Glimpses of ancient Indian medicine—Part I*

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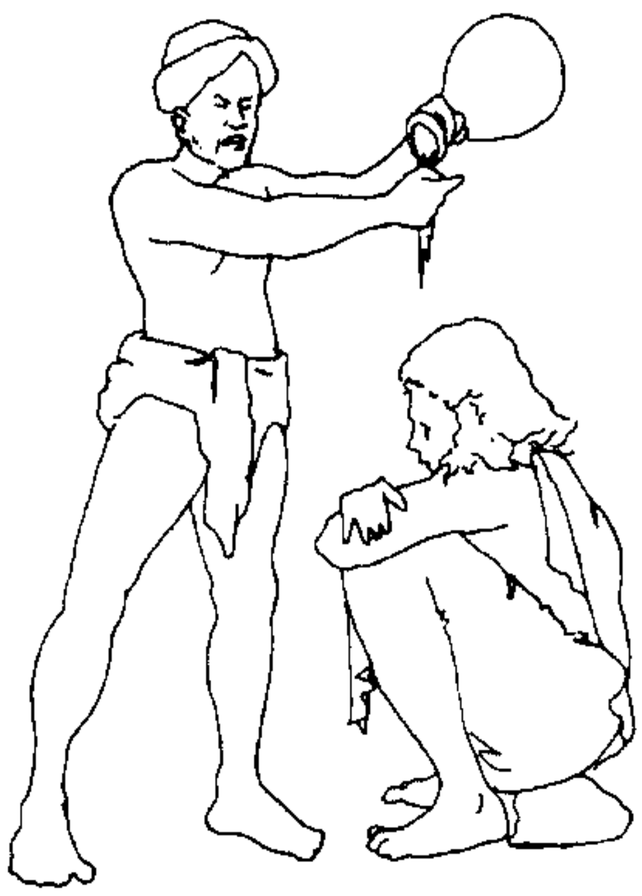
Origins

Folk medicine is the mother of all systems of medicine. In the Indian palimpsest, folk medicine was never fully erased before the newer texts of local or foreign origin were written. Millions of tribals continue to depend on the folk practitioner who seldom recognizes a flaw in his system. Folk medicine claims that diseases are caused by evil spirits or the wrath of gods; it recommends diagnosis by divination and treatment by propitiation. In tribal India, one may still see



Herbal extract being showered on a paitent with jaundice (Bastar).

herbal extracts being rained on a jaundiced patient to the accompaniment of chants or allied practices for other ailments. One may save oneself any derision towards folk medicine because it enshrines the seeds of compassion and craft which are the very soul of medicine. Its originators were no less intelligent than modern man. It was when folk medicine failed to stem epidemics that concepts of hygiene dawned in the minds of men. Long centuries of folk medicine and recurrent epidemics underlie the drains, soakage pits, lavatories and baths of the ancient Indus valley cities of Mohenjodaro and Harappa. If *Ayurveda* continues to serve millions after centuries of neglect and stagnation, it could only have done so by drawing the power for survival from traditions that reach back to prehistoric times.

The Harappan culture which flourished around 2500 BC faded away, leaving behind relics of enigmatic glory. By 1500 BC, the Vedic age heralded a joyous search which spared neither spiritual nor secular phenomena. The earliest historical references to medicine date back to the *Atharva Veda*, which contains mystical, magical and rational elements in varying proportions. Diseases were regarded as the punishment of gods for sin and transgressions and the punishment accorded was intensely visual. For example, *Varuna* (lord of the waters) inflicted dropsy, *Parjanya* (rain god) decreed diarrhoea, and *Agni* (fire god) ordered fever. Other diseases were looked upon as manifestations of supernatural powers that surrounded men as *pisachas*, *rakshasas* and other demoniac species. The *Atharva Veda* described symptoms and signs such as fever, diarrhoea, cough, seizures, tumour and ascites but did not specifically deal with diseases. The Atharvan approach to treatment consisted of propitiatory rites (*swastayana*), offerings (*bali*), auspicious oblations (*mangala homa*), penance (*niyama*), purificatory rites (*prayaschitta*), fasting (*upavasa*) and incantations (*mantra*). Many a hymn imprecated demons and enemies, while others sought the blessing of health. Here is a hymn addressed to *Varuna* for the treatment of a patient with dropsy[1]:

> The golden chamber, King Varuna,
> is built in the waters
> There the King that maintains the laws
> shall loosen all shackles.
>
> From every habitation, O King Varuna,
> from here do thou free us: If, O waters,

A drain in the ancient city of Mohenjodaro.

