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Sushruta:—His age and personality:—A few preliminary observations regarding the technique of the Ayurvedic system of medicine are necessary at the outset to correctly understand the aim and scope of the Sushruta Samhita. Who was Sushruta? When and where did he live and flourish? These are questions that would naturally suggest themselves to the readers of the following pages; but they can only be imperfectly answered like all similar questions respecting the lives of our ancient worthies. In a country like India where life itself was simply regarded as an illusion, the lives of kings or commoners were deemed matters of little moment to the vital economy of the race; and all histories and biographies were looked upon as the embodiment of the flimsy vanities of life. Lives of saints and canonised kings had been made use of in certain instances as themes of national epics. But they were intended more to elucidate or enunciate the doctrines of certain schools of Ethics or Metaphysics than to record any historical fact or event. Authentic history we have none beyond chronicles of state events and royal names in some instances; and those which are usually found in the Sanskrit Puranas are strange combinations of myths and legends, which often contradict each other. Hence the utter futility of attempts to explain a historical fact by the light of a votive medal or tablet unearthed perhaps from the ruins of one of our ancient cities. Such an endeavour serves, in most cases, only to make the "darkness visible," and the confusion more confounded.
Identity of Susruta and Divodasa:—It is only safe to assert that Susruta was of the race of Vishvamitra. The Mahabharatam (1) represents him as a son of that royal sage. This coincides with the description given of him in the present recension of the Samhita. The Garuda Puranam (2) places Divodasa as fourth in descent from Dhanvantari, the first propagator of medical science on earth, whereas the Susruta Samhita describes the two as identical persons. But this apparent anomaly in the Samhita can be accounted for, if we consider that in some parts of India the custom still prevails of appending, for the purposes of better identification, the name of one's father, or of a glorious ancestor to one's name, and it is therefore not surprising that Divodasa (the preceptor of Susruta), who was a firm believer in the doctrine of psychic transmigration, should represent himself as an incarnation of Dhanvantari, and assume his name and style in the usual way. Beyond this meagre genealogy we possess no trustworthy information regarding the life and personality of Susruta, the father of Indian Surgery.

Age of the Susruta Samhita:—We have no means of ascertaining what the Samhita was like as originally written by Susruta, the present being only a recension, or rather a

(1) यायायायीय सङ्गीत अवारिन्मृत्युः सुक्षमसः
   विश्वासप्रभासाः सङ्गीत सूक्ष्मः अत्यान्तिनः

   Mahabharatam—Anusasana Parva, Ch. IV

(2) विश्वासितवादिवर्त चक्तिकद्विय; वृः
   पार्थि सुर्वनसिंहीविशम रसङ्गमः
   नवधाः, जनकमनु सुदेशायामधवः
   काश्य कारणसन्तः संकीवर्तव्रेष्टः
   यथासामान्यमर्चुसिंह अव्याहतः समानसः
   तेष्वो धन्वनीसिद्धां सूक्ष्मसत्सवसः
   भूमर्गः केतीवादिदशर्मादः

   Garuda Puranam, Chap. 130, V., 8-11.
recension of recensions, made by Nāgārjuna. All opinions concur in identifying him with the celebrated founder of the Mādhyamika school of Budhhistic philosophy—a fact which materially assists us in fixing the age of the present Samhita. A few quotations from the Vriddha (old) Sushruta are all that are preserved of the original Samhita. But their genuineness is of a problematic character, and we are not sure whether they are the productions of lesser lights, or of ancient though less renowned commentators, attributed to the master to invest them with a greater sanctity and authority—a practice which was quite common amongst the bibliographers of Ancient India.

Date of Nāgārjuna:—At all events Nāgārjuna who redacted the Sushruta Samhita lived about the latter part of the fourth century before the Christian era (2) and the

(1) "यह तत्तु परिंत् नियमणमो तवेव भवितंससाधनं प्रजातिः। प्रतिमेंद्रपरी| प्रेणसाहायणम्।"

Dallana's Commentary, Sutradhāna, Ch. I. 1.

Dallana mentions the names of Jogada, Gayadasa etc., as the redactors of the original Sambhata, and rejects as spurious or of questionable authority the texts which cannot be found in these editions of the work. Most probably the authoritative verses are quotations from the Vriddha Sushruta.

A recension of Pratimasāstrī consists in entailing statements that have been made more minutely elaborated, and in diluting upon truths that have been very succinctly dealt with in the original text. A Redactor of Pratimāsāstrī makes an old book new again.

में ज्ञातित्वानस्याऽक्षेत्राय विभिन्नार्थे ।
संबन्धानिः कृतं तत्त्वे प्रश्नच घुमने ॥

A Sambhata, on the other hand, deals with aphorisms contained in the Vedas.

