observations and reasoning based on a humoral theory...This theory has no antecedents in Vedic medicine." (Zysk, 2000b: 84) However, anatomical knowledge did not undergo any change at all in its transition from Vedic to Āyurvedic period. To put it otherwise, Āyurveda did not require any precise and correct anatomical knowledge at all. It had its own explanatory model based on *tri-doṣa* theory. It was more concerned with prognosis than with diagnosis. Hence, precise organ localization of diseases was not a great problem for the Āyurvedics. New prognostic methods also came into use. For example, from about the sixteenth century, a technique developed whereby a drop of oil would be placed in the surface of a patient's urine. The remaining span of the patient's life would be read from the way the oil spread out. (Wujastyk, 1993)

In Āyurveda, the different body parts "referred to in *Saṃhitās*, are mainly those found in connection with diseases and their treatment and the rest have been mentioned in connection with the creation of human body." (Roy, 1967: 36) The structure of the chest, neck sides, vertical column and hand have been described and the number of bones in each case have been mentioned in analogy with the framework of verses, chanted at the time of arranging bricks in the sacrificial altars, constructed in the form of human body and with the number of daily offerings connected with the performances of *yajña* (sacrifice). "A large number of different parts of the body have each a special name and sometimes several names... unfortunately, there are no precise anatomical descriptions in the medical books, lesser still the figures." (Filliozat, 1964: 140)

In *Carakasaṃhitā* (*CS*) –

santi hyarthāntarāṇi samānāśavdābhihitāni, santi canarthāntarāṇi paryāyaśavdābhihitāṇi / samāno hi rogaśavdodoṣeṣu ca vyādhiṣu ca: doṣā hyapirogaśavdamātaṇkaśavdaṃ yakṣaśavdaṃ doṣaprakritisavdaṃ vikāraśavdaṅca labhante, vyādhayaśca rogaśavdamātaṇkaśavdaṃ yakṣaśavdaṃ doṣaprakritiśavdaṃ vikāraśavdaṅca labhante / tatra doṣeṣu caiva vyādhiṣu ca rogaśavdaḥ samānaḥ, śeṣeṣu tu viśeṣavan // (*CS*, Vi, 6.4) [The same word may very well connote different meanings, e.g., the word *roga* connotes both the *doṣa*-s as well as diseases. Again, different terms, which are synonymous, may connote similar meaning, e.g. *doṣa*-s are connoted by words like *roga, ātaṅka, yakṣa, doṣaprakriti* and *vikāra*. For both the meanings *doṣa* and *vyādhi*, *roga* is synonymous; but, finally, regarding *vyādhi rogaśavda* is ascribed a special meaning.]

So, there was always a hiatus in the actual meaning of the words to be filled in by commentators and redactors of the texts. The division of *dhamanīs*, *śirās* and *snāvas* thus seems to have been based on their relative fineness: the thicker channels (*nāḍis*) were called *dhamanīs*, the finer ones were called *śirās* and the still finer ones *snāvas*. It seems to have been recognized that there was a general flow of the liquid elements of the body. This probably corresponds to the notion of *srotas*. It is difficult to guess now what was actually meant by *prāṇa, apāna* etc. (Dasgupta, 1991: 291) Another problem of interpretation emerges with *kloma* (in plural, singular being *kloman*). Caraka counts it as an organ near heart, but he does not count *pupphusa*. He also connects it with hiccough. Cakrapāṇi describes it as seat of thirst. Suśruta speaks of *pupphusa* as being on the left side and *kloma* as being on the right. In *Bṛhad-āraṇyaka*, I, the word *kloma* is used in plural number. The *Bhāva-prakāśa* describes it as the root of the veins, where water is borne or secreted. *Śārṅgadhara*, I.V.45, however describes it as gland of watery secretions near the liver. (Dasgupta, 1991: 288)

