

# Science as service

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I am twice honoured to be called upon to give the Gandhi Memorial lecture in the Raman Research Institute and hasten to extend my cordial thanks to the Raman Trust for according me this singular distinction. So much has been written on Gandhiji that one can hardly say anything new about him. More than anyone else, he was responsible for waking up the Indian nation and breaking its chains of thralldom. Yet he declared: 'I have no desire for the perishable kingdom of earth. I am striving for the kingdom of heaven, which is spiritual deliverance. For me, the road to salvation lies through incessant toil in the service of my country and of humanity. I want to identify myself with everything that lives. In the language of the Gita, I want to live at peace with both friend and foe'. What characterized Gandhiji's spirituality was not retreat from the world but intense concern for the human condition. In powerful words he declared: 'I recognize no God except the God that is to be found in the hearts of the dumb millions. They do not recognize His presence: I do. And I worship the God that is Truth, or Truth which is God, through the service of these millions<sup>1</sup>'. Service to humanity had no greater exponent, and no more glorious embodiment, than Gandhiji.

Raman, on the other hand, was one of the chief glories of science. To quote him: 'The painter, the sculptor, the architect and the poet, each in his own way, derives his inspiration from Nature and seeks to represent her through his chosen medium, be it paint, or marble, or stone or just well chosen words strung together like pearls on a necklace. The man of science is just a student of Nature and equally derives his inspiration from her. He builds or paints pictures of her in his mind, through the intangible medium of his thoughts. He seeks to resolve her infinite complexities into a few simple principles or elements of action which he calls the laws of Nature. In doing this, the man of science, like the exponents of other forms of art, subjects himself to a rigorous discipline, the rules of which he calls logic. The pictures of Nature which science paints for us have to obey these rules, in other words have to be self-consistent. Intellectual beauty is indeed the highest kind of beauty. Science, in other words, is a fusion of man's aesthetic and intellectual functions devoted to the representation of Nature. It is therefore the highest form of creative art<sup>2</sup>'. Was there anything

in common between these two extraordinary men? Beneath the veneer, they indeed shared much. Like Raman, Gandhiji too was a creative artist who used life, not art, as his medium. A unitary source of inspiration drew them away from the world of the senses to the world of the intellect and the eternal. Raman canalised creative urge into scientific endeavour while Gandhiji turned it into disinterested action. Raman sought to restore self-esteem to Indian science while Gandhiji strove to set the Indian mind free from fear. And both were let down ultimately by their countrymen.

The gap between Raman and Gandhiji is no more real than the apparent conflict between Science and Service. Science and service are not mutually exclusive, polemics notwithstanding. Their complementarity was emphasized even by the Royal Society who sought to promote 'by the authority of experiments the sciences of natural things and of useful arts, to the glory of God the creator and the advantage of the human race'. Gandhiji's charka, the bullock cart and bicycle are no more than a few of the numerous applications of science and technology in the service of the work-a-day world. But, of all the sciences that have a claim to service, medicine has pre-eminence because it relieves human suffering as no other endeavour does. Suffering being the fundamental note of the human condition, by nothing is medicine as glorious as by its quality of compassion and its capacity to wipe the tears of pain and illness. This was indeed the theme of Gandhiji whose wish to wipe the tears on every face continues to haunt us.

If medicine is the symbol of science as service, there was no greater exemplar of it than Charaka in the Indian tradition. He preached and practised Ayurveda or the science of life 'to maintain the health of the healthy and to cure the diseases of the sick<sup>3</sup>' at a time when India witnessed a joyous celebration of the human spirit in its long history. Neither the text of *Charaka Samhita* nor any external evidence gives us a clue as to the date of Charaka. The description of Vedic gods and rituals, absence of any reference to the Buddha, mention of places like Panchala and the record of debates in the grand Upanishadic style would suggest that he lived before the Buddha. The name Charaka is associated with Vedic and post-Vedic personages and it could have been a personal name or the name of a clan. The author of *Charaka Samhita* chose personal obscurity in keeping with the ancient Indian tradition and claimed that he was only recording the proceedings in Acharya Atreya's ashram where his own Guru Agnivesa was a disciple. In the process of self-abnegation,

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he immortalized himself. As the name implies, Charaka moved from place to place preaching the science and art of medicine and denied himself a fixed abode. His *Samhita* was translated into Arabic in the 8th century and became the source of medical knowledge for Alberuni. As 'Sharaka Indianus', he also appeared in the Latin translations of Avicenna and Razes. Never was a peripatetic teacher of medicine honoured more at home or abroad.

