

Historical Notes

In Search of Roots: Tracing the History and Philosophy of Indian Medicine

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Abstract

The history of medicine dates back to the very beginning of human existence. Most of the great civilizations had their own systems of medicine. With the help of historical and philosophical underpinnings the authors recognize the influence of Indic civilization, and various Vedic *darśanas*, including the non-Vedic Buddhist, on the evolution of Indian medicine. This article discusses common threads and differences between Western and Eastern approaches related to science and medicine. The article analyzes possible reasons as to why the roots of holistic approaches embedded in Indian medicine were subjected to the reductionist approach of modern science, and modern medicine. Finally, the authors discuss possible approaches to rediscover the roots, and restore the growth, development, and vitality of Indian medicine, especially of Āyurveda and Yoga.

Key words: Āyurveda, Buddhist, Veda, *Darśana*, East and West, Health, History, Holistic, Medicine, Philosophy

1. INTRODUCTION: FROM HOLISM TO DUALISM

Every human civilization is concerned with two key questions: what is health? and what comprises a meaningful life? These questions further derive from two more fundamental questions with which science and philosophies of all origins are preoccupied; as of yet, there are no clear answers to them, namely, what is life? Has it any meaning? And has it any purpose? In this inquiry health is the most important concept. In all developed cultures good health is considered a vital element of good life, but good health is itself a composite concept. Science and philosophy are the two main branches of inquiry dealing with this composite concept of good health. This is evident in the history of science and philosophy in India, and in the West. However, there are differences in the very conception of a good life,

and these differences are due to the metaphysical views of science and philosophy in Indian and Western traditions. Against this background it is clear that medicine or medical science—whether of the West, or of India—rests on the foundations of both science and philosophy.

Although moral philosophy, whether of Indian or of Western origin, is concerned with the ideas of good and bad, and right and wrong which contribute to the idea of a meaningful life, or the life worth living. The question of meaningful life is not restricted only to moral philosophy. Caraka defines meaningful life not only in terms of an ethically virtuous life, but also in terms of a healthy life. He uses the term Āyurveda in the general sense of *science of life*. For Caraka, life consists of *sukha* (happiness), *dukha* (unhappiness), *hita* (good), and *ahita* (bad). “The object of the science

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of life is to teach what is conducive to all these four kinds of life, and also to determine the length of such a life.”¹ In fact, ancient Indian thinkers stress the fact that health is the foundation of all endeavors of life, including the moral and spiritual pursuits; the human body is an instrument (*sādhan*) of achieving them. *Śarīramādyam khalu dharmasādhanam* translates to: a (healthy) body is an instrument of *dharmā* (the principle of righteous behavior) that signifies the moral and spiritual pursuits of an individual. By health what is meant here is obviously holistic health—the physical, mental, psychological, and spiritual. Living a long and healthy life is regarded not only as valuable, but as a virtue in the Indian and Greek traditions. In the Greek tradition the idea of good life is expressed through the concept of *Eudemonia*, that is, a virtuous life that is happy, and worth living (Thomsan, 1956, p. 25). Health conceived in this broad sense is an integral part of a happy life.

The view of health as a virtue is expressed in Greek tradition by Plato (427–348 BC), and Aristotle (384–322 BC). They argue that a meaningful life is the life that takes a holistic vision of both mind (and mental illnesses), and body (bodily diseases). In other words, the holistic intertwining of mind and body leads to the idea of a human being who himself is a union of the two opposite principles of body (matter), and mind (consciousness). In the view of the ancient Greeks, the athletes and warriors are the best examples of perfect body, and thereby of this union (Plato’s *The Republic* 13, 403c–412b).

In Plato’s cosmology, the universe is divided into the world of *particulars*, and the world of *universals*; but in Aristotle’s cosmology the universe is not so divided. Aristotle says that although universals and particulars are conceptually different, they are not physically separate from one another (Irwin and Fine, 1995,

pp. 221–344). Plato’s holistic vision of man is expressed in terms of the division of the soul into three parts: the thinking or the logical part (*logisticon*), the spirited part (*thymoeides*), and the appetitive part (*epithymeticon*) (Jowett, B Internet edition). These three parts are to function in union, and without interfering in the functioning of the other. Plato applies this same understanding to the state, in which justice symbolizes the harmonious function of these three elements (Jowett, B Internet edition). This may be described as Plato’s holistic understanding of man and society. This can be interpreted as the holistic vision of man and the universe held by the ancient Greeks, which bears a striking similarity with basic Ayurvedic concepts of *Loka* and *Purūṣa*.