* The second part of the article will appear in the next issue.

inviolable ones!, we said,
Free this sin, O Varuna, free us!

Loosen from us, O Varuna, all fetters, the uppermost, the nethermost and those imposed by Varuna! Evil dreams and misfortunes drive away from us; then we may go to the world of the pious.

Incantations were supplemented by amulets and magic; the wizard appeared larger than gods. The *Atharva Veda* declared that 'there are hundreds of medical practitioners and thousands of herbs, but what can be done by these can be effected by binding an amulet'[2] In the forest of magical trees, one is also greeted by rational stretches such as the description of 'the wonderful structure of man'[3], which contains much good anatomy, prescriptions for dietary regimen, and medications such as *guggulu* and *satavari*. Medical procedures in vogue included probing of the urethra for retention of urine, enema application of leeches, and thermal cauterization of snake bites. *Mantras* were mandatory accompaniments for most of these procedures. Dasgupta believes that the *tridosha* concept, which forms the corner stone of *Ayurveda*, was foreshadowed by the Atharvan classification of disease into those produced by water, wind and fire[4]. It would appear that there were two classes of physicians who practised medicine in the Vedic period. The Atharvans were priest-physicians who had access to the king, prescribed charms besides herbs, and stood higher in the medical hierarchy; they were outnumbered by ordinary physicians or *vaidyas*, who dealt with mundane remedies such as herbs and manual procedures. The medicine of the *Atharva Veda* was no less advanced than the systems that flourished in contemporaneous civilizations in Mesopotamia, Egypt and Crete. It laid the foundations for the development of Indian medicine and forged a tenuous link between our Harappan inheritance in public health and the subsequent evolution of *Ayurveda*.

Evolution and subsequent stagnation

The compilation of Vedic hymns was over by 800 BC and the two following centuries saw the high-water mark of India's intellectual history. The *Upanishads* came into existence and revolutionized the concepts of man and his place in the universe. There are no medical texts ascribable to this period and the *Chandogya Upanishad* lists *Sarpa vidya*, *Pitriya vidya* and *Bhuta vidya*––but not *Ayurveda*––among the subjects for study[5]. Nevertheless, the advent of the six systems of Indian philosophy, the birth of Buddhism and Jainism, and the spirit of the age cast their spell on medicine, which became less magico-religious and more empirical in character.

The influence of *Samkhya* and *Nyaya-Vaiseshika* systems, in particular, on the development of the philosophical basis of *Ayurveda* was considerable. Examples of this influence may be seen in the Ayurvedic belief in the utility of analysis and the reliability of reason and the acceptance of the reality of the external world. By 600 BC, medical evolution culminated in the elevation of *Ayurveda* to the status of an *upaveda* with eight divisions. The pre-existing divisions of *Bhuta vidya*, *Agada tantra*, *Rasayana tantra* and *Vajikarana tantra* continued to have a place in orthodox doctrine, but they were overtaken by *Salya tantra*, *Salakya tantra*, *Kayachikitsa* and *Kumara britya*, new disciplines unknown in Vedic times. Two great figures appeared ––Atreya and Sushruta––, who established the medical and surgical branches of *Ayurveda* and gave them a rational orientation. Their authority was so great and their personalities so radiant that they were credited with divine origins. From Buddhist sources it is known that Taxila and Kasi had become outstanding centres for medical studies by 600 BC. Atreya and Sushruta were probably the *Acharyas* at Taxila and Kasi, which attracted students from all over India and neighbouring countries. Sushruta composed an enormously influential *Samhita* which went beyond the systematic treatment of medicine and dealt with surgery in a manner that had few parallels elsewhere at that time. Much later, in the first century AD, Atreya's system of medicine was codified by Charaka, whose *Samhita* became another majestic achievement in Indian medicine. In the treatment of the philosophic background of medicine and its interrelations with religious thought, the *Charaka Samhita* excels other ancient texts and marks the culmination of the creative phase in Indian medicine. No wonder that Sushruta and Charaka, and Vagbhata, who followed them a few centuries later, are affectionately known as the *vriddhatrayi* (the three ancients) of *Ayurveda* even today. The period of the *Samhitas* may rightly be regarded as the golden age of Ayurveda.