In *Suśrutasaṃhitā* (*SS*) [Sā, 5.11] – *nakha* (nails) are the terminal offshoots of the *kandarā*-s (tendon) of the hands and feet. Medhra (penis) is the offshoot of *kandarā*-s which bind *grivā* (neck) and *hṛdaya* (not heart, its position is indeterminate) together and run downwards. *Bhāvaprakāśa* differs with *SS* – here *kandarā*-s are big *snāyu*-s (ligaments?). The word "Nakha Agraparaho" means the place near the nails of hands and feet where the "Kandarās" are inserted. Here the word Medhra is not used for the penis

but it indicates genital organs which can be taken for pubic region. While in Suśruta's account *simanta*-s (suture?) are 14 in number, in *Aṣṭāṅgahṛdayasaṃhitā* they are 18 in number. According to Bhoja, Sevani (Sutures) and Simanta are the same. Arunadatta and Bhoja are in favour 18 Simantas. (Thatte, 2005) These facts point to the contradictory and differing modes of counting organs. To add, Āyurveda does not have any single conception of the body, but a dominant one.

In oral tradition of Āyurveda, mnemonic verses and prose parts were combined to form the text. Mnemonic verses were used to memorize relevant portions of body organs, while describing a disease and its treatment. Though, there was no real contact with the body at all recitations of mnemonic verses from the texts created a condition pseudo-anatomical ambience of continuity of anatomical knowledge. Shifting nature of meanings of terms and the use of mnemonic verses did lead to a unique situation which may be explained through Staal's interpretation, "The fixation of oral tradition by these mnemonic techniques pertains only to the *form* of mantras; there is no corresponding tradition that fixes and preserves their *meaning*. The interpretations of the tradition of ritual and mantras, and the meanings assigned to them have therefore always changed." (Staal, 1996: 373) Meulenbeld makes some keen observations on the evolutionary mechanism of 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, 2008b)

Similar discordance is found in the evolution of the concept of body too. "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 composition." (Maas, 2008) Moreover, Suśruta's *marman*-theory is considered 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 specific arrangement of bodily constituents in the *marman-* theory. (Maas, 2008: 142-143)

If we look into modern medicine, it will found that the recognition, naming, and classification of disease are central to so many aspects of early-twenty-first century life. If the physician is technologically proficient tends to focus on technological solutions, no matter how expensive it is. But, "Uncertainty influences virtually all of medical decision making... the most worrisome problem of generalizability occurs when receptor polymorphisms and other inherent racial differences cause different responses to the same drugs. Then, the best drug or class of drugs may vary according to the patient's race, just as it varies according to clinical characteristics." (McNeil, 2001: 1612, 1614) Moreover, besides pathological anatomy, microbiology, and other diagnostic procedures, this process is also clearly marked by priorities. They are often rationalized by the idea of progress. However, this description of progress "is not only debatable on its own merits but is also a tautology – molecular research leads to more molecular insights than nonmolecular research." (Aronowitz, 1998: ix)

Importantly, the process of evolution of disease in Āyurvedic system is quite different from the process of evolution of disease from the perspective of modern medicine. In Āyurvedic notion, disease evolves through the following process. A disease is something that gradually made manifest through a continuous process of development. Prodromes (*pūrvarūpa*) develop into full-fledged symptoms (*rūpa*). Secondary affections (*upadrava*) are consequences of the basic morbid process. At the end of this process recovery takes place or fatal signs (*ariṣṭa*) appear, foreboding death. In many cases the enumeration of these signs occurs in the form of verses, more easy to remember than statements in prose. According to P. V. Sharma, pathogenesis in Āyurveda occurs through six stages: (1) *Sañcaya* (accumulation), (2) *Prakopa* (aggravation), (3) *Prasara* (dissemination), (4) *Sthānasaṃśraya* (localization), (5) *Vyakti* (manifestation), and (6) *Bheda* (explosion). (Sharma, 1998: liii-lv)

As noted by Meulenbeld, it is repeatedly observed by commentators that one or more of the symptoms of a particular disease does not fit into the theoretical frame, but is nevertheless present. Such a symptom is *vikṛttiviṣamasamavāyārabdha*: this difficult term expresses that the symptom referred to cannot be explained theoretically as an effect

of one of the morbific entities involved. (Meulenbeld, 2008a: 612-613) Meulenbeld trenchantly comments, "Many Indian authors, on the other hand, readily equate disorders described in the Sanskrit texts with syndromes and diseases recognized in modern medicine." (Meulenbeld, 2008a: 612)