In contrast to Plato, Aristotle’s holistic vision is evident in his views on the nature of scientific explanation, and the nature of causation. Aristotle takes the same holistic view of the fourfold division of causes that explain the nature of the universe (Falcon, Internet Edition). For Aristotle the scientific explanation of the universe consists of four causes: material, efficient, formal, and final. Of these, the final cause of the universe seeks to find out the purpose (*telos*), or the meaning of the universe; this is a holistic notion. Just as Plato does not take the different parts of the soul as distinct, neither does Aristotle take the four causes as distinct and separate from one another. All of them together are parts of one, single, comprehensive scheme. This holistic approach to the universe and man (and his health) continued more or less until the advent of new science, that is, modern science led by Galileo (1564–1642), and the new or modern philosophy initiated by Descartes (1596–1650). With Galileo and Descartes this holistic vision of the universe and man was changed into a dualistic vision, separating man from the universe. This root dualism was further extended to man by separating

¹ Caraka, I, I.40 and I.30. 20–23: “*hitāhitaṃ sukhaṃ duḥkham āyus tasya hitāhitaṃ. mānaṃ ca tac ca yatroktam āyur-vedaḥ sa ucyate.*” as quoted by S. N. Dasgupta, *History of Indian Philosophy*, Cambridge, 1932. Vol. II, 277–278

mind from body, and to human knowledge, by separating the authority of the church from human reason.

Rene Descartes, a French philosopher who is known as the Father of Modern Philosophy, argued most powerfully that mind and body are two independent substances with different qualities. The body has extension (*res extensa*) but no consciousness, and the mind has no extension, but has only consciousness (*res cogitans*). They are substances that are absolutely irreducible to one another (Haldane and Ross, 1931, p.190). In all these aspects—the causal explanation about the nature of the universe, the relation between mind and body, and the role of authority and reason in knowledge—modern science and modern philosophy differ from ancient Greek philosophy. In the ancient and medieval cosmologies, supported by religious beliefs, man was part and parcel of nature, though his status was above the other creatures of planet Earth. But in the new science, the universe is man's other, which is an object to be explored.

In medieval theories of knowledge, the authority of the scriptures was the ultimate source of valid knowledge. But in modern science, and in modern philosophy, observation of natural phenomena, and doubting everything that can be doubted against any external authority became the hallmark of the new scientific and philosophical method. Similarly, what was the unified knowledge of man and the universe, taken together as a whole, became progressively specialized knowledge of different branches of knowledge. This separation into different domains of human knowledge and existence is acknowledged as the beginning of modern Western science, and modern Western philosophy. Both are primarily and predominantly dualistic; they introduce an unbridgeable gap between mind (consciousness), and body (matter) without there being any method or principle to unite the two.

The development of modern science and philosophy is thus based on separations that are operating at various levels. In this separation, what has gained the upper hand are the objective, observable and quantifiable methods of inquiry. The term scientific method has become synonymous with these three factors, and anything which does not fall within the scope of this method is treated as superstitious or blind faith. The dualism of mind and body as introduced by Descartes, and accepted thereafter almost universally, and the scientific method which emerged through the experiments of Galileo, Bacon, and Newton, is specifically important in understanding the development of modern medicine, and medical practices, which take every phenomenon in isolation.

In this overview one finds that in Indian and Western philosophies, different positions are taken to explain: how these two opposite principles, body and mind, actually affect one another; whether and how consciousness (mind) affects matter (body); and are consciousness (mind) and matter (body) independent substances? These questions are philosophical in nature, and have influenced science in general and medical science in particular, in the development of our understanding of the nature of the Universe and the nature of health and disease. It is interesting to note that according to Caraka, together *śarīra*, *indriya*, *mana*, and *ātma* constitute life.

2. HISTORY OF INDIAN AND WESTERN MEDICINE: AN OVERVIEW

The history of medicine dates back to the very beginning of human existence. The understanding of health and disease has evolved over thousands of years. Most of the great civilizations—Egyptian, Assyrian, Babylonian, Hebrew, African, Arabic, Chinese, and Indian—had their own traditional systems of medicine. The latter is particularly distinguished in that the tradition which predates the known history of the

Sindhu-Sarasvati civilization (one of the oldest world civilizations) has an enduring existence today in the twin disciplines of Ayurveda and Yoga. Reliable archaeological evidence of knowledge and treatments of diseases during prehistoric periods is debatable. The customs and traditions of several African tribes, and of the aboriginal people in Australia, and the Americas provide a few glimpses. During ancient times, the priests or shamans were responsible for diagnosing and treating diseases.