### Roots of compassion

The roots of Ayurveda run deep in the soil of compassion. To dramatize this origin, Charaka opens his work with the vivid description of a congress of sages in a Himalayan Valley. They recognized that good health was essential for performing virtuous acts, for the acquisition of wealth and even for attaining Moksha. But as the destroyers of health, diseases constituted a great obstacle to the attainment of the central objectives of life. According to Charaka: 'a cart with normal qualities and carriage comes to the stage of destruction only after the expiry of a specified period: that very cart, if overloaded, is broken even before the expiry of the specified period. So the life of a person with undefined span of life is destroyed even before the attainment of the normal span of life due to his own misdeeds<sup>4</sup>'. The congress of sages deputed Bharadwaja to Indra to obtain the knowledge of Ayurveda and the sage's appeal for knowledge ran as follows: 'Diseases terrifying to all creatures have manifested themselves; advise me on their remedial measures, O Lord<sup>5</sup>!'. Bharadwaja passed on the knowledge thus obtained to Atreya and he 'friendly to all and having compassion for all creatures' expounded the sacred science of life to his six disciples. When the knowledge was finally codified as *Samhitas* by disciples like Agnivesa and Bhela, the Gods rejoiced and declared that 'splendid is this sympathy for living creatures'. In dealing elaborately with the many types of knowledge and qualities required of good physicians, Charaka said elsewhere that 'they nurture affection exactly like the mother, father, brothers and kin towards all creatures. Physicians having such qualities give life to patients and cure their diseases<sup>6</sup>'. The theme of compassion permeates Charaka's system of medicine.

### Unchanging background

In considering what Charaka wrote twentyfive centuries ago, we should learn to distinguish the principles from the practice of his system of medicine. While principles change little if at all, the methods of practice change continually. While principles remain universal, methods are subject to the changing demands of space and time. This is as true today as when Charaka lived. The concept of the constancy of the internal environment of the

body which Claude Bernard advanced in the 19th century continues to remain valid; but the diagnosis and treatment of diseases have changed beyond recognition since that time. One's view of the material basis of life, philosophy of existence, the approach to knowledge and such other things have a quality of permanence which a method for diagnosis, classification or therapy will clearly lack. To miss this distinction in studying *Charaka Samhita* is to miss the woods not only for the trees but also for their countless leaves. Nor should one ignore the mischief of well meaning interpolators who lacked Charaka's genius, but who edited the *Samhita* nevertheless over many centuries.

### Material basis of life

For Charaka, the mind, soul and body are a tripod which sustains the world and constitutes its substratum. Sentient, the combination is the subject matter of Ayurveda. Body is formed of five elements (Prithvi, Ap, Agni, Vayu and Akasa) which are insentient on their own, sentience manifesting only with the entry of the soul. This definition applies to the vegetable kingdom as well. The five elements of the body have Gunas or attributes which are of three kinds. Some are distinctive of each element. For example smell, taste, vision, touch and sound are characteristic of Prithvi, Ap, Agni, Vayu and Akasa whereas heaviness, lightness, coldness, heat, etc. are common to all elements. The third category of Gunas consists of intellect, consciousness, and ego and their operations such as desire, happiness, combination, division, measurement and transformation, which relate to the soul. The elements and their respective attributes are inseparable and eternal even as the relationship is between the whole and its parts<sup>7</sup>. This inherent relationship is termed *Samavaya* by Charaka. According to him, Karma or action is present in matter and is responsible for the phenomena of combination and separation. And action relates to something to be achieved as, for example, the action of drugs. Charaka postulated two other categories, *Samanya* and *Visesha* which correspond roughly to the generic and the specific<sup>8</sup>. All cows, for example, are covered by *Samanya* but each cow, in so far as it differs from another, also has *Visesha*. One might say that *Samanya* augments and unites whereas *Visesha* diminishes and separates. While Charaka adopts the *Vaiseshika* doctrine in his analysis of the material basis of life, he is ready to take an independent line, as for example, in his interpretation of *Visesha*. In order to develop a philosophical basis for medical treatment, he accepted whatever was essential from the *Nyaya-Vaiseshika* system, but developed a view of his own.