Two interesting examples can be cited here. Shiv Sharma, an eminent Sanskritist Āyurvedic, commented in 1929, "Bacteriologists, as has been stated, believe certain micro-organisms or bacteria to be the root cause of the disease. Such micro-organisms, however, were not unknown to the ancients." (Sharma, 1983: 194) Gananath Sen, another English-trained eminent Āyurvedic of the early twentieth century, endeavoured to establish the 'germ theory' of disease in āyurveda and, to his unique analysis, āyurvedic *vāyu* was explained as "the phenomena under Central or Sympathetic Nervous systems." Quoting from *SS*, Uttaratantarm, chapter 40, he tried to equate germs of modern medicine with 'fine animalculae' of āyurveda. (Sen, 1916) Against such attempts notes of restraint are voiced by erudite Sanskrit and Āyurvdic scholars like P. V. Sharma, "There has been attempts from time to time to correlate the three doṣas with some concrete physiological entities but it has always been futile because the three doṣas are all-pervasive and control all the biological functions and as such it is not possible to restrict them in certain gross substances." (Sharma, 1998: xlvii)

In *SS* –

visargādānavikṣepaiḥ somasūryānilā yathā / dhārayanti jagaddehaṃ kaphapittānilāstatha // (Sū. 21.8) [The maintaining functions of kapha, pitta and vāta are likened to the emission (visarga), absorption (ādāna), and the capacity of imparting motion (vikṣepa) of moon, sun and wind respectively.(Meulenbeld, HIML. IA: 214)]

It is also to note –

sapta sirāśatānibhvanti; yābhiridaṃ śariramārāma iva jalahāriṇībhiḥ kedāra iva ca kulyābhirupasnihyatehnugṛhyate cākuṁcanaprasāraṇādiviśeṣaiḥ / drumapatrasevanīnāmiva ca tasāṃ pratānāḥ; tasāṃ nābhimūlaṃ, tatasca prasarantyurdhvarmadhastiryak ca // (*SS*, Śā. 7.3) [There are 700 ducts. The body is irrigated by 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.]

Dominik Wujastyk notes, "*Suśrutasaṃhitā* does not use a concept of fluid circulation, but rather works with a centripetal fluid distribution starting from the navel." (Wujastyk, 2008) In *Śārṅgadhara-saṃhitā* (5.40-44) and *SS* (Śā, 7.3) we note that all the *śira*-s which are found in the human body are linked with *nābhi* (to note, not the Harverian heart) and there from they are spread all over the body. In stead of gross substances physiological activities (in modern sense) inside body is conceptualized here in terms of harmony with nature – in the paradigm (not in Kuhnian sense) of macrocosm-microcosm harmony. An example from *CS* (Śā, 1.90-91) – In order that flood waters may not damage crops as they did in the past, a dam is constructed as a preventive measure. Therefore, some therapeutic devices are prescribed to prevent certain diseases which are likely to attack living beings in future. (Sharma and Das, 1977: 334-335)] In *Śārṅgadhara-saṃhitā* –

jālāntaragate bhānau yat sūkṣaṃ dṛśyate rajaḥ / tasya triṃśattamo bhāgaḥ paramāṇuḥ sa ucyate // (Pū, 1.15) [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.]

In this quotation too there remains ecological metaphor to explain bodily disease process which can never be made equivalent with disease conception of modern medicine. If we make a careful scrutiny it would perhaps become evident that – (a) anatomical study was not a part of Āyurveda in its own right and necessity, rather it was a part of understanding disease processes through *tri-doṣa* theory; (b) as human being is the focus of medical treatises so the question of body was given a special attention; (c) body was primarily conceived of in relation to *puruṣa-prakṛti* paradigm; (d) it may also not be superfluous to follow that Malamoud has made a distinction between the terms 'man' and *manuṣya*, where 'man' is related with *puruṣa* and *manuṣya* "is man as different from other classes of beings..." (Malamoud, 2004), and, to remember, Āyurveda is concerned with 'man', (e) "Caraka's list of sages, many of whom are known from Vedic literature, may have been inserted in order to stress the connection between āyurveda and the Vedic tradition, the orthodoxy of its teachings, and its associations with the brāhmaṇas" (Meulenbeld, IA: 2), and, finally, (f) context-sensitive, polysemous nature of āyurvedic words are always at the risk being interpreted according to socio-cultural specificity,

philosophical predominance and particular mindset of the commentator. One of the examples in this regard, "An old word for 'disease' in Indian tradition is *yákṣma-*, which is used in this sense in the Rigveda. The more specific meaning 'consumption' is attested from the time of the pre-classical Saṃhitās... Another word commonly occurring in classical Sanskrit medical texts is *gada-* 'disease'." (Emmerick, 1993: 84, 86)