Prehistoric people probably knew about medicinal plants and other substances to treat disease. The *Ebers Papyrus* dating to 1550 BC is considered the oldest and most important medical *papyri* of ancient Egypt. Imhotep, who, it is thought, was the chief minister to the Egyptian king in the twenty-seventh century BC is considered to be the first doctor; he is identified with the Greek god, Asclepius. Asclepius is the Greek god of medicine, and his daughters represent important branches of medicine. The snake-entwined staff of Asclepius is a symbol of medicine today. Those physicians and attendants who served Asclepius were known as the *Therapeutae* of Asclepius. The use of these terms in modern medicine today shows the influence of these civilizations. There is some archeological evidence that clay tablets bearing specific signs were used by physicians of ancient Mesopotamia. One of the oldest deciphered stone carvings, the Code of Hammurabi, was promulgated by a Babylonian king during the eighteenth century BC, and contains a few laws relating to the practice of medicine. Quite surprisingly, the widespread practice of the preservation of dead bodies as mummies by the ancient Egyptians did not lead to a deeper understanding of anatomy. However, they contained evidence of arthritis, tuberculosis of the bone, gout, tooth decay, bladder stones, gallstones, and the parasitic disease, schistosomiasis—maladies that are seen even today.

Modern medicine was nurtured in the European region, and draws substantially from the knowledge and approaches found in *papyri* of Egypt, Greek, and Hebrew origin. While the Harappan civilization also existed during the same time as the ancient Egyptians in the Indian sub-continent, reliable archeological evidence is not available; hence the nature of medical practices prevalent in the Indus Valley Civilization is not reliably known. The nature of the art and science of medicine that developed during this period still remains a mystery. Coming to late ancient Christianity one finds that Christian monasteries played an important role in the preservation and development of medical knowledge, since infirmaries were a standard feature of monasteries and convents. The role of monasteries continued in Europe until the Middle ages. Similarly, in India medical practice was mainly developed by the non-Vedic ascetics like the Buddhists and the Jainas during the fourth and sixth century BC.

Against this background, it is noteworthy that the Buddhist monasteries played an important role in the practice of medicine, and in the development of the classical Indian medical system, Āyurveda (Zysk, 1998). According to Schopen, “Indian Buddhist monasteries were well-suited to have infirmaries and provide medical services for the lay community (Schopen, 2004, pp.1–18).” In contrast to the Buddhism’s engagement with medicine, that of the other main non-Vedic unorthodox way of life, Jainism, is somewhat ambivalent. As pointed out by many scholars of Jainism, in its canonical phase Jainism did not permit either giving or receiving medical treatment because of their ideas of spiritual progress, based as they are on the cessation of *karmas* by ascetic practices, including extreme bodily discomfort. But it cannot be the case that the Jainas did not know medicine. They obviously knew medicine and medical practices, but they did not codify medicine in their monastic tradition (Zysk, 2004, p.64). But in the post-canonical Jaina

texts one finds that “treating the sick in the mendicant order is not only allowed, but in fact, required (Deo, 1954-55, pp.1-4)” This shows that there is a shift in the Jaina monastic attitudes toward medicine. The shift is clearly visible in the *Śvetāmbara* sect of the Jainas. The *Śvetāmbara* texts “make frequent references to medical practice and the alleviation of sickness, describing various medical procedures and instruments and devoting long sections to the interaction between doctors and monastics...” (Stuart, p. 64 <http://hssa.sayahna.org>).

Considering the long, slow process of maturation of thought processes and actual experimentation involved in the making of medicine into a science, and the great historical periods in which various schools of thought and ways of life influence each other, it is safe to assume that Vedic, and non-Vedic Buddhist and Jaina traditions were informed and influenced by each other. This fact is important for having a comprehensive picture of the history of Indian medicine. However, in the later period, the codification of *Āyurveda* at the hands of Caraka and Suśruta became the mainstream tradition of Indian medicine. For the purposes of this paper the reference point for cause and effect-based medicine in India is taken as Caraka’s *Caraka Saṃhitā*, the classic of *Āyurveda*. This classic is supposed to have been written sometime during the fourth century BC. Interestingly, Greece Hippocrates’ contributions to medicine were also made around this same time.

3. INDIAN PHILOSOPHY AND HISTORY OF INDIAN MEDICINE

The history of Indian medicine is inseparable from the history of *darśanas*, or schools of Indian philosophy. A detailed account of ancient and contemporaries studies on history of medicine in India has been carried out

authentically by Indian scholars (Sharma, 1992 and Subbarayappa, 2001). The fact has been acknowledged that “...medicine was the most important of all the physical sciences which were cultivated in Ancient India”, and that medicine was directly and intimately connected with *Sāṃkhya* and *Vaiśeṣikā* physics...” (Dasgupta, 1932, vol. II, p.273) The various treatises on medicine contain “interesting ethical instructions and reveals a way of life...” (Dasgupta, 1932, vol. II, p.273). As far as the mythological accounts are concerned, the quest for health, wellness, and longevity are manifest in the invocations of Lord Dhanvantari, the incarnation of the supreme deity, Vishnu. The Vedic hymns dedicated to Aśvini *devatās* which are symbolized by the twin stars visible before dawn, represent the healing spirit of the universe.