How are matter, quality, action, generic and specific categories concerned with the science of life? The answer is that their equilibrium or *Dhatusamya* is the

basis of good health and its maintenance or recovery is the sole business of Ayurveda. Charaka clearly says that any disturbance in the equilibrium or Dhatusamya is disease and the state of equilibrium is health<sup>9</sup>. Body and mind are the stage for the interplay of disease and health, misery and happiness. Eternal and free from duality, the soul imparts consciousness to the body and remains a witness to the drama of bodily phenomena.

The Vasiseshika classification of the five elements, Gunas, Karma, Samanya, etc. which Charaka modified serves another purpose. The pathogenic factors in the body being Tridosha or Vayu, Pitta and Kapha, their perturbation singly or in combination can cause innumerable diseases. Ayurvedic treatment is based on the concept that diseases are cured by drugs of opposite qualities. As drugs of plant or animal origin share the elemental compositions and attributes of the body, an understanding of the common elements and their attributes is indispensable for choosing drugs which can counteract the disturbed equilibrium of Tridoshas. Charaka recognized no strangers in the universe and no gap between the living and the non-living.

In looking at Charaka's analysis through the mist of centuries, we should refrain from attempting forced interpretations to fit his views into the framework of modern medical theories. We could do no greater injustice to him. Vayu, Pitta and Kapha, for example, constitute the Tridosha concept which casts its mantle on every aspect of Ayurveda. We should however commit a serious error if we were to translate them as air, bile and phlegm and analyse Charaka's Tridosha concept through the instrument of modern physiology. Charaka should be read without torturing words and the test applied should be whether his approach fits in with the facts of clinical experience.

#### *Attitude to life*

Charaka took life in its fullness and found no conflict between the active and contemplative faculties of the mind. He had no use for disillusionment or frustration with life; nor was he oppressed by the thought of death and decay. Joyous and radiant in spirit, Charaka had serene faith in a Divine Being who governed the eternal order of the Universe. He invested the day-to-day rituals in medicine with holiness, and living itself, for him, became a grand ritual. He wrote in a simple, direct style and took little trouble with metaphors or rhetorical turns. He wrote because he had certain ideas to impart, certain directions to give and a message to convey. He opened his *Samhita* by plunging straight into a discussion on longevity with no pause for a customary verse of invocation. He recognized that a normal person seeks to live long, to earn and to perform religious acts. Of these desires, he gave priority to the desire for longevity because with the end of life there is an end of everything.

The desire for wealth is reasonable because nothing is so miserable as a long life without wealth. One could acquire wealth through farming, cattle breeding, trade and commerce and government service. The third desire is shrouded in doubt because no one is certain that one will have a life after death. A wise man should however give up doubts because the scope of our perception is limited whereas unlimited is the scope of things known through scriptural testimony, inference and reasoning. Charaka pointed out that even the sense faculties through which one can perceive objects are not the objects of direct perception. It is incorrect to claim that only things which can be directly perceived exist. There are things, which though existent, cannot be directly perceived due to over-proximity, over-distance, obstruction, weakness of the senses, diversion of mind, confusion with other similar objects, overshadowing and extreme minuteness<sup>10</sup>. He condemned nihilism as the worst sin and urged wise persons to see things properly with the lamp of wisdom offered by good men.

For healthy living, Charaka offered a long list of explicit directions<sup>11</sup>. He urged respect for gods, cows and preceptors, and the performance of Sandhya twice daily. Frequent cleaning of feet and excretory passages; hair cut, shave and paring of nails thrice a fortnight were recommended. One should be happy, should wear good clothes, apply scent, comb hair, protect people in affliction, honour guests, speak sweet words and have enormous enthusiasm in action but not in the results thereof. It was advisable to wear a turban, use an umbrella, carry a stick and wear shoes while walking. One should be fearless, merciful to the poor and tolerant of unpalatable words spoken by others. One had to conquer the very roots of attachment and hatred.