Explaining diseases inside the body frame was done with the aid of the *doṣa*-s, not through any anatomical organs – "the three doṣa-s support the body, like the pillars (sthūṇā) of a house; the body is called tristhūṇa for that reason; when deranged (vyāpanna), the same doṣas bring about the body's dissolution (pralaya); the three doṣas, together with blood as the fourth, are always present in the body, maintaining it. (*SS*, Śā, 21.3-4) (Meulenbeld, IA: 214) In *tri-doṣa* physiology, disease is internalized and liquefied as vitiated humors run away, hidden in the depths of body channels. No strict demarcation exists between fluids and tissues. (Zimmermann, 1993) Following colonial encounters, as we have seen before, incessant effort was made to link *tri-doṣa* theory with anatomical organs and tissues of modern medicine. Polysemous and context-sensitive nature of these terms and concepts were reconstituted by the enlightened āyurvedic practitioners who were already convinced of the superiority of modern English education. Elsewhere, Meulenbeld observes, "Other facets of transformation of Āyurveda are the decline of surgery, and closely bound up with it, of anatomical knowledge. Surgical procedures like blood-letting and cauterisation fell into disuse." (Melenbeld, 1995) Though, in *SS* – *aṣṭāsvapi cāyurvedatantreṣvetadevādhikamabhimatam, āśukṛyakaranādyantraśastrakṣārāgnipraṇidhānāt sarvatantra sāmānyāca* // (Sū, 1.18) [Śalya is pre-eminent too on account of its quick action, owing to its use of sharp and blunt instruments (śastra, yantra), caustics (kṣāra), and cautery (agni). (Melenbeld, IA: 203)]

However, coming to anatomical and surgical practices, Kunte observes that surgery was much esteemed and could not be neglected in ancient times. In war legs were sometimes broken and iron legs were assumed. Eyes were plucked off or injured and the surgeons artificially helped the warrior. Not only that they would also extract the shafts of arrows lodged in the body and dressed wounds. The basis of their system of pathology was intimately involved with natural vicissitudes. He comments, "The Aitareya Brāhmaṇ

commends the scientific Ārya who demonstrated a correct division of a sacrificial animal." (Kunte, 1902: 8) To him, "The ancient-Ārya possessed a kind of knowledge of anatomy and physiology. He killed the lower animals for his food, and, therefore, was able to distinguish between the lungs, the heart, the stomach, the intestines, the kidneys, and the other Viscera." (Kunte, 1902: 5) On the other hand, 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, 2003: 507) Again, "in the time of Vāgbhaṭa I practical anatomy had fallen into disuse." (Hoernle, 1994: 11) With these observations in mind, texts at hand are found to be not so much conclusive about organs inside the body and their anatomical localization.

Problems arise also in measurement of time, space and quantities too. Bodily constituents are measurable in aṅjalis. Quantities mentioned are: ten aṅjali of watery fluid (udaka), nine of rasa as a fluid resulting from the digestion of the food, eight of blood etc. According to Caraka – individual human height is 84 aṅgula-s, while in Suśruta it is 120 aṅgula-s.

In *CS*, time (or, *kāla*) in relation to disease-production, is described as of two types: *nityaga* and *āvasthika*. –

kālo hi nityagaścāvasthikaśca; // tatrāvasthiko vikāramapekṣate, nityagastu ṛtusātmyāpekṣaḥ // (Vi. 1.22.6) ["Time (means time as) permanent motion and (time) in relation to stages; with regard to this (distinction of time) in relation to stages is linked to a morbid alteration and (time as) permanent motion to seasonal adequacy." (Meulenbeld, 2008a: 157)] *Nityaga* is thought to be related with season and *āvasthika* is related with disease. In *SS*, time is perceived as both an end to life and actions going on. Quanta of time are kāṣṭhā, muhūrta, nimeṣa, kṣipra, etarhi, idāni etc. (Achar, 1998) One example, 1 muhūrta = 15 kṣipra, 1 kṣipra = 15 etarhi, 1 etarhi = 15 idāni, 1 idāni = 15 breathings, 1 breathing = 1 spiration = 1 twinkling (nimeṣa). In another estimate it is measured with respect to kāla, muhūrta, ahorātra, candramāsa, ṛtu, and year. Another point is of quite importance at this juncture. Discussion on *kāla* too is done in harmony with natural rhythm –