But the *Sushruta Samhita* and *Charaka Samhita* of today are products of evolution in so far as they are later editions of much older texts. Charaka composed his *Samhita* on the basis of the *Tantras* of the six disciples of Atreya, all of which are lost but were extant in the first few centuries of the Christian era according to the evidence in the Bower manuscript[6]. Similarly the *Sushruta Samhita* was written and expanded by Nagarjuna in the early years of the Christian era from the original *Salya tantra* of Sushruta who lived eight centuries earlier. In editing older texts, Charaka and Nagarjuna regarded them as national libraries of medicine to which they added their own treatises. The great *Samhitas* attained their present form in the hands of Charaka and Nagarjuna in the first one or two centuries of the Christian era. Charaka is believed to have been the physician of King Kanishka.

The *Samhitas* of Charaka and Sushruta stood in isolated splendour until Vagbhata Senior wrote a masterly compendium to harmonize the conflicting views that had grown over centuries. According to prevailing custom he added much independent material to his *Ashtanga Samgraha*, which had become something of a national favourite by the time of I-tsing who visited India in the seventh century AD. In the following century, Madhavacharya extended the art of diagnosis and produced a classic, *Madhava Nidana*, which dealt with the diagnosis and pathology of diseases exclusively. Lucid and practical, Madhavacharya's system marked an advance on Charaka and Sushruta in deepening the understanding of diagnosis. The eighth century also witnessed the advent of the famous *Ashtanga Hridaya* by

Vagbhata Junior, who literally condensed all that was known in *Ayurveda* and produced a masterpiece which continues to be a living text for the Ayurvedic physician. After Vagbhata Junior, the flow of creativity, already slowed down from the early centuries of the present era, ceased altogether. Commentaries continued to appear, such as those of Chakrapanidatta, but the creative phase in Indian medicine was over.

When European observers came to India a thousand years later in the eighteenth and nineteenth centuries, they took careful note of the practice of medicine in India and sent detailed reports to the Royal Society and the Royal College of Physicians. They are valuable source material for the student who wishes to know the status of medical practice in India following a thousand years of stagnation after Vagbhata Junior. The eighteenth century reports of observers such as Holwell, Scott and others are important because these were competent observers who wrote before India was subjugated and Indians were regarded as a conquered race. No matter that the reports concern the ancient Indian procedures of variolation, cystolithotomy, cataract removal or rhinoplasty; their canvas displays no more than islands of excellence in a sea of faded elegance.

Profiles of *Ayurveda*

It is far from easy to portray a medical system that took birth in the mists of antiquity, sparkled as it grew, slowed down mysteriously for a thousand years, but continues to live and serve millions in the present day. Philosophic, scientific, clinical, and ethical dimensions stand out as the main elements of its many-splendoured character.

Philosophic aspects of Ayurveda

The philosophic roots of *Ayurveda* are to be found in the *Nyaya-Vaiseshika* and *Samkhya* systems even though their degree of influence on Charaka, Sushruta and other authorities is not uniform. *Nyaya-Vaiseshika*, in particular, had considerable impact on the development of Ayurvedic thought in so far as it accepts the reality of the external world, which is known through, but not dependent on, the mind. It depends solely on experience and reason and does not attempt to reduce the diversity of experience to any universal principle. According to Sushruta, the science of medicine does not lay down that souls (*Kshetrajnas*) are all-pervading, but, on the contrary, it asserts that they are real and eternal and are born in the planes of divine, human or animal existence. It postulates six original categories of which all things in the world are made of. They are *dravya, gunas, karma, samanya, visesha* and *samavaya*. Charaka accepts these categories but often differs from the *Nyaya-Vaiseshika* concept in the sense in which the terms are employed. For example, *samanya* in the *Vaiseshika* system signifies a class concept whereas Charaka means it to include concrete things that have similar characteristics. Similarly *visesha* in *Vaiseshika* implies ultimate specific properties differentiating one atom from another, but it means concrete things that have opposite constituents in Charaka. In the *samanya* and *visesha* concepts, which have decisive influence on *Ayurveda*, Charaka does not hesitate to differ from the *Vaiseshika* system.