वेदवाकार्यविवादान संबिनामाः। प्राकृतिकाः।

(2) तदाभिसाप: शास्त्रिमिहं परिंत्तत ये ॥
भविभाषानि नित्यानि साहि वर्णमाणि भाषां ॥
भविभाषाय द्विसंगमैः समीश्रितानि ।
अ य नासामः। सौभाष्यः ॥

Rāmakṛtāgama I. Tatanga, Vs. 172-173.
original or Vriddha Sushruta must have been written at least two centuries earlier in order to acquire that hoary authority and prescription of age, which alone could have given its right to a recension at the time. Several scholars, on the authority of a very vague and general statement concerning the recension of the Samhitā in Dallana’s commentary, ascribe the authorship of the Uttaratantram (latter portion of the Sushruta Samhitā) to Nāgārjuna. We, on the other hand, hold the Uttaratantram to be neither an interpolation, nor a subsequent addition, but that it forms an integral portion of the book as it was originally written, though not planned by the Rishi. In the first Chapter of Sutrassthānam Divodisa formally divides the Science of Ayurveda into eight subdivisions, such as, the Shalya (surgery), Shālakya (portion treating of diseases restricted to super-clavicular regions such as the eyes, etc.), Kiya-Chikitsā (general diseases such as, fever, etc.), but does not speak anything about them in the first five Sthānas or subdivisions of the book. It is only once in the 25th chapter of the Sutrassthānam that he mentions the name of Netrvartma (diseases of the eyelids) in connection with the classification of surgical operations. It is impossible that Divodisa would fall short of his duties by omitting to give instructions on all the subdivisions of the Ayurveda as he promises at the outset, or that Sushruta would leave his Samhitā, which is pre-eminently a work on surgery, incomplete by banishing ophthalmic surgery, laryngotomy or fever-therapeutics from his work. From the general plan of the book we can safely assert that Sushruta dealt with easier or more elementary topics in the first five subdivisions of his Samhitā in the manner of our modern progressive readers, reserving the discussion of those requiring a more advanced knowledge and skill for the Uttaratantram. The Uttaratantram has not been included within the five original subdivisions of the Samhitā inasmuch as it embraces and more elaborately discusses
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Topics which legitimately belong to, or are but incidentally mentioned in, those subdivisions. Hence it is more of the nature of an appendix or supplement, arising out of the exigencies of the original subdivisions. It is probable that Nāgārjuna might have redacted this part of the Samhitā in common with its other portions.(1)

Western opinions on the subject:—The consensus of western opinions is to place Nāgārjuna in the first quarter of the third Century B. C. (2), and for fixing Sushruta as a contemporary of Śākya Sūṅga Buddha. It is contended that the age immediately preceding Śākya Muni was a period of decadence in Hindu thought; and the Sushruta Samhitā must have been the fruit of a revived intellectual activity which usually follows the advent of a new creed—an assumption which is in favour of the hypothesis of Greek influence on the Hindu system of medicine. But great men there had been in India before Buddha. The age which immediately preceded the age of Buddha was by no means an age of decadence properly speaking, the age which followed the downfall of Buddhism shows, on the contrary, signs of true decadence India had had eminent philosophers and scientists almost contemporaneously with the great Buddha. The chronological facts collected above from the Mahābhārata, and the Garuda Purāṇam could have been construed to prove that the age of Sushruta was prior to that of the Mahābhārata but for the internal evidence furnished by the Samhitā itself as to the probable date of its composition which we shall have occasion to deal with later on.

Extraneous Evidence:—Sushruta is mentioned in the

(1) Maññamahopādiyāya Kavirāj Dvānākā Nāth Sen Kaviratna of Calcutta subscribes to this opinion—Tr.
(2) Bacl’s Buddhistic Records of the Western World. Vol. II. P. 212.
(3) Stein’s Rājatarangini.
Vārtikas of (1) Kṣityāyana (4 Century B. C.) and we have no hesitation in saying that the original Śamhitā was written at least two centuries before the birth of Buddha. We are equally ready to admit, on the other hand, that the final recension of the Śamhitā by Nāgārjuna, at least the form in which we have it, was made about the second Century B. C.

Two Nāgārjunas:—Several scholars, on the authority of Dallana (the celebrated commentator of the Sushruta Śamhitā) endeavour to establish the identity of Nāgārjuna (the redactor of this Śamhitā) with his namesake, the celebrated alchemist of the tenth Century (2). But their contentions fall to the ground when we know that many verses of the Sushruta Śamhitā occur in the works of Bāgbhāt (Ashtangahridayam) and Midhāva (Nīdamān), which are two of the works which were translated by the order of the Kaṭiph (2) in the eighth century. The internal evidences of the book do not supply us with any authentic material to compose anything like a biography of this father of Hindu Surgery.

Internal Evidence:—The line in the Śamhitā, which has formed the veritable bone of contention amongst scholars of all shades of opinion as throwing a light upon the probable date of its composition, occurs in the Sharīra—Śīlīnām, in connection with the development of the fetal body and reads as “Subhuti Gautama saith that it is the trunk that first developed.”