kālaḥ punaḥ saṃvatsarascāturāvasthā ca ; tatra saṃvatsaro dvidhā tridhā ṣoḍā dvādaśadhā bhūyaścāpyataḥ prabhijyate tattat kāryamabhismīkṣā ; (*CS*. Vi. 8.125) [*kāla* is of two types – the full year and the physiological changes of the patient. The full year, depending on the movement of the sun, is divided into the three main seasons (hemanta, grīṣma and varṣā). It is further divided into twelve months and so on.]

George Cardona, while tracing some early Indian arguments concerning time, notes that perception of time in India is intricately related with Sanskrit grammar – "The *Ratnaprakāśa* adopts a tatpuruṣa interpretation that is different... Kaiyata's interpretation invokes general time, and thus departs to a degree from what Pātañjali has said earlier." (Cardona, 1991) According to Nyāya-Vaiśeṣika philosophical school (this school of thought has greatly made its contribution to the making of Āyurveda), the appearance of kāla (time) as a separate entity is a creation of *buddhi* (*buddhinirmāṇa*) as it represents the order or mode in which the buddhi records its perceptions. (Dasgupta, 1991: 311) Time, in such a conceptualization, is intimately related with grammar. It is not an entity in itself, divorced from grammatical knowledge. It becomes apparent that this kind of time perception, which may be described as ecological time, does not correspond to the modern notion of time. Time was incorporated within the concept health as the establishment of scales with dichotomies of complementary opposites like *Agni* and *Soma*. Good health, in traditional terms, means harmony and balance. In sharp contrast to modern European conceptualization, in Indian context "Space and time, soils and seasons form two similar domains in which the principle of *appropriateness* is applied." (Zimmermann, 1999: 33) Renaissance notions of the perfectibility of humankind, the importance of individuality, and the possibility of progress originated with a sense of time as a straight line leading to "an end of time" and apocalypse, rather than a circle. (Lee, 2000; Kern, 2000; Hall, 2000) Such perception of time was transformed into clock-time during colonial encounter in India. "Time acquired new meaning and disciplinary authority through an equally abrupt entry of clocks and watches, and there was among sense of moving forward in consonance with its linear progress." (Sarkar, 2002; Kalpagam, 1999) To put it otherwise, it was the concept of 'homogeneous empty time' in which the nation was believed to live in and, in turn, which determined the fate of hitherto existing times. (Anderson, 1991) However, it must be remembered now, similar

examples with regard to the disjunction between social time and the time required for the construction of an industrial society can be had from English experiences too. (Thompson, 1967)

In India, the subjective experience of life-cycle time could now be projected into a new *epistemic* domain rendering it objective, measurable and linear. However, 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: 12) Consequently, time was reconstituted into scientific clinical charts understood as *temporal* physiological changes, and morbid anatomy understandable as *spatial* pathological changes. (Heaton, 2001)

In the hospital setting, clinical charts were being produced consistent with the temporal division that was again consistent with physiological temporal swings arising out of the volume (third dimension) or the solid interiors of the body. By this time, European medicine had undergone a fundamental change "from humoralistic diathesis to solidistic localism." (Ackernecht, 1958; Scharfe, 1999) Even when European medicine was rooted in Galeno-Hippocratic humoral theory two distinct features were conspicuous which were never found in Āyurveda – (a) individual patient's history taking and its documentation, and (b) recording of treatment history of the individual patient (and, later on, in modern medical practice, production of clinical charts which are always 'biography-less' and abstract in nature). For example, Galen's treatment record can be cited. (Horstmanshoff, 1995)

Mentioned by name	***total***	***names***	***percentage***
Elite	15	12	80%
Sophists	26	12	46.2%
Lower classes	23	6	26.1%
Anonymous	110	—	—

Modern researches have discretely quantized each hour of Galen's daily activities. It was different for midsummer and midwinter, keeping in mind Galen was a very hard working person. (Horstmanshoff, 1995: 97-98) These facts are worth pondering for two reasons – (1) unlike Indian medical practice, since long time in European medical history

there was the presence of *individual* as patient, (2) whatever primitive be surgical, anatomical, medical and therapeutic procedures all of these were categorically and cartographically noted as evidence for generations of students to come – it is altogether different from the practice of mnemonic verses, and (3) humoral theory for disease causation and anatomical dissection went in unison (excepting a period of about 1000 years when dissection was prohibited in Christian world).