If *Ayurveda* is indebted to the *Vaiseshika* system for its metaphysics, it draws upon *Nyaya* for its logic and dialectics. In regard to diagnosis, Charaka postulates three means for establishing it. These are instructions of the wise (*aptopadesa*), perception (*pratyaksha*) and inference (*anumana*). Charaka believed that all three should be employed either jointly or separately for determining the nature and prognosis of diseases. Charaka and other masters also assigned a high place to logic in promoting debates, which he termed *sambhasa*. Whether the debates were friendly (*sandhyaya*) or hostile (*vigrhya*), Charaka held that they 'increased the zeal for knowledge, clarified understanding, increased the power of speech, removed doubts, and strengthened convictions'[7]. Indeed, *Charaka Samhita* seems to be a distillate of many such learned discussions which had taken place under Atreya's chairmanship. Debates and logical disputation had been in vogue in India from ancient times but they seem to have been practised with special zeal by physicians not only to refine their knowledge but also for the less lofty purpose of defeating their opponents!

Science in Ayurveda

Ancient Indian anatomy and the *tridosha* doctrine are examples that illustrate the scientific underpinning of *Ayurveda*. Other aspects, including ancient Indian physiology, are no less important. Indian anatomical traditions reach back to the *Rig Veda*, which mentions the lungs, heart, stomach, kidneys and other viscera. In the *Atharva Veda* the hymn on 'the wonderful structure of man' enumerates several parts of the human skeleton which agree with the version of Charaka. Ancient anatomical knowledge received a boost from the dissection of cadavers, which was already practised in the time of Sushruta, who admonished, 'Anyone who wishes to acquire a thorough knowledge of anatomy must prepare a dead body and carefully observe and examine all its different parts'[8]. But the curious practice of dissecting a cadaver decomposing in water weakened knowledge of soft parts, unlike the reasonably correct observations on osteology. The knowledge gained from dissection was acknowledged to be imperfect because Sushruta enjoined its supplementation by observations made during surgery. Both Charka and Sushruta devoted entire sections to anatomy, which included embryology.

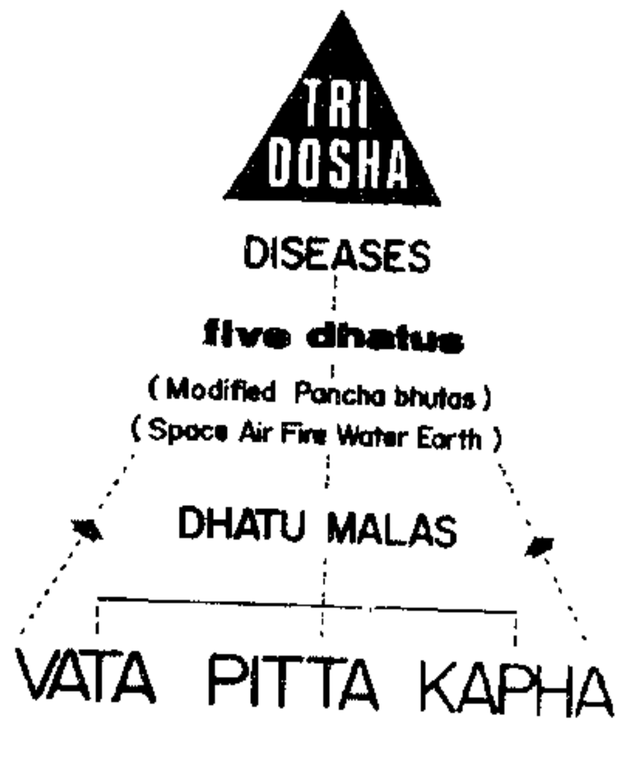
What was the ancient embryology like? The embryo results from fertilization to which both male and female members contribute seed and into which the soul enters through the vehicle of the mind. Just as gold or copper assumes the form of any mould in which it is poured, causal elements enter the human mould to take birth in human shape. A jelly-like structure in the first month, the human foetus becomes hard in the second month, and shows five prominences and the rudiments of limbs in the third[9]. In the fourth month limb differentiation is more advanced, the heart appears and offers itself as the seat of consciousness, which becomes more alert in the fifth month. In the sixth month intelligence begins