In Charaka's vision, a code of ethical conduct was inseparable from healthy living and the practice of medicine. He forbade lying, longing for other's wives or property and the disclosure of secrets or defects confided to oneself. On the mundane level, he had plenty to say. He abhorred yawning, sneezing or laughing without covering the mouth; releasing wind with a sound; easing on the road side; itching the nostrils; transgressing the shadow of a sacred tree or teacher; entering a solitary house or forest alone and having relations with women of bad conduct. Among his detailed advice on sexual relations, he specifically forbade sexual activity in any except the genital organ. His instructions covered every imaginable kind of activity in the daily lives of men and women.

For all his strict directions, Charaka cautioned that one should not inflict too much burden over the intellect or senses and that one should not be too meticulous at all times<sup>12</sup>. By observing his code one earned the praise of the good, earned fame, attained virtue and wealth and became a friend of all creatures. He was, however,

liberal enough to concede that to perform an act unknown to his code, but prescribed elsewhere as virtuous, would also be acceptable.

The very term for the body in Sanskrit *Sarira* indicates gradual decay. Therefore Charaka called upon wise persons to be vigilant regarding the duties towards their bodies like an officer-in-charge of a city and a charioteer would be towards the city and the chariot<sup>13</sup>. Not for him was the denigration of the human body which crept into Indian tradition later.

### *Theme of harmony*

The concept of universal harmony runs like an undercurrent through the *Charaka Samhita*. The great Master had watered his heart with the dew of heaven and found that the 'Sovereign artist had left nothing disorderly in His whole creation'. In the final analysis, the universe and the human body are one in their fundamental constituents of five elements (Panchabhutas), and whatever affects one must perturb the other, howsoever small the perturbation may be<sup>14</sup>. In this sense, the human body is a cosmic resonator. A breakdown in human Dhatusamya disturbs cosmic harmony and the restoration of Dhatusamya reinstates it. This concept underlies Charaka's attempt to make diet, conduct and treatment responsive to climate, geography and other cosmic factors. He devoted a whole chapter on dietetics to deal with diets and regimen for different seasons which were described in detail. He would point out that not only the sun with his rays, but also winds with their 'sharp velocity and dryness' would absorb moisture from the earth in late winter, spring and summer and cause bodily weakness besides the enhancement of 'bitter, astringent and pungent tastes'. In the rainy season, the sun would move south, earth would be relieved of heat, drugs having sour, salty and sweet tastes would become more potent and human beings would gain in strength. It is hard to think of a system where a greater or more elaborate effort was made to harmonize dietetics and human conduct with the elements<sup>15</sup>. Charaka advised the habitual use of such diets and regimen which have the opposite qualities of the habitats of individuals and their diseases. The pervasive role of the theme of harmony appears again in Charaka's instructions on the utilization and wrong utilization of the sense organs and the mind<sup>16</sup>. Harmony at all levels dominated Charaka's teachings.

### **Training of disciples**

Charaka insisted that an ideal preceptor was well grounded in scriptures, was equipped with practical knowledge and had the necessary equipment for treatment. He had to be hardworking, understanding of human nature and

affectionate towards disciples. A student had to approach such a preceptor and respect him like god, king and father in obtaining knowledge of the chosen medical text. To be admitted, a disciple had to have no less than twentyfive qualities of the body and mind<sup>17</sup>. Initiation of the disciple was a sacred ritual, complete with sacrificial fire, oblations and the chanting of Vedic mantras. Following the ceremony, the preceptor would administer an elaborate oath to the disciple in the presence of witnesses. The oath covered his relationship with the preceptor, with patients and with women, and his conduct in all circumstances. The oath bears testimony to the high level of medical ethics which Charaka demanded. He acknowledged that the science of life is vast and that one was obliged to make constant efforts to keep in touch with the science and to treat the whole world as a teacher<sup>18</sup>.