In Indian medical practice, patients are not individuals they are always counted as nameless social bodies (excepting some prominent royal personalities or sages). Moreover, all the measurements for a person are normalized to his constitution, not standardized. The length of the intestine is three and a vyāma (of that very person). (*SS*, Śā. 5.9) Meulenbeld estimates vyāma to be a difficult measurement to correctly ascertain. There are various measurements according to different commentators (Meulenbeld, 1B: 373)

In *CS* –

pramāṇataśceti / śarīrapramāṇaṃ punaryathaṣvenāṅgulipramāṇenopadiśyate. utsedhavistārāyāmairyathākramam // (Śā. 117) [The norm for measurements of numerous parts of the body is given, the unit of these measurements is the breadth of one's own finger, called an aṅgula. (Meulenbeld, 1A: 36)]

Meulenbeld draws attention to variable measurements by aṅgula.

If we take a deeper look into the discussion so far done, a few points might emerge before us. First, Indian perception of time was reconstituted and the person of the patient was considered to be a conglomeration of pathology inside the body; second, non-standardized Indian/Āyurvedic units of measurements were dislocated and reconstructed into standardized, modern units of measurements in cases of both measuring an organ or unit of time; third, conceptualizing the body consisting of many channels and carrying flow of *dhātu*-s, *mala*-s and *doṣa*-s was reconstituted to a three-dimensional image of the body which does not need to be in harmony with nature. All these taken together, finally, reconstruction of Āyurveda and Indian medical system was done for ever. Not only that, Indian subjectivity, to a great extent expressed through Āyurveda, was also reconstituted.

Āyurveda – Expression of Indian Subjectivity

When the British people faced Indian culture it was not a *tabula rasa.* Indians had their own of seeing the world. They were very much refined, particularly, in some of the most sophisticated disciplines of knowledge like grammar, prosody, philosophy, philology, astronomy and no doubt in Āyurvedic herbal medicine. "From Pāṇini also we can glean technical terms as used in Ayurveda, suggesting that a system of medicine existed in his life time." (Ray, 1903: xxxvi-xxxvii) Again, Āyurveda itself was intensely engaged with philosophical doctrines and, predominantly, influenced by Nyāya-Vaiśeṣika and Saṃkhya systems of philosophy. (Matilal, 1999; Matilal, 1997; Comba, 2001; Larson, 1987; Bruns, 2004; Meindersma, 1993) One important observation in this regard is, "In India, it was grammar, rather than mathematics, that was dominant, and logical theories were influenced by the study of grammar." (Matilal, 1997: 14) Another characteristic of logic recorded in the Caraka, Nyāyasūtra and some other contemporary texts is that it is not a "refutative enthymemes...It only establishes a proposition which happens to be logically contradictory to the thesis of the 'demonstration'." (Matilal, 1997: 3)

Indian people and experts in the field of medicine had also their rudimentary form of surgery as a craft amongst lower castes of the society. In ancient time, they used to practice the means of liberating the obstructed flow of urine. (Zysk, 1998: 70-71) There is also mention of a surgeon in Buddhist text *Mahā*-vagga *of the Vinaya-Piṭaka,* named Ākāśagotto, who made surgical operations (*satthaka-kamma*) on fistula (*bhagandara*). (Dasgupta, 1991: 276) Though, during later period or, more specifically, since 600 A.D. surgery went into complete disuse. Almost similar examples can be had from European medical practice during the middle age. "It is well known that during the Middle Ages the practice of surgery in western Europe was generally regarded as disreputable, and operative surgery was for the most part relegated to the butchers, barbers, bath-keepers, executioners, itinerant herniotomists and occulists..." (Handerson, 1918: 55)