As regards the systematization of the science and practice of medicine in India, scholars agree that the history of Indian medicine is synonymous with *Āyurveda* which is supposed to be a part of Atharvaveda. About its antiquity Caraka says, “there were always medicines which acted on human body according to the principles of *Āyurveda* (Dasgupta, 1932, vol. II, p.274).” However, the status of *Āyurveda* is a contested matter. For Caraka it is a full-fledged Veda, and therefore it is called the fifth (*pañcama*) Veda. For Vāgbhata it is *upa-veda* (independent division) of Atharvaveda; while for Suśruta, it is an *upaṅga* (part) of Atharvaveda.

All this shows that Atharvaveda in some way existed when the Vedic literature was still in the making. Along with Atharvaveda one finds references to other compendiums of medicine, such as *Subheśja* (Dasgupta, 1932, vol. II, p.276). It is also interesting to note “nowhere in the *Upaniṣads* or Vedas does the name *Āyurveda* occur, though different branches of study are mentioned in the former.”²²

²² It is also observed that Mahābhārata mentions Aṣṭāṅga *Āyurveda* along with *dhātu*, *vāyu*, *pitta*, and *śleṣmam* with a theory that these three sustain body and by their decay the body decays. Dasgupta

As far as Indian philosophy and the history of medicine in India is concerned, it should be noted that along with Āyurveda, which belongs to the Vedic tradition, non-Vedic Buddhism, as a philosophical creed, and as a way of life, has significantly contributed to Indian medicine. One of the earliest systematic mention of medicines “unmixed with incantations is found in the *Mahāvagga* of the *Vinaya-Piṭaka* where Buddha prescribes medicine to his disciples. These medicines are of a simple nature, but they bear undeniable marks of methodical arrangements.” The *Vinaya-Piṭaka* contains special sections on specifications about the food and medicine of Buddhist monks, and classic Buddhist descriptions of meditation on the body, with lists of body parts and bodily impurities. For example, in such texts as *Bhaiṣajyavastu* of the *Mulasārvastivāda*, and in some *Pāli Vinaya*, there is a detailed description of medication allowed for Buddhist monks and nuns (Stuart, p.64).

There is a mention of a surgeon, Akāśagotto, who made surgical operations (*sattha kamma*) on fistulas. There is a mention of Jivaka, who studied medicine in the Taxila University under Atreya (Dasgupta, 1932, vol. II, p. 275-276). As pointed out earlier, this shows that the practice of medicine was common even among the non-Vedic traditions, such as the Buddhist and Jaina traditions, even at the time of Atharvaveda. The scholars have debated the issue of the antiquity of Atharvaveda, and how Āyurveda is related to it. The two main codifications, Caraka’s *Caraka Saṃhita*, and Suśruta’s *Suśruta Saṃhita*, allude to the beginningless traditional continuity of Āyurveda. In this context, Āyurveda means “life, the constancy of the qualities of medical herbs, diet, etc., and their effects on the human body, and the intelligent inquirer (Dasgupta, 1932, vol. II, p. 277).”

Although the Sāma and Atharvaveda refer to health, disease, medicine, poisons, and spiritual and remedial measures, the Vedas, as such, are generic in nature, and do not contain any particular metaphysical discipline of thought. The systematization of different metaphysical views resulting in various *darśanas*³ like *Sāmkhya-Yoga*, *Mimāmsa*, and *Vedānta*, is a latter phenomenon. *Darśanas* are broadly classified as *āstika*, who believe in ātma, and *nāstika*, who do not. Vedānta is one of the *āstika darśanas*. *Purva Mimāmsa* (ritualistic view), and *Uttara Mimāmsa (advaita)* have different approaches toward the Vedas.

In this process, the *Vedānta*, as a philosophical school, is a culmination of the philosophical views of *Sāmkhya*, and *Uttara-Mimāmsa*. Āyurveda derives its basic premises from the *Sāmkhya-Yoga* as a combined discipline. Further premises were derived from *Vaiśeṣika* and *Nyāya*. These philosophical theories play a fundamental role in Āyurveda as it examines the physical, mental, social, and spiritual health of an individual. This function is encompassed in the term, the science of life.

Among the *darśanas*, it is apparent that the *Sāmkhya* system had the greatest influence on the precepts of Āyurveda. The aim of the *Sāmkhya* system is cessation of sufferings (*dukkha nivritti*). This system is attributed to the legendary sage, Kapila. It aims at comprehending the entirety of the meaning of life through twenty-five *tattva* (principles). It is interesting to note that the *Sāmkhya* begins its inquiry into the good life by identifying and distinguishing between three types of *duhkha* (suffering).⁴ The three types of sufferings are: *adhibhautika* (caused by external conditions, mainly physical); *adhidaivika* (caused by supernatural agency); and *adhyātmika* (intra-organic). The twenty-five *tattvas* are the principles

³ The term *darśana* literally means *to see*. *Druśyate anena iti darśanam*: *Darśana* is the one which enables one to perceive deeply.

