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On

Hygiene in Ancient India.

BY

SURGEON-GENERAL C. A. GORDON, C.B.

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AN inquiry having reference to *Hygiene* in ancient India is at the present time of considerable interest. Such an investigation, however, is attended by not a little difficulty, and, in the absence of other particulars regarding it, must be prosecuted rather in the pages of historians and poets than in those of regular medical treatises. In the following remarks I accordingly desire to collect such observations bearing upon the subject as have come under my notice,* they being arranged for the sake of greater convenience into those that bear upon General Hygiene and those that more properly belong to Army Hygiene.

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* The following are the works to which I am chiefly indebted for information, namely:—1, Ancient India as described by Megasthenes and Arrian, by J. W. McCrindle, A.M.; 2, History of India, by J. Talboys Wheeler; 3, The Indian Antiquary; 4, Hindu System of Medicine, by T. A. Wise, M.D.; 5, Ancient and Mediæval India, by Mrs. Manning; 6, Calcutta Review, No. 83 of 1865; 7, Asiatic Researches; 8, Colebrook's Essays; 9, Professor Wilson's Works; 10, Travels of Buddhist Pilgrims, S. Beale; 11, Legend of the Burmese Buddha, Bishop Bigandet.

NOTE.—This paper does not pretend to contain more than an imperfect sketch of the subject of which it treats; it may, however, form a groundwork for further investigations regarding the different points alluded to in it.

I. GENERAL HYGIENE.

1. *Historical Allusions to Hygiene.*—That the preservation of public health—in other words *Hygiene*—was in the very earliest periods of India's history considered in relation to general polity is apparent from the frequent allusions to it contained in "The Institutes of Manu;" nor is the circumstance less evident from the tenor of those institutes, that the state of society to which they refer was in many respects advanced and refined. Here, for example, is an enumeration of subjects touched upon by that great law-giver, namely, 1, On the Creation; 2, On Education, or on the "First Order;" 3, On Marriage, or on the "Second Order;" 4, On Economies and Private Morals; 5, On Diet, Purification, and Women; 6, On Devotion, or on the "Third and Fourth Orders;" 7, On Government and on the Military Classes; 8, On Judicature and on Law, Private and Criminal; 9, On the Commercial and Servile Classes; 10, On the Mixed Classes and on Times of Distress; 11, On Penance and Expiation; 12, On Transmigration and Final Beatitude. The Ayur Veda, propounding the science of health, contains various allusions to subjects more properly within the province of Preventive Medicine—*Pathyāpathya*, that is *Hygiene*, including the care and diet suitable for children,—the universal *panacea* that would render health permanent and perpetual, and *prevent*, as well as cure, diseases,—besides various distinct precepts for the preservation of health. Similarly, the Atreya includes preventive as well as curative medicine, although several of the subjects therein described under the first-named category have long since ceased to be looked upon as within the province of hygiene.

In that ancient work there are chapters on the classification of diseases; the physical influence of soil and season; on age and temper, and on the influence of the winds—in other words on medical geography and climatology, the qualities

of different kinds of *water* as that of the Ganges "which comes from heaven," sea-water, rain-water and that from snow and ice; the qualities and medicinal properties of *milk*, as that of kine, goats, ewes, buffaloes, camels, and lastly of women; also remarks on butter-milk; on sugar-cane; on sour gruel; infusions of rice, barley, and other grains; oils, different kinds of grain; fruits; on the four kinds of spirituous liquors as made from molasses, honey, mead, and a plant (Bassia?); on the medical properties of different kinds of flesh, as of hoofed and horned animals, beasts of prey, birds, fishes, serpents, whether of the water or of arid districts; and on the *moral* causes of disease.

The exact dates of the Ayur Veda and Manu's Law Code are not known, but we may pretty safely fix them a few centuries before our era.

2. *General Condition of the People.*—Several particulars with regard to the general condition of the people of India during the Vedic period are to be gathered from the descriptions of early life contained in the story of the greatest Indian Epic, the Mahabharata. Then, as at the present day, the majority of the countrypeople lived in *huts*, for, as is still the case, the nature of the climate required the greatest simplicity with regard to accommodation, and also as to clothing; they smeared the mud-floors and walls with cow-dung by way of cleansing them; they sprinkled water upon the floor and passages before sweeping; they decorated their dwellings with flowers, and, in times of rejoicing, assembled under canopies made gay with streamers and decorated with flowers. As population increased new settlements were formed, the jungle being for this purpose cleared by means of fire and axe, and huts or villages erected in the newly-opened-up space. Their sacrifices to their gods consisted of the choicest articles of their food, including flesh-meat and simple cakes, parched grain, ghee or clarified

butter, curds, and the *Soma wine* or *Indra's drink*, a wine or rather spirit prepared from the fermented acid juice of an *Asclepias*, namely, the *Asclepias acida*, *Sarcostemma viminalis*, or *Cynanchum viminale*. This drink was indulged in to great excess on occasions of Bacchanalian festivals, dating, it is said, from about B.C. 1400. Upon this beverage the Pandavas are described as indulging to an extent that was abominable, having at the same time promiscuous intercourse without regard to relationship, eating flesh extensively, and, in this drunken and debauched condition, dancing together in a medley.

Among them the art of cookery was held in high esteem; the office of cook was a position of honor and trust; thus Bhima was appointed by Rajah Virata head cook as a mark of distinction. There were regular *washermen* as a separate class, and particular allusion to them occurs in the time of Krishna. As to arrangements of *conservancy* in establishments, so far as can now be gathered, the fields and forests served all such purposes. That the value of pure water was fully appreciated appears from the circumstance that among the most esteemed works of charity was the excavation of wells; another the erection of rest-houses for travellers. Among the most expressive marks of hospitality was the bringing of water to wash the feet of the dusty way-farer. It is satisfactory to learn also that in those times long gone by the *duration of human life* was estimated as one hundred years; nor have we much improved on that standard during the three thousand years more or less that have elapsed in the interval. The circumstance of a person being attacked by *disease* was looked upon as so far a disgrace that illness was inflicted by the gods as a punishment for sin committed. Hence Brahmins who feared its approach would burn themselves alive rather than undergo its sufferings; others, more submissive held festivals on making a recovery.

Of the early Aryan invaders it is said that they were much given to indulgence in wine, women, animal food, and high play; in all of which respects their habits were not so very dissimilar after all from some of the more modern occupants of India. Horse-flesh was by them largely consumed, it having been looked upon as having stimulant qualities. Rama and Sita, while wandering together in the jungle, are said to have lived chiefly upon venison dried in the sun, as is the custom at the present day with the American Indians. Animals were sacrificed to the gods, their flesh then eaten; instead of these animals, after a time oblations of rice and milk were offered as sacred food, and as Brahminism became established vegetable food was substituted for animal. Indulgence in wine continued to be a prevalent vice; in other words the worship of Varuni (goddess of wine) was very general; sellers of intoxicating drinks, however, were looked upon as inferior, being classed among sellers of flesh, iron and poison. But although indulgence in strong drinks was thus general, the vice of drunkenness, like licentiousness, was deemed to be disgraceful. In aftertimes the Buddhist laws against drunkenness were held to extend also to the use of opium and other intoxicating drugs.