For teaching, Charaka enjoined medical men to hold discussions or Sambhasa with colleagues because discussions increased the zeal for knowledge, clarified knowledge, increased the power of speech and strengthened convictions. In the course of discussions many new things could be learnt even from opponents. Consider, for example, the discussion on the question whether diseases originate from the same source as man<sup>19</sup>. The question was raised by Vamaka, the king of Kasi, and Acharya Atreya invited the attending physicians to respond. Pariksi claimed that living beings originated from the soul and so did their diseases; Saraloman refuted that view because soul which is immune from miseries cannot by itself bring about diseases or miseries: it is the mind covered with Rajas and Thamas which causes the body and the diseases. Varyovida contradicted Saraloman and claimed that living beings and diseases are in fact caused by Rasa or the product of digestion. As water abounds in Rasa, it is the ultimate cause of living beings as well as their diseases. So the debate ran, with no less than six other disciples expressing dissenting opinions on the vital question. Finally Acharya Atreya intervened by pointing out that one could not arrive at truth by identifying with its parts. It was necessary to get rid of argumentation and try to pursue the whole truth. He went on to answer the question by stating that the same factors which bring forth living beings in the wholesome state cause diseases in their unwholesome state. In response to questioning, he illustrated wholesomeness and unwholesomeness by an elaborate exposition of the example of food.

The example I have given is by no means isolated, it illustrates the vigour and interest of the debates which Charaka advocated. They bring to mind the Upanishadic model of serious discussions. As Kutumbiah commented, 'the entire *Charaka Samhita* seems to be based on discussions of learned physicians with Acharya Atreya in the chair'.

Diseases—diagnosis and treatment

Charaka laid great emphasis on correct diagnosis as the basis of rational treatment. He devoted no less than three Sthanas—Nidana, Vimana and Indriya—to discuss the subjects of diagnosis and prognosis. According to him 'The physician conversant with his science, reflecting, in all manner of ways, upon everything, as far as is possible, should then come to a conclusion about the diagnosis of the disease and the treatment that should be followed. The physician of knowledge who fails to enter the inner sanctum of the patient with the lamp of wisdom can never treat diseases<sup>20</sup>'. Much stress was laid on the examination of patients including interrogation on the onset of symptoms, place of residence, duration of illness and so on. Inspection, palpation and percussion were employed, even smell and taste being pressed in when necessary. The aim of the diagnostic exercise was to lay down the findings on the individual disease; origin of the disease; strength of the disease; sound, touch, smell, colour and taste pertaining to the disease; its usual state and attenuation; and the treatment to be followed and to be avoided. Diagnosis was based on causes (Nidana), premonitory signs (Purva Rupa), symptoms (Rupa), response to drugs and diet (Upasaya) and the full picture of the disease (Samprapti)<sup>21</sup>. No clear distinction was made between a cause and its effect in the diagnostic process.

The aim of treatment was to advise diet, medicines and a regimen of life to reestablish the balance of the



Jivaka, celebrated as Buddha's physician, performing a craniotomy.

आयुर्विद्ययापि यो नाचिन्ति वस्त्रयि ।  
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"The physician who fails to enter the inner sanctum of the patient with the lamp of knowledge and discrimination can never treat diseases."

disturbed dhatus and doshas. Since prevention is better than cure, Charaka prescribed detailed regulations with regard to food, deportment and daily practices in life. The regulations covered a long list of subjects such as ablutions and evacuation, dental care, meals, exercise, sexual intercourse and the prophylactic use of emetics and laxatives. There was no sharp line of demarcation between drugs and food items in the management of health and disease.

For successful treatment, four ingredients were regarded indispensable. These were the physician, medicament, attendant and the patient, each possessing requisite qualities<sup>22</sup>. He recommended that treatment should start early before disease struck roots. He assessed the seriousness of an ailment on the basis of its location and whether it involved the externals, the vital organs or inner core in the increasing order of importance. Once the diagnosis was made, treatment was instituted with diet, medications and conduct, each possessed of qualities opposite to the cause and to the disease. His therapeutic measures apart from drugs, comprised of six processes known by the picturesque terms—Langhana, Brimhana, Rukhana, Snehana, Swedana and Sthambhana. Roughly they stood for reduction, building up, drying, oiling, induced sweating and binding of the bowels. They covered the use of emetics, errhines to promote nasal secretion, enemas, oily enemas, purgatives and venesection. Oils were used extensively and Charaka described twenty different ways of their use in therapy. A frequently employed method was to induce sweating which was recommended for several conditions including asthma. Even though Charaka recognized the role of surgical procedures such as incision, excision, etc. he did not deal with them in detail like Sushruta. He gave directions on the construction and organization of hospitals for inpatients<sup>23</sup>.