⁴ From the torment by the three-fold (causes) of suffering (*duhka-trya-abhighātāt*) there arises a desire for inquiry (*jijñyāsā*) into the means of terminating it (*tādāpāghātake hetau*) *Samkhya Karika* 1

of the creation of the universe; the five fundamental derivatives of the universe, *pañca mahābhūtas* (earth, water, energy, air, space); and the *tri-guṇas* (the three primordial natures of *prakṛiti*, or *sattva*, *rajas*, and *tamas*), are at the foundation of the evolving philosophy of Sāṃkhya. These were translated and applied to all the problems of health and wellness in Āyurveda. The most fundamental derivation of this is the conceptualization of the *tri-doṣas*, *vāta*, *pitta*, and *kapha*, which are responsible for all kinds of morbidity in the body.

4. EVOLUTION OF AYURVEDA AND OTHER DISCIPLINES

Notable contributions to the disciplinarization of Āyurveda followed the pioneering work of Caraka, the father of Indian medicine. The *Caraka Saṃhita* elaborates principles, diagnoses, and treatments. This classic text gives detailed knowledge of human anatomy, embryology, pharmacology, blood circulation, and diseases such as diabetes, tuberculosis, heart disease, and details of thousands of medicinal plants used in Āyurveda. In other scientific disciplines like astronomy and mathematics significant contributions followed Caraka, including the work of the master astronomer and mathematician, Āryabhaṭa (476 AD). In his classic text, *Āryabhaṭīyam*, he describes the process of measuring the motion of planets and eclipses. Āryabhaṭa proclaimed that the earth is round, that it rotates on its axis, that it orbits the Sun, and is suspended in space. Āryabhaṭa's most significant and well-known contribution is the concept of zero. Varāhamihira (499–587 AD), in a classic text, *Pañca Siddhānta*, notes that the Moon and the planets are lustrous, not because of their own light, but due to sunlight. In the *Brhat Saṃhita*, he detailed many discoveries in the domains of geography, botany, and animal science. Another great scholar and master of arithmetic and astronomy was Bhāskaraçārya (1114–1183 AD).

In his classic text, *Sūrya Siddhānta*, he made a note on the force of gravity. Nāgārjuna (800 AD), in the classic text, *Rasa Ratnākara*, outlined many interesting experiments in metallurgy, alchemy, and chemistry. He also used metal-based ingredients in medicinal preparations.

After Caraka, there were only two major contributions in the next ten centuries: Vāgbhaṭa (circa sixth to seventh century AD) wrote two treatises, *Aṣṭāṅga Hṛdaya* and *Aṣṭāṅga Saṃgraha*; and the *Mādhava Nidāna* (circa ninth century AD), an Ayurvedic text on symptomatology and diagnosis. Indian science left its footprint in neighboring regions: from 400 BC, Indian knowledge became available to European and Arabic regions through invasions by Alexander the Great, and others. There is evidence of some communication between Greece and India even before Alexander the Great's invasion, possibly through the Achaemenian Persians (Filliozat, 1964, pp.229–257).

A closer look at the history of Western science reveals the influence of Vedic, and ancient Indian knowledge systems on many philosophers and thinkers from the West. Evidence of this influence is also found in the works of pioneers in the field of medicine such as Hippocrates, Avicenna, Galen, and Osler. The influence of Vedic knowledge on Greek science and medicine is apparent, yet hardly any mention or recognition appears in the documents, including in Osler's often-cited book on the history of modern medicine (Osler, 1921, p.233). Whether Osler's omission of Āyurveda in his landmark book is due to his ignorance, or a case of biased negligence, is a subject of speculation (Patwardhan, Chopra, Vaidya, 2003, pp.1165–1166).

Whereas most of Western scientific, philosophical, and medical texts do not acknowledge the influence of other cultures, the Persian scholars duly acknowledged their sources of knowledge. For instance, Abdulla-bin-Ali,

Manka, and Ibun-Dhan translated several Āyurveda texts into Persian and Arabic. *Caraka Samhitā* (Sharaka), *Suśruta Samhita* (Kitab-E-Sushrud), *Aṣṭāṅga Hṛdaya* (Astankar), and *Siddhayoga* (Sindhashtaq) reached the Arabic and Persian physicians in the sixth to eighth centuries. In 850 AD, Ali-bin-Raban-al-Tabri authored a textbook of medicine, *Firdausu'l-Hikmat*. He appended a chapter on the Indian system of medicine in this book; this was much before Avicenna wrote his famous *Canon of Medicine*.