In Vedic times the warrior classes were polyandrous and polygamous according to circumstances, including no doubt convenience; the peaceful classes, however, observed monogamy. But in other instances, as in that of the Sakyas, marriages took place between brothers and sisters, as indeed is done at the present time in Upper or Native Burmah. This union was, and is, however, regarded with the utmost detestation by the Brahminical law. Suttee had not then come into use; a widow was directed to devote herself to works of charity, and under Manu's law to marry the brother of her deceased husband, "or any other man." According to Manu, marriages were prohibited within the sixth degree

of relationship; also with a person who was subject to consumption, indigestion, epilepsy, leprosy or elephantiasis, deformed, with one who had inflamed eyes, or who suffered from habitual sickness. In selecting a wife one should see, that her form is without defect, that she walks gracefully "like a young elephant;" that she has a moderate quantity of hair, teeth of moderate size, and an exquisitely soft body. Certain classes of persons were excluded from *Shraddhas* or funeral feasts, doubtless for hygienic reasons, although their precise nature does not now appear. Among the persons thus excluded were those afflicted with physical evils, such as leprosy, blindness, and elephantiasis; those guilty of certain kinds of immorality; sellers of meat, wine; gamblers, and *physicians;* the latter no doubt, because their profession led them among uncleanness of many kinds.

A very vivid picture of the condition of the people in the Buddhist period occurs in the work of Hiouen-Thsang. There was then no registration of families for taxation, no requisition for gratuitous labor; all who were employed on the construction of royal buildings or other public works were paid according to their labor; cultivators occupied the heritages of their fathers and paid to the king as taxes one-sixth of their produce; transit duties on merchandise were paid at ferries and barriers; the punishment of death for crimes was not inflicted, banishment "to the desert mountains" having been its substitute. At the proper time the agriculturists permitted the streams to overflow the land, by which the soil was rendered soft and fertile; provisions of all kinds, cereals and fruits, were very abundant, and in the evening "the sound of convent bells might be heard on every side, filling the air with their melody."

Numerous allusions to what we may term "Sanitary" conditions during the Brahminic period occur in the Ramayana. That great epic poem opens with a description of the

ancient city *Ayodhya* represented by the modern Fyzabad, and it was but an example of many as they then existed throughout India. The houses are there described as large and beautifully arranged; the streets always watered; the gardens pleasant, full of birds and flowers, and with many groves of fruit trees; the tanks of the city magnificent beyond all description and covered with white lotus (*Nymphea lotus alb.*); birds swam upon the surface, and a border of plantain trees surrounded each tank. Around the city were lofty walls, and outside them a moat filled with water, deep and impassable like that of Palibothra, no doubt a receptacle for the city sewage. Ayodhya was full of people; every one was healthy and happy; everybody was fed on rice, and, as recorded, well-fed; children were numerous, and "no man lived less than a thousand years," that is, no doubt, many attained a ripe old age. Men fixed their affection "upon their wives only,"—a very proper state of society indeed; women were chaste; no one was poor or fed on unclean things; in all Ayodhya there was not a man or woman who was unfortunate, or foolish, or wretched, or diseased. Those were surely the "good old times" of India, the "golden age" of society and of propriety. During the Vedic period regular roads did not exist; hence, on the occasion of the advance of an army or of a chief, communications of this kind had to be opened up for their passage. Even before the date of the Ramayana, however, large tracts of the country had been intersected by roads, along which pillars or mile-stones were erected to mark distances; inns for travellers had also been erected. A regular system of village communities existed,—their rights and privileges well defined, the affairs of each village conducted by officials appointed for the purpose. Among the works connected with each village, trees with creepers, chiefly convolvuli, were planted; lakes, wells, and streams were formed, partly for use by the people, partly

to serve as boundary-marks. The people paid their taxes in kind. As charitable works they constructed tanks, ghâts, and rest-houses for travellers, and feeding the poor and afflicted.

3. *Topography and Climate.*—Many allusions occur in the history of ancient Hindu medicine to the influence of locality and climate, as also the manners and customs of peoples, on disease, and to the consequent necessity on the part of an accomplished physician to study their influence on the spot,—in other words, to travel. *Charaka* thus writes on the subject of *climate* and *locality*: "The moist country *Anupa* is intersected by rivers; the air is cool; lilies and other water-flowers abound; geese, ducks, cranes, fish, and serpents are numerous." In such a situation the inhabitants are unhealthy and short-lived; "the juices of the body require to be *dried* by the use of hot, dry, and light food in small quantities so as to strengthen the internal fire." Such a locality would now be said to be swampy and malarious, the inhabitants affected with malarial cachexy.

The second kind of country described is the hilly or *jangala*, characterised by arid plains on which dwarf trees and prickly shrubs grow sparsely; the heat of the air is great and hot winds prevail. In such a country there is little water upon the surface, and wells have to be dug. The diseases of "air and bile," that is intestinal and hepatic, are most frequent, but the climate is healthy and the inhabitants are longlived. It is remarked that "when a person is born in a particular climate and has air, bile, and phlegm deranged," these affections will be aggravated if he go to a worse one, but, "if he journeys to another and better climate," the tendency to disease will be removed, showing clearly that the effect of *change of climate* was then understood and appreciated. It is further added that, when the above enumerated climates are found in the same country, the general climate of that country is described as *mixed*.