Wujastyk argues, "in spite of Suśruta's elaborate descriptions, there is little evidence to show that these practices persisted beyond time of the composition of Suśruta's *Compendium.*" (Wujastyk, 1998: 106-107) In practice those who applied the surgical techniques seem to have been increasingly isolated from mainstream āyurvedic practice. Even physicians were not in a better position of social acceptability. Manu mentions physicians in the same category as meat-sellers and liquor-vendors,

Yājñavalkya classes them with thieves, prostitutes and others, whose food cannot be taken. (Bose, 1894: 19-20) "The food of a physician is (as vile as) pus, that of an unchaste woman (equal to) semen, that of a usurer (as vile as) ordure, and that of a dealer in weapons (as bad as) dirt." (*Manu Saṃhitā*, 4.220)

In more recent observation it is stated, "Because Ayurveda constitutes a blend of Vedic 'metaphysics' and traditional, pre-modern science it has earned its high place among the learned and intellectually unique accomplishments of Indian civilization." (Fabrega, 2009: 336) 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. In stead 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. (Langford, 1995) 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. 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. It also teaches how to behave in private as well as public life, even how to conduct one's sexual activities. Hence, in many ways Āyurveda represents Indian subjectivity too.

The Indian body image stresses an unremitting interchange taking place with the environment with accompanying ceaseless change within the body. Contrarily, the Western image is of a clearly etched body, sharply differentiated from the rest of the objects in the universe. (Kakar, 1998: 219-251) 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 *tri-doṣa*

theory explains disease causation, assuming human body (microcosm) to be in harmony with the universe (macrocosm).

Meulenbeld argues that this theory is of post-Vedic origin. "At the time when the saṃhitās of Caraka and Suśruta assumed their present shape, it had definitely begun to dominate āyurvedic theory, but...this process was then still in flux and had not yet come to stand still." (Meulenbeld, 1991: 91) Later commentators enhanced this process. It is perhaps linked with Brahminization of heterodox medical practices to suit to orthodox practice. "Statements that appeared to jeopardize the *tri-doṣavāda* caught the eye of the commentators and gave them much food for thought in their efforts to avert any danger to the prevailing theory." (Meulenbeld, 2008) It has been argued that the reverse may also be true – "brahminic conceptions were changed to fit into the medical point of view." (Benner, 2009)

We can compare some Greek experiences too in this regard. 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, 1994: 266) Āyurveda has been a part and parcel of the culture of India and as such is enmeshed within a very large area of Indian texts. Theories and practices of medicine referred to in non-medical literatures "not only indicate their prevalence and popular impact but also confirm the same described medical texts." (Sharma, 1992)

To sum up:

(1) Had there been no colonial confrontation in India it would be just a conjecture what course could be taken by Āyurveda. Following encounter it has been transformed for ever and never to find any more its original texture and status. It holds good for the Āyurvedic terms too. We can never say now what it actually meant to ancient sages and practitioners.

(2) Construction of medical hegemony occurred through multiple processes – very intricate, intersecting and insidious ones. Some of these processes can be understood and explained, more are in need of better grasp. This process extended from inculcating

European science as the liberating vehicle from ignorance and superstition to making job opportunities by using state machinery to relativizing and trivializing Indian surgical crafts.

(3) Polysemous, context-sensitive and speculative anatomo-patho-physiological and nosological terms of Āyurveda were metonymically reconstituted by circumscribed, context-neutral and *universalized* scientific terms.

(4) Mnemonic verses for organ description were replaced by anatomical atlases and practical dissection. An interesting example in this regard can be had from Ainslie's description – "The present Rajah of Tanjore is a most educated and learned prince, and particularly distinguished by his attachment to scientific research; anxious to make himself acquainted with the structure of the human body, but too rigid a Hindoo to satisfy his curiosity at the expense (sic) of his religious opinions, he ordered a complete skeleton made of ivory to be sent to him from England. The Rajah is, besides, a tolerable chemist..." (Ainslie, 1826, Vol. II: vii) It perhaps epitomizes the basic tension of Indian elite class. They became increasingly avid for modern scientific knowledge of the body, but traditional medical thinking and practices could not provide them with this knowledge. So, they more and more depended on European medical knowledge. Again, religious constraints were hindrance to gaining this knowledge. As a result, both European medicine and 'enlightened' Indian people had to make out some innovative ways to solve this imbroglio. We should remember that the British medical authority was anxiously seeking for proof from 'Shaster' in support of first human dissection in 1836. (Mitra, 1877: 138-139) In their turn, native medical personnel, skilled in modern medical knowledge, served the most urgent needs of the Empire – going out of their institutions to cater to cholera, malaria and other fever and disease-prone areas.