Besides therapeutic procedures, *Charaka Samhita* contains a vast section on Materia Medica which harks back to the medicinal plants of Atharva Veda and links the taste of drugs with their effect on Tridoshas. Those with sweet, sour and saline taste alleviated Vayu; those with astringent, sweet and bitter tastes alleviated Pitta and those having astringent, pungent and bitter taste palliated Kapha<sup>24</sup>. Another method of classification was to divide drugs on the basis of their origin from vegetables, animals and minerals. Honey, bile, fat, marrow, blood, cow dung, urine, horns and other items of animal origin, vegetable products from trees, flowering plants and creepers, and metals such as gold, silver, copper, lead, tin and iron contributed to Charaka's medical formulary. Wines and meats of various kinds were prescribed liberally. There was no mention of opium or mercury. Charaka divided medicines into 50 classes according to their supposed action on different organs or on particular symptoms of diseases. Besides these

drugs, he also described two other classes of medicines called Rasayana and Vajikarana for rejuvenation. Great and even extraordinary results were claimed for the medicines. In fact, Charaka believed that there was nothing in the world which did not have therapeutic utility in appropriate conditions<sup>25</sup>. However, a great deal depended on faith based on ancient usage dating back to Vedic times. The physician was required to possess a detailed knowledge of the drug and its mode of action. A drug not known was like a poison while the one known was nectar. A drug known, but improperly administered, also was disastrous<sup>26</sup>.

## Conclusion

Does Charaka who lived in the late Vedic age relate to the present? The answer is obvious because the practice of the science of life, Ayurveda, which serves millions is based on what he wrote. In the centuries that followed, concepts and methods did transcend, but not abrogate, Charaka. In denying himself a fixed abode; Charaka made the whole world his hermitage. His heritage of compassion, holistic view of life and the never-ending quest for knowledge is a waxing crescent which shines in the long night when the kinship of all life and the faith that the unknown is greater than the known are lost in a spell of pettiness and greed.

Charaka inspires us for another reason. In two centuries of European medicine on its soil, India failed to make a single contribution which turned the course of global medicine. For those who despair over this prolonged barrenness, Charaka is a reminder of the grandeur of the Indian medical mind which could germinate and flower again in the right climate. Might not Charaka, so venerated over centuries, tell us 'You once thought me divine; you said I was infallible; you read into me a super-intelligence; you put the words you desired in my mouth: you forgot my lesson that the science of life knows no frontiers and demands ceaseless striving. Now that other nations have undeceived you on your heritage, you seem to take ill that where you used to

say that I had super-intelligence, I have none: where you used to find remedies for all occasions you now find none'.

And he might continue 'For you, it will do to remember, having got your share of inheritance, that you are on new ground. You are up against odds. Remember too that things will not stay where they are. Movement is the law of 'life.'

'You are my children. Do not expect miracles of me. I can supply none. But I have left you a heritage which contains all that is precious in life. It is for you to enhance that heritage. In seeking to know me, you see but the tool of a Hand too large for your eyes. May your sight grow.'

I believe that Gandhiji and Raman might not disagree with Charaka.

1. *Harijan*, March 11, 1939.
2. Quoted in *Journey into Light* (ed. Venkataraman, G) Indian Academy of Sciences, Bangalore, 1988, pp 493-494
3. *Charaka Samhita* (eds. Sharma R. K. and Dash, B), Chowkhamba Sanskrit Series, Varanasi, Vol. I-III, 1992, Sutra Sthana 30:26.
4. " Vimana " 3:38
5. " Sutra " 1:22.
6. " " " 29:7.
7. " " " 1:50.
8. " " " 1:45.
9. " " " 9:9.
10. " " " 3:8.
11. " " " 8:18
12. " " " 8:26
13. " " " 5:103.
14. " Sartra " 4:13.
15. " Sutra " 6:6-8
16. " " " 8:17.
17. " Vimana " 8:8.
18. " " " 8:14.
19. " Sutra " 25:5-29.
20. " Vimana " 4:9-12.
21. " Nidana " 1:3-11.
22. " Sutra " 9:5
23. " " " 15:6-7.
24. " " " 1:66.
25. " " " 26:12.
26. " " " 1:124-125.