4. *Seasons.*—Numerous allusions occur to the influence of season on health and disease. Thus it is stated bile varies in different seasons: in July and August it is increased; in September and October it is liable to be diseased; in March and April it is diminished. Chyle is also said to be deranged by the seasons: in November and December it is increased; in March and April it is liable to be deranged; in May and June diminished. Six seasons were enumerated: *a. Cold months, i.e.*, January and February; warm clothing was then to be used; broths of flesh and fish-meat and substances mixed with ghee (clarified butter) to be taken; the wine called *Sídhu* to be used; also honey with water, milk, sweetmeats, fat, and new rice; warm water to be used; the head and body oiled; the person to sleep near the centre of the house removed from the wind. *b. Spring months*, March and April; bodily exercise; tepid water for every purpose; use barley and wheat, the flesh of deer, hares, wild fowls; drink *Sídhu* and *Mada* wine. *c. Hot months*, May and June; use cool foods and food prepared with ghee; drink sherbets; use broths of wild animals and birds; eat rice with milk and ghee; little wine is to be used, and always mixed with much water; do not take much exercise; sleep during the day in a cool room and at night in the upper rooms, and use the hand-punkah sprinkled with sandal wood and water. *d.* The *Rainy season*, July and August. Water is impure during this season; the use of river water is to be avoided, as also exposure to the climate or to the sun, and too much exercise; the wine of grapes and fresh water that has been boiled are to be drunk; anoint the body with fragrant oil; bathe daily; use light white clothes, and live in a dry and high house. *e.* The *Moist season*, September and October. The water is pure and may be used freely for bathing and drinking. The food produced during this season is not good, but is improved by keeping *if it admits of this.* Use purgatives

and blood-letting; avoid exposure to the sun, heat, and night air, more particularly the east wind; sleeping during the day is to be avoided, also fat, oil, fish, the flesh of amphibious animals and acids. The clothes should be light *and clean*, the mention of the latter being remarkable in as much as it is not elsewhere alluded to in this category. *f.* The *Cold season*, November and December. The water becomes clear, cool, and heavy; *bilious* diseases, common during the preceding two months, diminish; mists hang over tanks and rivers; diseases from "bile" are cured.

Irregularities of the seasons are alluded to as producing an unfavorable effect on health; food, water, and medicines lose their good effects, and various diseases are produced; plagues prevail. Easterly wind increases "phlegm;" westerly wind increases internal heat, dries the body, and diminishes bulk and strength; northerly wind is soft, cooling, and slightly sedative; southerly wind is pleasant and does not produce heat, and has also a light and sedative influence. Thus, in all the points enumerated, it is evident the ancient Hindu physicians observed minutely and well.

5. *Towns and Cities.*—In the seventh century A.D. the surface life in Indian towns was much as it is at the present day, and as it had been for generations before that time. Hiouen-Thsang describes the tortuous streets and lanes, the brick houses and verandahs with walls plastered with cowdung; the roof either of bamboos and dry grass or of planks and tiles. There was, however, under Buddhist rule, an absence of all butcher-shops and wine-sellers; but outside the cities were the secluded dwellings of the lowest classes of the people—the Chandalas. The dwelling-houses were inside elegant, but outside plain. The ground in front was strewed with flowers especially in the morning. But, with regard to what may be called "conveniences," the nature of such arrangements, if indeed any of a special nature existed, cannot be detailed,

simply from absence of information regarding them. In a climate of extremes such as that of India, with dry heat at one period, and heavy rainfalls at another, refuse matters are removed to a greater extent than would be the case in more temperate regions.

Of the great officers of State, those who had charge of *cities*, were anciently divided into six bodies of five each. The members of the first looked after everything relating to the industrial arts; those of the second attended to the entertainment of foreigners; they assigned to them lodgings; they kept watch over their modes of life by means of those persons whom they gave them for assistants; they escorted them on their way when they were leaving the country, or, in the event of their dying, forwarded their property to their relatives; when sick they took care of them; when they died had their bodies buried and temporarily took care of their property; and this illustrates the manner in which the dead were disposed of in those *pre*-cremation days. The third body inquired when and how births and deaths occurred, with a view not only of levying taxes, but that births and deaths might not escape the cognizance of government. The fourth class superintended commerce and trade, weights and measures. The fifth superintended manufactured articles that were sold by public notice. The sixth class collected the *tenths* of prices of articles sold. These classes are now more or less fully represented by our City Magistrates and Town Councils.

The *village* in fact became the basis of a political organization and type of the kingdom of which it was an individual member. The headman was the rajah; there was a council of elders. At a later period it had its own officials including accountant, *watchman*, priest, *physician*, musician, and artisans of various crafts. In rural districts *inspectors* observed the yearly inundations, and looked after the great

tanks or reservoirs from which the water was distributed by canals, so that the country might be equally irrigated.

6. *Public Health.*—Of the condition of public health during the Vedic period we learn that the people were afflicted with few bodily pains, the reason assigned being that the seasons were genial, the remark indicating that climate conditions in their relation to health were observed. At that time, and for long after, physicians were believed capable of recovering persons bitten by venomous snakes, notwithstanding that in the treatment of such accidents they trusted to the then ordinary appliances of their sciences, namely, charms and incantations.

Manu was the first known improver of conditions having reference to public health. According to that ancient sage "The king is to cause broad roads, drinking fountains, and market-places to be constructed in his territory; magazines of various kinds to be prepared; herbs or medicines, roots and fruits to be collected; and to provide four sorts of physicians; to repress drinking shops, procuresses, loose men, gamblers and such like; to provide for the welfare and subsistence of the poor, orphans, old men, and widows." But the first real progress in matters of this nature took place many generations afterwards, namely, under Sandracottus. He utilized the philosophers or learned class by engaging them in the work of *experiment* and observation with a view to improve the productions of the earth, especially animals—in other words he established agri-horticultural institutions. Monks there were to seek out and relieve poverty and suffering; and in fact such works appear to have been carried out in India from time immemorial. The circumstance is also mentioned that as the people had a very *temperate climate* they were not subject to many varieties of disease. Among the many works of philanthropy performed by *Asoka*, "the Sorrowless," he established medical dispensaries

throughout the empire; he introduced a State system of instruction in moral conduct; he prohibited all convivial meetings on the ground that *much evil* attended such assemblies; a stringent law was enacted against such persons as indulged in spirituous drinks, opium or other deleterious drugs; an edict was passed that stores of medicinal fruits and roots should be maintained throughout the empire for the treatment of human beings and *animals;* also that wells should be dug and trees planted along every high road. Fa Hien saw at the beginning of the fifth century in *Pataliputra* (Patna) hospitals that had been founded by the neighbouring nobility and gentry after the manner of those instituted by Asoka. To them the poor, the crippled, and diseased *of all countries* repaired; every requisite was supplied gratuitously; physicians inspected their diseases and ordered diet and medicine according to their respective cases. It is believed that the *hospices* that had prior to that date been erected by Brahmins were rather houses of shelter and entertainment for travellers than establishments for the reception and treatment of sick. Those erected by Asoka were more purely *hospitals* as we have just seen. According also to Fa Hien each of the ninety-six heretical sects, into which the followers of Buddha became divided, erected *Punyasalas* or hospices by the sides of solitary roads so that travellers might rest and sleep therein and be supplied with all necessaries. All such establishments have long since ceased in India, but in Burmah they are still represented by the *Zyats* which occur at intervals along the thoroughfares, still known as "works of merit," but now alas! disappearing under "the march of improvement."