to develop, and the seventh is marked by completion of limb development. Parturition takes place as a rule in the ninth or tenth month. While this sequence generally accords with the descriptions of Charaka and Sushruta, there were other views on organogenesis and the rate of differentiation, indicating the lively nature of the debate on embryology. In fact, much of *Garbha Upanishad*, of unknown authorship, deals with embryology. Sushruta comments, 'Just as the juicy parts and the stone, which are undifferentiated in green mango in its early stages, are found clearly developed and differentiated when it is ripe so, when the human foetus is uniform in the early stages of development, all its undifferentiated parts are already developing there *pari passu*, though on account of the fineness of their structure and growth they cannot be distinguished'[10]. According to Indian anatomists, the growth of the embryo took place by a process of stratification in which several layers were superimposed one upon another. Apart from seven layers of the skin, there were also seven other layers which separated organs and tissues, all derived from the *dhatus*. The derivations, often fanciful, were given in considerable detail.

In anatomy, osteology excelled, thanks to the dissection of cadavers. The osteology of Charaka and Sushruta differs in important respects from current knowledge. Sushruta begins by saying, 'The professors in general speak of 360 bones; but books on surgical sciences know only 300!'[11] Sushruta, in common with other Indian anatomists, divided the body into six parts – the four extremities, the head and neck, and the trunk. Whereas the number of bones as known today is 200, Sushruta's total was 300 because he included teeth, nails and cartilages in the count and regarded processes or protuberances as separate bones (see table). Another cause for inaccuracy was the counting of aggregate structures such as carpus and tarsus as single bones. In the four extremities the present day total of bones is 120, against 106 of Sushruta; in the trunk the figures are 50 and 128, the difference being accounted for by the Indian practice of counting costal cartilages, tubercles and transverse processes of vertebrae which articulated with ribs as parts of ribs. Similarly the bones in the head and neck total 30 whereas Sushruta's figure is 66 because he included trachea and bronchi, teeth and dental sockets in his count. Apart from enumeration, Sushruta also classified bones into five types—flat, sharp, tender, circular and seed-shaped. He fully realized the role of the skeletal system and commented: 'As trees are supported by the hard core inside their trunks, so the body is supported by the firm bones. Muscles are attached strongly to the bones by means of ligaments and are thus kept in position and do not fall off.'[12] Sushruta possessed accurate knowledge of joints, which he totalled as 210, and provided their numerical distribution in the extremities, trunk, head and neck. He classified joints as movable and immovable and subdivided them into hinge (*kora*), ball-and-socket (*ulukhala*), and so on.

Sushruta's description of muscles was less accurate than that of bones even though his total of 513 for the body is amazingly close to the modern figure of 500. He recognized ligaments (*snayus*) and their function: 'As a boat of wooden planks, well tied by many knots, can bear the weight of animals and goods in water, so a man can carry weight as his joints are knotted together by the snayus'[13]. Occasionally he confused nerve trunks with ligaments.

In the field of cardiovascular anatomy, Sushruta could build upon many references to the heart and blood vessels from earlier texts, including the *Atharva Veda* and *Upanishads*. He described the heart as having the shape of a lotus bud, hanging with its apex downward and serving as the primary seat of *rasa*, which runs through the whole body. He described four kinds of ducts, even though their origins were left vague. It is difficult to know the exact meaning of statements such as 'the ducts emanating from the cavity of heart, other than the *siras* and *dhamanis*, and found to course through the body



The *tridosha* doctrine

are called *srotas*'[14]. He definitely referred to 24 *dhamanis* arising from the heart and their carrying vital principles of the body. The words *siras*, *dhamanis* and *srotas* and mention of the transport of *pitta*, *kapha* and *rakta* through channels abound in Sushruta's angiology, and one tends to agree with Seal that 'the standing puzzle of Indian anatomy and physiology is the classification of *siras*, *dhamanis* and *srotas*, the channels, passages and ducts in the body, including the arteries, veins, nerves and lymphatic vessels'[15]. Kutumbiah concluded that the differentiation of the arterial and venous systems was not achieved and that nerves too were included in the category of *siras* and *dhamanis* by ancient Indians[16].

It is curious that the brain does not find a major place in the ancient medical literature of India. Sushruta does refer to a nerve on either side of the larynx, damage to which produces hoarseness of the voice; he does also mention olfactory and optic nerves.