The process of dialogue, dialectical method of enquiry, and hypothesis building is common to both Indian and Western philosophy. The Delphi method of participatory consensus building, which is used widely today, resembles the method in Āyurveda known as *tadvidyā sambhāṣa*. Detailed rules and procedures for conducting consultations, debates, and discussions are given in the *Nyāya Śāstra*, which, as a method of argumentation, was common to all disciplines, including Āyurveda. The Greek theory of macrocosm and microcosm; the concept of the four elements (fire, air, water, and earth); the four qualities (hot, dry, wet, and cold); and the four humors (yellow bile, blood, phlegm, and black bile) are also to be found in the ancient systems of *Sāṃkhya* and *Yoga*. These formed the basis of *loka-purūṣa*, the five *mahābhūta*, the three *doṣa*, and six *rasas*, which form the basis of Āyurveda.

The Indus Valley Civilization, and the ancient Chinese, Mesopotamian, and Egyptian civilizations share several similarities. In the beginning of the first millennium AD, three principal systems of medicine, Āyurveda, Greek, and Chinese, were active. The fundamental attitude to the relationship of man and nature was similar in these three ancient civilizations. However, their explanations of the human body, physiology, pathology, and therapy were different in some respects (Subbarayappa, 2001, pp.1–38). Their approach to health and medicine was holistic. Later, Greek medicine followed the

modern science path, and gradually evolved as modern medicine. Āyurveda emerged as a remarkable holistic system, both in its foundational ideas, and therapeutic measures. Later, during the period of invasions in India, Ayurveda was suppressed, and stagnated for several centuries—a severe setback for systematic progress and development of Āyurveda. Moreover, because of the dominance of modern medicine during the colonial period, Āyurveda was further fragmented, deteriorated, and was marginalized.

5. PHILOSOPHY AND SCIENCE

During the ancient times science and philosophy were considered as one; whether in the West or in the East. The ancient Egyptian, Roman, and the Greek thought traditions took a holistic approach to man, nature and universe. However, these holistic traditions were slowly replaced by modern science by its scientific method of observation, rigorous experimentation and analysis. Some of the well-known philosophers and scientists who represent the spirit of modern science are Galileo, Descartes, Pascal, Newton, and Einstein. As the modern science was slowly replacing the ancient Greek scientific outlook that was mainly shaped by Aristotle, many of the ancient Eastern traditional knowledge systems were becoming frozen parts of history for a variety of reasons including social, political, and economic. They remained static for a long time, and lost the dynamism implicit in the spirit of experimentation that is necessary for the progression of science. As a result, many of the Eastern traditions, like that of Tibet, remained more a philosophical bulwark against the adaptation of the culture of science. The ancient Indian knowledge systems like Āyurveda and Yoga seem to fall somewhere in between.

Western philosophical tradition is mainly divided into two main standpoints: rationalism and empiricism. As the very term suggests, rationalism

stresses reason as the chief source of knowledge of the universe. Human reason is objective, and is the chief source of validity of human experience. Against this, empiricism holds that the main source of knowledge is sensory experience. The logic that was developed by Aristotle takes reason as the source of valid reasoning in which particular conclusions are drawn from the general premise by way of the process of deduction. This is called a deductive logic, and is used mainly in formal disciplines like mathematics and logic.

On the other hand, the logic that was developed by the empiricist philosophers such as David Hume, is based on the grounds of experience which can be generalized, that is, a general conclusion is drawn from observing several particular facts. Until the Middle Ages, Aristotelian deductive logic was rigorously used in understanding several natural phenomena, and in their explanations. But Aristotelian logic as a tool of scientific reasoning, and as a classification of causes was inadequate to explain many natural phenomena discovered during the Renaissance. A new scheme of explanation of natural phenomena was needed. In this new scheme of explanation there was no place for any supernatural power, or God, or scriptural authority. The whole universe was governed by a system of natural laws, and man was supposed to discover these laws. There was no purpose, or final end of the universe. The universe was governed by purely mechanistic laws. It was not governed by the will of God. In this universe, man was at the center of all inquiry. This was the spirit of the Renaissance that gradually prepared the way for the evolution of modern science. However, in the process of scientific advancement, valuable insights and ancient knowledge were either neglected, or lost, or remained in obscurity.

6. PHILOSOPHY OF MEDICINE

Philosophical questions about any discipline constitute a meta-discipline. Thus, there

are such disciplines as the philosophy of mathematics, the philosophy of history, or even the philosophy of music, wherein philosophical questions are raised about various concepts and procedures in mathematics, or history, or music. One such overarching meta-discipline is the philosophy of science. As far as the philosophy of medicine is concerned, there are diverse views regarding what constitutes a philosophy of medicine. In 1992, one of the authorities in this field, Arthur Caplan, raised the question, "Does the philosophy of medicine exist?" According to Caplan, the philosophy of medicine is a sub-discipline of the philosophy of science (Caplan, 1992, pp.67-77). The philosophy of medicine includes medical ethics and bioethics, but its scope is much wider, involving epistemological, metaphysical, and methodological dimensions of medicine, which include therapeutic, experimental, diagnostic, and palliative aspects. If we consider medicine only as a branch of the basic sciences like anatomy, physiology, and biochemistry, then the philosophy of medicine will be a branch of philosophy of science.