7. *House-construction.*—The earliest Aryan town of which we read was Hastinapura, some fifty miles north-east from modern Delhi. It appears to have at that distant date consisted of huts of mud and bamboos. At the same period,

however, the *Naga* people, among whom they had come, dwelt in *cities*, the precise construction of which is not stated, but in all probability was of similarly flimsy materials. The city of Ayodhya had strong walls and gates, and, moreover, served as a garrison. That the advantages of houses elevated from the ground were acknowledged hygienically at a very early period is evident from instructions contained in the Ayur Veda regarding the advantages during the rainy season of living in elevated apartments. The ordinary kind of houses still remain much as they were in ancient times; they are raised from the ground by being built on prepared earth. The walls are similarly constructed; the thatch is thick and extends beyond them so as to form a protection from the heavy rains, ventilation being provided for by means of a space left for that purpose between the walls and roof. The houses are divided into apartments according to the circumstances and conditions of the owner, those of a family or tribe occasionally together forming a series of squares for mutual protection. All these are usually kept clean. In other parts of India houses are made of sun or fire-burnt bricks and are two or more stories high. In particular districts these are more or less fortified.

8. *Water*.—The ancient, like the modern, Hindus were very careful about their drinking-water, and attributed various diseases to that of bad quality. They considered the water of wells or natural springs in the sandy beds of rivers as the most wholesome; that of rivers and of fountains at the foot of high hills as less wholesome; that from brooks or such as was stagnant in tanks or reservoirs as the most unwholesome of all, predisposing to indigestion, obstructions, lethargy, dysentery, and *fevers*. Water was considered to be improved by boiling. During the rainy season the use of this boiled water mixed with a little honey was recommended; further, as more particularly narrated under the head of *seasons*,

minute rules existed with regard to the quality and kinds of water to be used. In connection with temples and some other institutions the remains of ancient reservoirs and water-conduits still exhibit the care with which they were attended to, and as already observed the excavation of public tanks constituted one of the most "meritorious" acts of public philanthropy.

9. *Intoxicating Drinks.*—They had six different kinds of fermented and spirituous drinks: that prepared from the grape was called *siddha*, from raisins *mārdvika*, from the flowers of Bassia latifolia *madhulaka*, from jaggery or goor, *guda* or *sura*. In the Shastras the use of wine and spirits is forbidden; but in the Tantra they are allowed, and the worshippers of Siva indulge in their use. Spirits are described as "a kind of poison which taken in moderation and with food produce good effects, being heating, pungent, subtile, light, placid and *drying*. When taken in large quantities these qualities act unfavourably on the humours, and instead of strengthening the body will destroy it. Spirits, like medicine, when taken in a proper manner restore appetite and strength to the body." Such particulars as are available lead to the conclusion that, in the early stages of society in India, the vice of drinking was general, and that the orgies of those days were very disgraceful. One of the many good results of Buddhism, however, appears to have been the diminution of drunkenness.

10. *The Social Evil and Polygamy.*—Among the earliest disciples of Sakya Muni were "the wealthy courtesans of great cities." During the Greek and Roman period of Indian history the *public women* were employed as spies of the Government, those of cities being employed for this purpose by the civil authorities, those who followed camps, in other words, "wrens" by the military inspectors. But what will be said to this? At the ancient town of Rajagriha, to the

north-east of the city, and in a crooked defile, the physician Jivaka erected a *vihara* or monastery in the garden of Ambâ-pâtî, a celebrated and very beautiful courtesan, and invited not only twelve hundred and fifty disciples of Buddha, but the *sage* himself to "receive her religious offerings." Buddha accepted this invitation and received from the fair donor Amramaya the garden. The inference is clear that no disgrace was attached to the profession of a courtesan as such. During the Brahminic period the "chief courtesan" of the city of Ujain was a person of great importance. It also appears that then the prosperity of the luxurious cities of India often depended upon the attractions of the lady who held that "proud pre-eminence," and her power of alluring the rich nobles and merchants from the surrounding countries. Thus it is said "a princess of rare beauty and accomplishments was sometimes appointed to fill so equivocal a position." Nor was the courtesan always unacknowledged by the *wife*, the Hindu drama indicating that ladies of that class occasionally were recognised as part of the domestic establishment, with such results to comfort and happiness as may be readily imagined. When, early in the eleventh century, Somnath was captured by Mahmud, five hundred damsels, many of whom were daughters of rajahs, were found dwelling therein, their occupation being to dance and sing before the idol pillar. Parents consecrate their daughters even nowadays to the service of the deity in particular temples, where these often become mistresses to the priests and lead a life of prostitution.

With regard to the *sanitary* aspects of polygamy in ancient Asiatic nations, they are thus described by Rawlinson: "Polygamy destroys the domestic affections by diluting them; degrades and injures the moral character of those who give its tone to the nation; lowers the physical energy and renders the people self-indulgent and indolent. Among

the lower orders, feeling of self-respect becomes lost through taking money for their daughters from proprietors of harems; they become the ready applauders of crime and the submissive victims of every kind of injustice and oppression."

11. *Monastic Institutions.*—There appears every reason to believe that with the introduction of Buddhism monastic establishments were instituted with a *hygienic* object. Thus a large proportion of men who joined them were those who had been surfeited with pleasure, whose health had doubtless suffered thereby, and to whom a quiet regular manner of existence was in reality the best restorative. A strange mixture must those have formed who first took monastic vows! Besides those already mentioned, there were those without hope or joy in the world, voluptuaries, free-booters, filthy yogis, the healthy and the afflicted—*women* predominated. In connection with temples of various kinds the remains of which have of late years been investigated, the extent and completeness of some of their sanitary works furnish subject for wonder and admiration; this more especially with regard to reservoirs and aqueducts or conduits in Western India.

12. *Personal Hygiene.*—As in the Mosaic law, so the injunctions of the ancient Hindu sages with regard to matters of personal hygiene received the impress of religious ceremonies. Man was said to be like a coachman driving his own carriage; if this be well made and he continue to drive cautiously it will go a long time (100 years), but if he drives it upon bad roads the wheels will get injured and the carriage will soon get worn out. As a principal item under the present heading was personal cleanliness; the eyes of gods, so it was said, were too pure to behold *uncleanness;* hence numerous ceremonies were instituted, the object of which was to maintain *purity* of the person and command over the bodily organs. Among the observances which come within the scope of this