(5) Organ localization of disease gave birth to surgical excellence which, in its truest sense, resulted in marvelous 'speedy efficacy' as avowed by Suśruta. Consequently, prognosis-dependent slow Āyurvedic recovery turned out to be ineffectual. 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) It was mainly owing to European surgical excellence. There was no perfect anatomical knowledge in

Indian medicine. As a result, no regular surgical practice was undertaken. Indian physicians, or better to say low-caste people practicing surgery, could perform only some particular types of surgery like couching, lithotomy and rhinoplasty. These surgical procedures were an outcome of regional anatomy knowable through the knowledge of *merman's*. It will be discussed at greater length in the next chapter.

Emergence of *secular social hierarchy* in a positivist, utilitarian milieu generated – (a) awe for new clock-time-based social system, (b) victory of scientific and technical education, and (c) a perpetual sense of 'lack' with respect to the ladder of civilization. Reconstruction of time-space perception > individual patients (*cases*, not *person* per se) in hospital (not domestic) setting > production of *clinical charts* consistent with scientific temporal swings (not seasonal rhythms) occurring inside the body > postmortem dissection to clinch *organ localization* of disease. Now, a sharp dividing line emerged between Indian way of thinking one's self and self-image (and body too) and that of Western medicine – "that the self be not defined too tightly or separated mechanically from the not-self." (Nandy, 1987: 107)

(6) Printing technology relegated manuscript culture of pre-colonial India almost completely to the margin. In European experience in the fifteenth century, it has been estimated that the number of medical manuscripts in the vernacular was six times what it had been in the fourteenth century. In the late-fourteenth and fifteenth centuries, the distinction between medical manuscripts in Latin and medical manuscripts in English was socially significant. (Getz, 1982)

This situation is almost replicated in Indian context where Sanskrit hand-written manuscript culture was completely outwitted and overpowered by English printed books. In mimicry of modern medical textbooks, copious pictures were unhesitatingly reproduced in neo-āyurvedic texts. Interestingly, Sanskrit terms were increasingly employed to locate modern organs. Uprooted in indigenous knowledge systems, healing practices were left with no resource of cognitive and epistemological encounters with the West. The severance of the body's social roots, its dematerialization as a figment of discourse started to build up an entirely new story-in-the-making. "Subversive resistance through hybrid space (and hybrid vocabulary) not only implies (a) a changing native culture but it also indicates (b) the impossibility of generating a sovereign existence

untouched by native culture. The body always exceeds the power frame that attempts to control it." (Bhattacharya, 2004)

(7) Throughout the whole of Āyurveda, to borrow from Wujastyk, "the gaze remains unwaveringly male." (Wujastyk, 1998: 23) A few examples may be cited here. In the famous Bower manuscript one should note that the knowledge of medicine "should not be given to any one who has no son, nor to any one who has no brother; nor should it be taught to any one who has no disciple." (Proceedings, 1893: 62) In *Aṣṭāṅgahṛdayasaṃhitā* – "do not place trust on women or do not give them independence." (*Ah.* Sū. 2.44) In *Carakasaṃhitā – na striyamavajānīta, nātiviśrambhayet, na guhyamanuśrāvayet, nādhikuryāt* / (*CS.* Sū. 8. 22) [Do not ignore women or wife, do not indulge them with over-belief, nor should one confide secrets to them nor should one give them authority.]

(8) As pointed out by Sanjay Subrahmanyam and others, to trace the history of medicine in India efforts must be given "to take the vernacular historiography seriously, and to refine our reading practices, rather than overly depending on normative materials in Sanskrit, or on a prefabricated theoretical schema that derives from a stylized (and impoverished) view of the nature of the transformations produced by colonial rule." (Rao, Shulman and Subrahmnayam, 2007)

I have tried to give an outline picture of the dissertation along which studies will be narrated, documented and made clearer. Rest should be told by the dissertation itself.