In reality, medicine is not limited to pathophysiology, pharmacology, psychology, microbiology, or genetics. The main purpose of the science of medicine is to understand human body functions and dysfunctions through sound hypothesis, robust experimentations, observations, analysis, and a continued search for truth. However, the real purpose of medicine is more than this. Indeed, it is a search for truth, with the definite objective to attain health, and healing. Probably this is the reason why religious places like churches, temples, monasteries, and mosques were involved in medical care before the evolution of clinics and hospitals. These sacred places protected traditional knowledge during invasions and dark periods in their respective regions. In many ancient civilizations like Egypt, priests worked as doctors and healers. Even now, in some parts of Africa and India, such practices exist. In ancient times, medicine was not restricted to

material drugs; rather, the approach was holistic— involving body, mind, and spirit.

7. THE EAST AND WEST: THE DIFFERING ATTITUDES

Before the European Renaissance, the division of the world into East and West was not very sharp. The European Renaissance of the fourteenth to the seventeenth centuries AD, started in Italy and spread throughout Europe. This triggered a new era of creation, transformation, and progress, and witnessed spectacular revolutions in humanistic, social, political, and intellectual pursuits. Some of the world's greatest artistic achievements were made during this period. Remarkable artists like Leonardo da Vinci and Michelangelo made timeless impacts during this period. The fruits of the Renaissance in various disciplines including art, culture, science, technology, medicine, and the humanities were mainly seen in the West, and in the Middle East, including European, English, Arabic, and Russian regions. Although many of the technological innovations reached the East through the European travelers and merchants, the spirit behind these developments in science, technology, and humanities was not captured by the Easterners, including the Indians. As a result, today's modern science is known as Western science, and modern medicine is known as Western biomedicine.

Western science and philosophy is a mix of many strands which include, in principle, the rationalist strand held by philosophers like Aristotle, Descartes, Spinoza, Leibnitz, and Kant and the empiricist strand held by John Locke, David Hume, and others. The history of Western science is closely associated with the developments in the rationalist and the empiricist schools, since these are the two basic epistemological positions held by all the major philosophers and scientists in the West. The whole history of Western philosophy and science has

shaped the modern world through robust developments in various branches of sciences and technologies. In the light of these developments, the modern world is characterized as more rational, logical, mechanistic, materialistic, and human-centered. On the other hand, the Eastern world continued with its traditions, and has remained suppressed, intuitive, and spiritual. If an epistemological bridge, a two-way traffic, had existed between these two worlds, the face of Āyurveda, as well as modern medicine, would have been much different.

Often it is said that the Eastern and the Western ways of thinking about man and the universe differ in many ways. The Western mind and philosophy is alleged to be more restrictive (for example, to sensory organs), reductive (for example, mind to matter,), quantitative, and analytical—relying more on empirical, measurable parameters within the understanding or experiences of human sensory organs, or from instruments as their extensions. On the other hand, the Eastern mind and philosophy, particularly the Indian, is alleged to be inclusive, holistic, qualitative, and intuitive in its approach, and not restricted to sensory experiences, but often aspires to transcendence involving body/mind, and spiritual insights. These differences are articulated and theorized variously by the indologists and sociologists. What is relevant to note is that these differences were articulated against the background of modern Europe's self-perception vis-vis the East, or the Orient. Thus, the articulation of these differences has a definite political background of the complex relationship between Europe and the Orient. This is clearly reflected in the works of German romantics like Schlegel and Herder, and others. India, in their imagination, is the land of spirit, whereas, as in the imagination of Hegel, Europe is the land of reason.

Another dimension of these characterizations of the East and the West,

particularly Europe and India, is clearly political and sociological. It has been argued that characterizations such as rational versus emotional are grounded in the deep-seated bias that modern Western civilization has toward the East. This bias divides the social reality into two realms, “the realm of this side of the line” and the realm of “the other side of the line”. This division is based on granting the highest rationality to modern science and technology, and denying the status of rationality to other forms of non-Western thinking and philosophy (Deshpande, 2015, p.5). Such distinctions are often introduced as analogous to brain structure and functioning. If the Earth can be visualized as a human brain, then one can say, metaphorically, that the philosophies and sciences of the East and South are dominated by the right brain, and that of the West and North are dominated by the left brain. Interestingly, the difference in Eastern and Western approaches is seen in the respective geographical regions as well.

We are aware that while psychologists agree with the left and right brain theory, brain scientists differ. We feel that psychology, as a systemic science focusing on the mind, represents the right side, while the neurology, as a structural science focusing on the brain, might represent the left side. According to Jeff Anderson, a neuroscientist from University of Utah, who studied over seven thousand regions of the brain with the help of magnetic resonance imaging (MRI), “It’s absolutely true that some brain functions occur in one or the other side of the brain. Language tends to be on the left, attention more on the right. But people don’t tend to have a stronger left- or right-sided brain network (Nielsen et al., 2013).” At a physical level, the division between the left and right brain may not be seen by MRI. A brief history of ideas about brain, philosophical approaches, and contemporary discussion on consciousness from a neuroscience perspective is very interesting (Chakravarti, p.428). Recently, researchers have discussed

complex relationships between the hemispheres from evolutionary and sociological perspectives (Michael, 2011, pp. 284-288).