paper are the following, namely, to rise from bed sometime before sunrise; to perform the functions of nature with the face towards the north; to clean the teeth, using for this purpose a fresh branch of the *Melia azdirachta* (a bitter tonic) or *Mimosa catechu* (astringent), washing also the mouth and eyes; the teeth however not to be thus cleaned before the tenth year of age. It was forbidden to use a pot touched by persons defiled; to eat rice cooked by, or have intercourse with, women of low caste,—both of which injunctions have a very obvious hygienic bearing. The practice of *anointing* the body with oil was looked upon as conducive to health; mustard or other fragrant oil was most frequently used for the purpose, but it was laid down that the body should not be anointed at the beginning of fever, an injunction that doubtless commends itself to physicians even at the present day. Exercise was enjoined; for the sake of health limbs were to be shampooed, the nails, beard and moustaches and hair to be cut every fifth day, the hair to be combed and cleaned. Several kinds of *baths* were recommended; *cold* bathing removes the inordinate heat of the body, but if with very cold water in winter it deranges the "phlegm and air," in hot weather it increases the bile and blood; bathing is not proper in diarrhœa; bathing the feet removes impurities, local diseases and fatigue; then follow instructions as to the suitable times for bathing, having reference to business and occupation of individuals. The warm-water bath is recommended for relieving pain, and in different kinds of fever. The vapor bath is similarly employed for both those purposes. In cloudy days exercise was *not* to be taken in the open air; the bed-room should be warmed with fire; and persons should sleep on a charpoy. In autumn exercise is to be taken in the evening; sherbets and spirituous liquors are to be used. In winter the warm bath to be used and exercise taken in the morning. In spring the drinking water is to be

boiled; spirituous liquors to be mixed with it; the warm bath to be used, and exercise taken. In the hot season light food and curries to be used; the cold bath and light dresses; the body smeared with cooling aromatic applications; cool water to be used as drink, and sleep allowed during the day. Lastly, Charaka states that there are three means of preserving life—proper food, sleep, and proper government of the senses and passions.

13. *Food.*—As already observed, the inhabitants of ancient India were well-supplied with food as with other requirements. It is recorded of them in the sixth century before our era that they had abundant means of subsistence; that they inhaled pure air and drank the very finest water. All kinds of fruit appear to have been cultivated; in addition to cereals there were grown throughout the country much millet, pulse, rice and many other plants useful for food, all these being well-watered by the profusion of river streams—a remark which, applied as it was to the Punjab and adjoining districts, shows how different was then the conditions in this respect from what they now are. *Famines* were scarcely known; and as two rainfalls occurred each year, so were two crops of cereals obtained. In the third century before our era guests of Sandracottus at Patna were treated to rice and different kinds of meat "dressed in the Indian style," that is, doubtless as curries much the same as at the present time. At that time a large portion of the agricultural produce of the empire was stored up in the royal granaries and disposed of partly in the maintenance of the army and civil administration, partly sold to the trading and manufacturing classes. About this time the sacrifice of animals in Buddhist India was prohibited, involving as it did the use of their flesh as food. It is however specially stated that the prohibition in question little affected the population of the Gangetic valley who had subsisted on grain and vegetables for unrecorded ages, although they had

always sacrificed animals to the gods, especially to the female deities, who, it is said, revelled in flesh-meat and strong liquors. Fa Hien described the food and some of the social conditions of the inhabitants of the territory between Agra and Kanouj. No one except the Chandalas, *i.e.*, the very lowest class, killed any living thing or drank anything intoxicating ; there were no shambles and no wine shops.

According to the earliest works on Hindu medicine minute rules with regard to food were laid down ; a few examples of which follow. Pumpkins, mushrooms, bamboo-shoots, plums, dried vegetables, unleavened bread, pig's flesh, salt, spirits when eaten or drunk with milk resemble poison ; rice which has sprouted, *masha* (*Phaseolus radiatus*), fat, honey, milk, jaggery when eaten with flesh of domestic or amphibious animals, or with fish, are so bad as to resemble poison ; milk with honey and vegetables in general should not be used together. According to Charaka there are six kinds of food, namely, *soft* food as rice ; soft *sweetmeats ; hard* food that requires chewing to prepare it for digestion ; *drinks*, liquids that are lapped ; and food that is *sucked*, as mangoes, sugar-cane, &c. Then there are six different kinds of food classified according to their taste ; these are sweet, acid, salt, bitter, pungent, and astringent, regarding all of which minute rules are laid down. "For ensuring good digestion, it is said, the passions must be regulated ; the person must sleep at night in a protected room ; he must use warm water and take bodily exercise ; such observances are considered to be most necessary to health."

Although in Vedic times there was no law against eating animal food, nevertheless as in the Mosaic Code, so Bhṛigu the son of *Manu*, prohibited as food the flesh of pigs ; among other articles of food similarly prohibited were garlic and onions, mushrooms and all vegetables raised in dung,—the object with regard to hog's flesh being apparent, but it

is not with the onions and garlic; at any rate, that moderate, if not tolerably free indulgence in the "pleasures of the table"—only that there do not appear then to have been tables—was permitted, is tolerably apparent from one of the injunctions having reference to this subject which may be here reproduced, namely, "a virtuous moderation, eating meat, drinking fermented liquors produces *signal* compensation." The remark is peculiar. From the account given of the return voyage to China of Fah-Hien the circumstance is made tolerably evident that, although the principal food stores laid in for that voyage consisted of *rice* and fresh water, the value of fresh vegetables under such circumstances was well understood; thus it is expressly stated that, when the ship in which he sailed touched at Ping-Tu-Chow, a supply of fresh water and of fresh vegetables was taken on board.

14. *Sleep.*—As with the modern Indians, so in ancient times, an approved maxim was "early to bed and early to rise." They slept upon a mat and used a small pillow, their bed being either upon the ground or on a *charpoy* according to circumstances. There were various rules with regard to the position of the sleeper; sleep was said to be promoted by tranquillity of mind, by music, working, anointing the body with oil, the use of the bath, by eating new rice, milk and ghee, by sherbets and spirits, and such articles as improve the health.

15. *Clothing.*—The rules with regard to clothing were somewhat as follows: After bathing the body to be rubbed with a piece of clean cloth; silk and warm *red* clothes should be used in winter; the clothes should be light, cool and thin during the hot weather; in rainy and cold weather warm white clothes of medium thickness should be used; care should be taken always to wear clean clothes, which is good for the skin, looks well, and promotes happiness and longevity. The turban defends the head from heat and cold, sandals

strengthen the feet and protect them. The *umbrella* protects the person from rain, wind and dust. A *stick* protects the person against beasts, and prevents fatigue.

16. *Physicians.*—According to Hindu mythology one of the precious gifts obtained by the *churning* of the ocean by the gods or *Devas* and demons (giants) or *Asuras* was the physician in the person of *Dhanvantari*, carrying in his hand the water of life, *Amrita*, drunk by immortals. We also read that the physicians to the gods of the vedas were the two *Aswins*, sons of *Surya*, the sun, otherwise personifications respectively of *light* and *moisture*. Dhanvantari called also *Devadasa*, having, it was said, practised medicine with great success in Heaven, descended to earth to cure men's diseases, and to instruct them in preventive (hygiene), as well as in curative medicine. He subsequently became King of Kasi or Benares.