Table
Summary of Sushruta's osteology

Part	Sushruta	Modern	Remarks
Head and neck	66	30	Included teeth, trachea
Trunk	128	50	Included costal cartilage transprocess and tubercles as bones
Four extremities	106	120	Carpus and tarsus regarded single bones
Total	300	200	

Since the ancient authorities regarded the heart as the seat of consciousness, they included nerves in the cardiovascular system and apparently relegated the brain to a position of secondary importance. Among the internal organs, the lungs, stomach and intestines were noted and the intestine was divided into small and large intestine. Rectum, urinary bladder and anus were accurately described. While the source of urine was indicated to be channels too fine for the eye, the ureters were noted to fill the bladder constantly with the waste products of the body. Uterus and vagina were described correctly.

The taboos on the dissection of fresh cadavers and the imperfect technique of dissecting cadavers handicapped anatomical studies in those days. They were compensated only in part by surgical observations. The need for surgical exposure obliged the surgeon to learn regional anatomy in the form of *marmas*, which advanced anatomical knowledge as well as surgical technique. In summary, systematic anatomy did not attain the accuracy and depth of regional anatomy in ancient India.

Turning to the doctrine of *tridosha*, its enormous influence on Indian medicine is matched only by its conceptual difficulties and bewildering interpretations. Its origin can be traced to the *Rig Veda*, which contains a reference to *tri-dhatu*[17] and seminal concepts such as that of the body being composed of elementary ingredients called *bhutas*. From Vedic times, matter was regarded as the combination of five elementary parts or *bhutas*, namely space, air, fire, water and earth. Ancient Indian medical authorities believed that the body is a community of the variants of the five elements, which were in turn called *dhatus*. When the *dhatus* hold together and remain in equilibrium, the state is called *dhatu samya*, which is equivalent to health. When their normal measure is disturbed and they are in disequilibrium, the result is *dhatu vaishamya*, or ill health. The *dhatus* are formed from ingested food, the unassimilated fraction of which is excreted. Besides the fraction from food, what is excreted also includes refuse generated by *dhatus* during their physiological operations (*dhatumalas*). The *tridosha* doctrine holds that of all waste products, *vata*, *pitta* and *kapha* are responsible for ailments and that causes (*nidanas*) can disturb the *dhatus* and produce disease only through the disturbance of *vata*, *pitta* and *kapha*. Because they vitiate the *dhatus*, *vata*, *pitta* and *kapha* are called *doshas* and the *dhatus* that undergo vitiation are known as *dushyas*. There is no unanimity among Charaka, Sushruta and Vagbhata on the pathophysiologic status of *vata*, *pitta* and *kapha* or their pathogenetic mechanisms. In the anxiety to integrate the human microcosm with the universal macrocosm, *vata*, *pitta* and *kapha* were even identified with sun, moon and air from time to time.

The *tridosha* doctrine evolved over many centuries and provided a scientific framework for ancient medical thought in India. At the philosophical level, it sought to identify bodily elements with the elements of the universe; at the practical level, it provided a rationale for classifying diseases on the basis of the disturbances of *doshas*. The doctrine provided a physiopathologic matrix wherein health and disease were assigned their proper roles by ancient Indians.

1. *Atharva Veda*, VII, 8.3.
2. *Atharva Veda*, II, 9.3.
3. *Atharva Veda*, X, 2.
4. Dasgupta, S.N., *History of Indian Philosophy*, Vol. III, p. 300.
5. *Chandogya Upanishad*, VII, 1.2.
6. Kutumbiah, P., *Ancient Indian Medicine*, Orient Longman, 1962, pp. xxxi xxxv.
7. *Charaka Samhita*, III, 8.
8. *Sushruta Samhita*, III, 5.49.
9. *Sushruta Samhita*, III, 14.15.18.
10. *Sushruta Samhita*, III, 3.18.
11. *Sushruta Samhita*, II, 5. 17--20.
12. *Sushruta Samhita*, III. 5. 21--22.
13. *Sushruta Samhita*, III, 5.36.
14. *Sushruta Samhita*, III, 9.13.
15. Seal, B.N., *Positive Sciences of Ancient Hindus*, Motilal Banarsidas, 1915, p. 208.
16. Kutumbiah, P., *Ancient Indian Medicine*, Orient Longman, 1962, p. 29.
17. *Rig Veda*, 34: 6.

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