We feel that current science still has many limitations in understanding the real functioning of the brain, let alone its relationship to an entity called mind. The analysis of the brain by neuroscientists is a typical feature of the Western, analytical mind; an artist’s depiction of the brain as a globe, showing the right and left divide, is a typical feature of the Eastern, creative mind. We are considering the division of East and West, not merely in a geographic sense, but more in terms of approaches and mindsets. Both the Eastern and Western approaches are important, and should not be seen as mutually exclusive.

Medicine has a much larger role than that of physical science. It is not merely a sum of philosophies of science, biology, or the humanities. The motivating force of the practice of medicine is the alleviation of suffering, and restoration of people’s health (Velanovich, 1994, pp. 77-81).

8. IN SEARCH OF ROOTS

In this brief philosophical and historical overview, we highlight that Indian systems of knowledge, including medicine, were not only hamstrung by invasions and foreign rule, but were denied revitalization through the influence of the industrial revolution, and the progress of science and technology that propelled Western science to prominence. The important question at this juncture is how to rediscover our roots and restore growth, development, and vitality to the traditional science systems in India—mainly to Āyurveda and Yoga. Yoga itself has undergone a global transformation through multiple channels. Yoga has spread globally through Buddhism, including into Western institutes of excellence, where, through scientific research and scrutiny, it has gained credibility, and wider acceptance.

Today we find that centers of excellence in medicine such as Mayo Clinic, Cleveland Clinic, and other prominent academic centers of medicine bring Yoga practices into rehabilitative medicine and other fields of physical and mental health. In other channels in Europe and the United States, where, through individual initiatives of Indian scholars like Maharshi Mahesh Yogi (the originator of transcendental meditation), many types of Yoga, such as mindfulness and haṭha Yoga, are practiced. Yoga also has been lamentably commercialized, and often reduced in modern Western cities to street-corner outlets purveying quick fix, body-building exercises. The challenge is to bring to the West the quintessential feature of Yoga—based on an inextricable and indivisible meld between body and mind—and apply it as the basis of a way of life for the prevention of illness, promotion of health, restoration of vitality, and cure of diseases.

According to some scholars, Āyurveda cannot be called a strict science. At the same time Āyurveda does not oppose science, and is not unscientific, or pseudo-scientific. Āyurveda is considered as a trans-disciplinary knowledge system that accepts but transcends methods of science (Manohar, 2005, pp.175-171). Along with integrating its practices with Yogic disciplines and modern medicine, Āyurveda has the potential to emerge as a major scientific discipline, and one holistic, mainstream medicine. Before that happens, there are many hurdles to clear.

The first hurdle is establishing an acceptable evidence base suited epistemologically to Āyurvedic precepts and practices. Secondly, efforts of identifying an effective therapy in Ayurveda, discovering herbal remedies, isolating the active principles which have maximum therapeutic properties—as is the current approach to Āyurveda—is not the right way to go. This may yield a few short-lived therapeutic agents, which has nothing to do with the revitalization of Ayurveda as a whole, since this is purely a

reductive methodology. Thirdly, instead, Āyurveda must develop a bridge through a systems biology approach by scientific characterization of well-linked components at various levels of application of such disciplines as cell biology, biochemistry, genomics, epigenetics, proteomics, and metabolonomics (Patwardhan, 2014, pp. 1-7). Eventually, basic Āyurvedic principles such as *mahābhūta*, *tridoṣa*, and *prakṛti* types, and their contribution to body pathophysiology need to be scientifically explored with tools of advanced technology. Fourthly, training in Āyurveda is today confined to a class of students who are filtered down after the best are absorbed in various careers of business, technology, modern medicine, and other monetarily rewarding careers. Unless this is changed, it will be difficult to get the cream of the brightest students to emerge as leaders of Āyurveda of the new era. Educationists, thought leaders, and policymakers need to apply their minds seriously to this daunting challenge. Fifthly, in the interim, there is a need to train scientists as *vaidyas*, or *yogis*, as well as train *vaidyas* as modern scientists, in order to create a confluence of traditional wisdom, and modern science (Patwardhan et al., 2011, pp.476-83).

In its fiftieth year of the journal of history of science in India, we wish to urge for an attention and deliberations on searching our roots encouraging emergence of new models of integrative health and medicine to benefit the global community—with Āyurveda and Yoga as its principal ingredients (Patwardhan, Mutalik and Tillu, 2015, p.353).

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