The first member of the *Vaidya* or medical caste was of miraculous birth. Subsequently Manu laid down laws with reference to the science of medicine and its professors, the aptness of many of which must still be acknowledged. For example, he thus describes the necessary qualities of a medical student : He should be of respectable birth ; inquisitive, observant, not covetous, jealous nor lazy ; he should be a philanthropist, and his disposition should be amiable and happy. The indications of such qualifications are an agreeable voice, a small tongue, eyes and nose straight, thin lips, teeth short which do not expose the gums, and thick hair which retains its vigor. As to his duties he should know the causes and varieties of disease and *the means* of preventing and curing them; he should be acquainted with his profession; he should be acquainted with anatomy; some severe diseases are cured immediately by a good physician, but simple diseases are increased much by the want of early assistance ; these principles were laid down more than

twenty-seven centuries ago. He should perform his necessary purifications before visiting a patient in the morning, and then visit his patient in a *clean place*, not in one where there is hair, bones, spikes, stones, chaff, broken stone vessels, charcoal, nor in impure situations.

Although according to Manu, among the official functionaries belonging to individual villages, the physician was enumerated, the circumstance would appear tolerably evident that at the date of the Mahabharata the position held by him was not remarkable for its dignity; thus, when the citizens of Sringavera went out to meet Bharata, physicians were enumerated with bathmen, dealers in incense and distillers; and yet by other allusions met with in history referring to that period, there is every reason to believe that professors of the healing art were held in high estimation.

In the third century B.C., next in estimation to the priests of Buddha was the class of physicians engaged in the study of the "Nature of man," that is, of physiology. These lived frugally on rice and meal which were freely supplied to them by the people. One class of physicians at the same time were *Sramans* or hermits; these hereditarily engaged in curing the diseases of their fellowmen, and did not accept any recompense except the dole of food as above stated. It was about this time that *Sakya Muni*, while suffering from internal complaints, is believed to have been by his physician *Jivaka* treated by means of *opium*, the effects of which drug, if tradition is to be credited, first impressed *the sage* with the idea of *Nirvana*. The history of *Jivaka* is peculiar, the name means causing *life*; he studied in Benares and seems to have been household physician to "the great reformer" of that period.

17. *Theory of Disease.*—The early theory regarding the origin of disease is somewhat thus: Mankind, as a consequence of wickedness, became divided into sects, ignorant,

restless, unhappy and afflicted with numerous diseases. According to the Atreya all diseases spring from men's actions; all resemble *hell*, the curable as well as the incurable. Among the predisposing causes of illness the following are enumerated, namely, carrying heavy weights, severe exercise, excesses, much study, falls, fast walking or other violent movements, using too much or unsuitable food, exposure to cold or to damp air, &c. With reference specially to fevers, they were considered to be caused by exposure to the morning sun while fasting, by fatigue, fear, grief or watching; by *drinking stagnant water* into which withered leaves have fallen, by visiting a new climate, the two latter causes having at the present time an additional interest attached to them in connection with existing theories of the origin of this large class of diseases. According to the same ancient work, the manifestation of disease depended upon derangement of the "five elements," namely, ether, air, fire, water and earth; so by the same theory restoration to health was effected by diminishing or increasing those that were deranged with reference to their indications. That the influence of local and climatorial influences was at the same time acknowledged is evident from the heading of the fourth chapter of the Ayur Veda, namely, "On the influence of soil and season, on age and temper, and on the influence of the winds."

Some of the rules laid down regarding the treatment of disease may not even now be altogether without their value. Thus a disease is to be examined by means of the five senses. Active treatment should not be employed in a slight disease, nor mild treatment in an acute disease. Should the treatment employed be doing no good, it should be changed, but when the symptoms are yielding under a particular plan of treatment it should be continued. According to Susruta, medicines given in small doses are like throwing a little water upon a large fire, which rather increases than dimin-

ishes it; if in too large doses they will be liable to produce other diseases. Medicine should be administered according to the strength and age of the patient, and nature and stage of the sickness. After the physician has visited a patient, should the disease be complicated, he must detail the symptoms, and call in other physicians to consult as to their nature and treatment, a principle by no means unsuited even to the present period.

18. *Hygiene in Curative Treatment of Disease.*—Among the instructions for physicians laid down in the early works already quoted is that on being first called to visit a patient his inquiries should be with regard to things eaten and other circumstances likely to have caused the disease; the signs of longevity, in other words, the physical condition of the person; the nature of the disease; the seasons of the year; from what country the patient came; his temperament; the food he had been accustomed to and so on. The *treatment* is begun by strict injunctions with regard to the diet to be taken, the principle having been adopted by the ancient Hindu physicians that, "if a patient does not attend to his diet a hundred good medicines will not remove the disease;" hence they were directed to be careful with regard to diet according to season, and the kind of vessels used by them. In the fourth century of the present era the Indian physicians are said to have mistrusted powerful remedies in the treatment of disease and to have placed their chief trust in diet, regimen and external applications.

II.—ARMY HYGIENE.

1. *Soldiers.*—During the Vedic and Brahmanic periods there existed a distinct class of warriors altogether separate from the civil population. In the latter of those periods the *standing* army was composed of the soldier caste, that is *Kshatriyas*, the merchants of the *Vaisyas*, the agriculturists

of the *Sudras*. Then, as in the time of Bharata, the regular army was paid, clothed and fed by the State, and all so liberally that soldiers could with ease support themselves and others. On service they were accompanied by their wives and families. In war they were prohibited from molesting the husbandman; hence it was said, while the former were engaged fighting and killing each other as they could, the latter might be seen close by tranquilly pursuing their work, perhaps ploughing or gathering in their harvest, or pruning trees, or reaping their crops. The contrast is remarkable as compared with war during the latter quarter of the nineteenth century of the Christian era. In times of peace they underwent their *drill*, they employed their time in hunting and athletics, gambling with dice, or pursued romantic and often lawless amours; in fact, not very unlike what one reads of with regard to the military classes of certain advanced countries at the present time. In the third century B.C., the army of Sandracottus was "not composed of contributions from feudatory princes, but was a vast standing camp maintained solely at the expense of the king." *Mobilization* was then an easy matter, for the troops were always in a state of readiness to start on an expedition "furnished with all that was required throughout the campaign." In the seventh century, according to one account armies were raised according to the necessities of the state, soldiers being encouraged to enlist by promises of large rewards. This account however conflicts with that given by Fa-Hien.

Young Kshatriyas, that is men of the soldier caste, were trained to fight with their fists, to wrestle with their legs and arms, to throw stones and brandish clubs. At a later period they were taught to shoot with bows and arrows, to throw the quoit or *chakra* (in which art the Sikhs excelled up to the date of our wars against that power in 1845 and 1848), to wield swords

and spears, to tame horses and elephants, and to drive in chariots. Thus, having reference to the conditions of the period, the circumstance is tolerably clear that great attention was paid to the drill and training of troops in ancient India.

The relative value of old and of young soldiers was perfectly demonstrated during the expedition of Alexander to the Punjab, the army with which he successfully met Porus having consisted of *veterans inured to battle*; the circumstance however still bears its lesson that the same army, worn out by fatigue and sickness, absolutely refused to advance from the banks of the Jhelum to Palibothra, that is Patna, as that great commander originally intended. Had his ranks been reinforced, and more ample provision for his sick and wounded existed, there is every reason to believe that his original intention would have been carried out.

2. *Uniform.*—That soldiers wore a particular dress or uniform in the time of the Mahabharata appears to be placed beyond doubt. Thus in the great war for the restoration of the Pandavas the respective armies wore *armour*, and were otherwise well dressed. Babhruvahana, Rajah of Manipura, on the occasion of being visited by his father Arjuna, ordered that all his troops should be in readiness in their parade dresses, also that all the men and women of that city should go out in procession, and, according to the record, a very gorgeous procession thus took place. The ancient armour alluded to appears to have for the last time been represented in the *chain* mail worn by the *Khalsa* soldiers during the Punjab wars of 1845 and 1848; the more usual *uniform*, alluded to as the quilted jackets, is still seen in the north of India.

3. *Rations.*—The scale of food, particularly during war, appears to have been peculiarly liberal. Thus when Bhima started for his battle against the Asura, his provisions were a waggon load of kichri (rice and dholl, *Cajanus Indica*) a fine buffalo, and a huge jar of ghee, that is clarified butter.

Here is symbolized the first war by the Aryans against the aboriginal or Turanian inhabitants of North-Western India. The ordinary food of the Kshatriya of the Vedic Aryans, so far from consisting of the simple diet of the rishis, was such articles as roasted horse-flesh and venison dried in the sun; their beverages were fermented liquors and strong wine, or rather spirits.

4. *Beverages.*—There is no doubt the military classes among the Vedic Aryans were immoderately given to drink. Among the very earliest characteristics of the *Kshatriyas*, was that "they revelled in fermented liquors," and probably also in strong wine. The Marattas, as a preparation for battle, not only made themselves intoxicated, but also rendered their elephants so. But in those days excesses of all kinds appear to have been the fashion of the time, not only among the military, but also among the civil classes.

5. *Forts.*—The hygienic rules regarding forts were distinctly laid down, albeit they were not what would now be considered very complete. In the Ramayana the statement occurs that such positions should be supplied with weapons, money, grain, beasts, Brahmins, engines (artillery ?), grass and water, the latter an important requirement as it still is. *Palibothra* in the time of Sandracottus is given as an example; the history of that city being, it is said, traceable back to the Indian Hercules, that is Balakrishna, brother of Krishna Belus or Baldeo. That fortress was of the shape of a parallelogram; it was girded with a wooden wall pierced with loop-holes for the discharge of arrows; it had a ditch in front, probably communicating with the river, for defence and *for receiving the sewage of the city*. Such appears to have been the state of that place from about 1000 B.C. to A.D. 600 when it was destroyed: and, considering the succession of seasons and the present conditions, meteorological and otherwise in Behar, little gift

of imagination seems necessary to form an idea of how offensive old Palibothra must have been. Tientsin in 1861 supplied an apt illustration to our officers and troops, who during that and the previous year occupied that port situated in Petchili not far from Peking.

6. *Armies on the march.*—During the Vedic period an army on the march presented a motley appearance. Taking *Krishna's* following as an example, there were in his camp an indefinite number of tradesmen and artisans, of women of the lowest character, gay women, flower women, milk women, serpent charmers, monkey leaders, all kinds of pedlers and show men,—all, be it observed, presenting elements the most favorable for the development and propagation of epidemic disease. When many centuries afterwards Sandracottus started from Palibothra, whether on a hunting or warlike expedition, he was attended by Yavana women, armed with bows in their hands and wearing garlands of wild flowers. On such occasions soldiers were supplied by the State with horses, elephants and waggons, all being returned by them (or accounted for ?) after a campaign. Every elephant carried four men, namely, the driver and three archers; every chariot three men, namely, the driver and two fighting men. On the line of march these chariots were drawn by oxen, the horses belonging to them being held by a halter, so that their spirit might not be damped or their legs chafed and inflamed. Just before action the bullocks were taken from the chariots, and the horses then yoked to them.

In later times the march of an Indian army has been thus described: "In their march and encampment there is the utmost confusion; when it is necessary to halt, the great object is the facility of getting water; a large supply is not everywhere to be obtained, particularly at certain times of the year, and whole armies have been reduced to the greatest distress

by being deprived even for a short time of this necessity. On arriving at camp a great flag leads the columns; each division takes up its position beyond the standard without regularity or order; the chief pitches his tent in the midst of his party, the men being arranged around without order or regularity; their shelter such only as can be extemporised by mats, grass or branches. In an army in movement the utmost profligacy prevailed; the establishments known in Bengal as *lal bazaars* existed in every camp and were freely resorted to, the generals making by them a source of profit; among the followers were mountebanks, magicians, fortune-tellers, thieves, beggars and all sorts of *useless mouths*, so that to an army of 25,000 fighting men there was a *following* of some 200,000 persons, or even upwards. In fact as were the armies of India in the most ancient times regarding which we have a history, as were those of England in the times of the Crusades, so in India they continued to be even up to the time when *red* became the color upon the map of each succeeding province.

7. *Camps.*—In Vedic and Brahmanic times, as in those of more recent date, camps speedily became offensive. Even then however there was at least one class of persons in India to whom evil smells, and consequently standing camps, were an abomination; and of whom it is related that "they were distressed with things of evil smell." In selecting camp-grounds great consideration was paid to the vicinity of wholesome water; thus in the story of Damayanti and Nala, a caravan is described as encamping by a pleasant lake fragrant with lotus flowers, that is *Nymphæa lotus*, which is still venerated by Hindus. From this circumstance it would seem that the fact was then understood that stagnant water was rendered non-malarious by means of living vegetation in it.

The following particulars regarding a camp are taken from the story of Mahabarata, namely, a level and fertile spot

abounding with fodder and fuel, not trespassing upon burial-grounds, temples, places of pilgrimage or hermitages of holy men; the site to be commodious, agreeable and well watered. The ground was measured for the camp, carrying it on one side along the sacred river *Kurukshetra* which was flowing "with pure and salubrious waters undefiled by mud and sand;" this done, *Kesava* directed a deep ditch to be dug on the other sides for the greater security of the camp. The army then marched into the enclosed space and "were arranged agreeably to the precepts which regulate the practice of encampment." Whatever was proper to do on such occasions *Kesava* commanded to be executed; stores of firewood and of all necessaries for eating and drinking were provided; large and handsome tents were erected severally for the chiefs; artificers dexterous in various handicrafts were there in numbers, and *skilful surgeons* were in attendance well provided with the means for healing wounds; quantities of honey and of ghee, and resin and fuel, and piles of bows and arrows were heaped up like mountains, and *Yudishthira* took care that, in every tent, fodder (food), fuel and water were abundantly provided. Great "engines of war," iron shafts, spears, axes, bows, arrows, drivers and elephants like mountains, armed with spikes and covered with harnessings of iron mail, were beheld in the camp by hundreds and thousands. When the *Pandavas* knew that their friends had taken up their respective quarters, they removed with their own divisions to their several stations, and the kings, their allies, in order to secure their triumph, "observed in their encampment the strict rules of self-denial, liberality and religion." From these particulars it is evident that a considerable degree of system and regularity was observed in the armies of those far-away-days; details do not however appear to be handed down with regard to arrangements now deemed essential in connection with military encampments.

In the camp of Sandracottus, several centuries later, it is recorded that the greatest regularity prevailed; his armies consisted, it is said, of four hundred thousand men, yet his camps were maintained in good order and discipline; no useless or disorderly multitudes were tolerated in them, and it is particularly mentioned that theft was extremely rare.

8. *Rules of Combat.*—In battle the proceedings of the opposing parties were after this manner. The *Kauravas* and the *Pandavas* sallied from their respective camps each morning; they engaged each other in masses and by single contests; the survivors on either side returned to their respective camps at sunset and passed the night in perfect security. As to their actual manner of fighting at a distance, each of the contending forces sent showers of arrows at each other; at closer quarters men fought each other with clubs, knives or swords and clenched fists; they cut and hewed and wrestled and kicked until the conqueror threw down his adversary; he then severed the head from the body, carried off the ghastly trophy, sometimes drinking the dripping blood as he went.

So long as men were actually engaged in actual combat, as we learn of the armies of *Arjuna* and *Krishna*, their rule was to slay or be slain, but "when we leave off fighting our people and your people are free to mess together and may come and go to each other's quarters and hold conference together." Fugitives, suppliants, drummers and chariot-drivers were treated as non-combatants and not slain. Horsemen were expected to fight with horsemen, riders on elephants with riders on elephants, warriors in chariots with warriors in chariots, foot-men with foot-men. For a man to take up arms against another without first giving warning was deemed unfair; the use of a poisoned or barbed arrow was held to be against the laws of Manu; it was contrary to rule for a third person to interfere between two while engaged against each other in the actual fight. Quarter was given to women, to

soldiers who had lost their coats of mail, to those disarmed, or wounded or "terrified" or running away. To the modern substitute for *neutrality* as practised in Vedic times the "Convention of Geneva" is applied in token of its recent introduction as a result of very far advanced civilization. But to the principle of non-interference between two warriors while engaged against each other no modern name is applicable, the principle itself having been ages ago swept away in the onward march from *barbarism*. The wounded and the dead were left upon the field except in the comparatively rare instances of chiefs and men of special rank; these were removed from the field but by no means in every case; so we read that in some cases a guard was mounted over a wounded warrior as he lay upon the field, and so continued during seven days, at the end of which time death came to his rescue. According to the other principles of war, followed on the same occasion, an enemy when wounded was to be treated in the enemy's country or sent to his home.

The dead are said in some instances to have lain on the field unburied during eighteen days, at the end of which time, considering an Indian climate, birds and beasts of prey, little more than skeletons could have remained. The dead were burnt upon the field. The bodies of chiefs, being first wrapped in fine funeral cloths, were incinerated, their pyre composed of sandal and other odoriferous woods and sweet oils. The bodies of the ordinary classes were wrapped in cloths of coarser materials, their pyres composed of faggots and a commoner quality of oil. After a battle, carts were employed to convey burning materials for the above purposes to the field.

9. *Surgeons.*—On the occasion of the battle between Babhruvahana of Manipura and his father Arjuna, when the latter was defeated, Chitrangada, the mother of the former, hearing that among the chieftains taken prisoners was Pradyumna,

son of Krishna, sent surgeons to dress their wounds, placed them in handsome apartments, and entertained them with food and sweetmeats ; in fact, established *ambulances* for them, as similar establishments of help are presently named.

Although the following instructions had reference chiefly to physicians, they are considered as more appropriate in this place as coming within the sphere of the army medical officer or surgeon, namely : "The duties of a physician, when a rajah travelled, was to point out the road, that is, route by which he was to proceed, also the water and shelter for the accompanying troops or followers and for the elephants. He should live near the rajah ; his care should extend to the water and food of the army as well as of the beasts of burthen which the enemy may endeavor to destroy by poison, and, it is added, the good physician may detect this, and be the means of saving the army." With regard however to the more immediate duties of a surgeon in war they appear to have been but slight in the time of the Ramayana ; thus Sushena, *physician* in the army of *Hanuman*, treated the troops who were wounded in the fight which led to the capture of Ravana in Lunka, that is Ceylon, by means of herbs which, having beaten and made into a paste, he then applied.

Susruta, like Machaon, appears to have in some measure at least performed and taught the duties of an army surgeon. Thus in the Ayur Veda, of which he is believed to have been the author, there are instructions with regard to the influence of the weather on health, on the regimen of patients suffering from surgical diseases, besides dissertations on the preparations required for accompanying a rajah in war, on the difference of climates, a description of fluids, and on different preparations and articles of food, besides a chapter on toxicology and one on intoxication, the whole, in fact, forming a compendium in which are included questions of sanitation which some so-called "Sanitary reformers" would have us

believe have only quite lately been enunciated by themselves for the first time in history.

10. *Hill Sanitaria.*—In the history of the early Aryan invasion of India a remarkable example occurs of the utilization of *hill stations* as a sanitary measure for troops. No doubt the story is to a great extent mythical, but like the majority of tales belonging to the same category, may have some degree of foundation in fact. Thus, then, it is stated that through the great heat a pestilence broke out among the troops of Dionysos while he occupied Upper India. To prevent the spreading of the pestilence Dionysos dispatched his soldiers from the plains to the hills, which were taken by force and held for this purpose. Here the soldiers recruited their health by the cool breezes and by the water that flowed fresh from the fountains.

Much later, in the time of Hiouen Thsang, some traces of such sanitaria seem to have still existed. An Indian army was stationed in these mountains, moving about here and there, while the soldiers were recruiting their health in these healthy parts. The inhabitants of the country—which is identical with the modern Afghanistan—wore felt garments, in summer they sought the cool of the mountains, and in winter dispersed themselves among the villages.

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