Conflicting testimonies and the uncertain indication of materials at our disposal:—It is a matter of historic

(1) सुदृढ़म् श्रोताम् कौशलम्
Kāṭyāyana’s Vārīl as to Tinim’s Grammar.
(2) मालाम्बुं लोकः सत्ताम यथोक्तामासभिविष्कम्
Chakravala—Kashyapadhikirta.
(3) P. C. Roy—Hindu Chemistry p XVIII. (1902).
certainty that Subhuti was one of the personal disciples of Śākyamuni Buddha, and that it was customary amongst the contemporary Buddhists to append the appellation of their (1) lord (Gautama or Bodhisattva) to the name of a proselyte to accentuate his wisdom and sanctity in the world. A certain section of scholars is never tired of setting up this line as a conclusive evidence of the fact that the Samhitā was, at best, a contemporary production of early Buddhism. But they shut their eyes to opinions of Shānaka and others on the subject quoted exactly in the same portion of the book, which places the date of its composition at least several centuries earlier. Shānaka, who was the sixth in remove from the immortal Vṛṣṭi in direct line of discipleship, was the author of the renowned Shānaka Samhitā of the Atharvāṇ. These facts lend a very plausible colour to our hypothesis that the original Sushruta Samhitā, which was first composed perhaps contemporaneously with the latter portions of the Atharvāṇ, naturally discussed the opinions of Shānaka and other Vedic embryologists, while Nāgārjuna, at the time of redacting that book, quoted the opinion of his contemporary Subhuti for the purpose of giving him an equal status with the Vedic Rishi, if for nothing else.

Greek Influence:——As regards Hellenic influence on the Hindu system of medicine and on the Sushruta Samhitā in special, we must disabuse our mind of all sentiments of racial vanity and proceed to investigate the case in a scientific and unprejudiced spirit before giving a more detailed account of the contents of the Sushruta Samhitā.

(1) Nāgārjuna Bodhisattva was well practised in the art of compounding medicines. Nāgārjuna Bodhisattva by moistening all the great stones with a divine and superior devotion changed them into gold.—Bae’s Buddhistic Records of the Western World Vol. II.

भद्धापरिवारम् प्रबलस्मात् नृषिताश्वं य ||
स’ न भद्धापरिवारे नर्मं चोरीं च वल्लाय चालकालिखन ||

Annāk 19. 45. 46. 5.
Sushruta and Hippocrates:—From the very apparent similarity which exists between the contents of this Samhita and the aphorisms of Hippocrates, many western scholars are apt to conclude too hastily that the ancient Indians drew their inspiration in the healing art from the medical works of the Greeks. But the reverse may be said of the Greeks as well with the greater confidence because such an assertion is supported by historic facts, and confirmed by the researches of the scholars of the west (1). According to all accounts Pythagoras was the founder of the healing art amongst the Greeks and the Hellenic peoples in general (2). This great philosopher imbibed his mysteries and metaphysics from the Brahmanas of India. Mr. Pocock in his *India in Greece* identifies him with Buddhagurus or Buddha, and it is but an easy inference to suppose that he carried many recipes and aphorisms of his master's Ayurveda with him. The sacred bean of Pythagoras is thought to have been the (3) Indian Nelumbium (Utpalam). We know that simultaneously with the birth of Buddhism, Buddhist Sramanas were sent out to Greece, Asia Minor, Egypt and other distant countries to preach their new religion. They were known to the Greeks and there is good reason to believe that the Greek Sinfra (venerable) were no other than the Buddhist Sramanas (4). Now a missionary usually teaches the sciences of his country in addition to the preaching of his gospel. The distant mission stations or monasteries of Buddhism were

(1) There is no ground whatever to suppose that Sushruta borrowed his system of medicine from the Greeks. On the contrary, there is much to tell against such an idea—Weber’s History of Indian Literature.

(2) The Origin and Growth of the Healing Art—Bedroo P. 162.


(4) These Sinfra (venerable) whom Clement of Alexandria has narrated to have rendered worship to a pyramid originally dedicated to the relics of a god, were the Buddhist Arhats (venerables) Sramanas.

the principal centres for disseminating Brahmanic culture in distant lands, and Hippocrates, though he did his utmost to liberate medical science from the thraldom of speculative philosophy, yet might have thought it necessary to retain only those truths of the Ayurveda which Pythagoras and the Buddhistic brotherhood might have imported into his country, and which do not exactly appertain to the domain of pure metaphysics. Of course, it is quite possible for men of different nationalities to arrive at the same truth or conclusion independently. There are coincidences in science as in art and philosophy. (1) Gravitation and circulation of blood (2) were known to the Indians long before the births of Newton and Harvey in Europe. The celebrated atomic theory was preached in the Gangetic valley some five hundred years before the birth of Christ (3). But well may we ask those, who still adhere to this Hellenic hobby, to look at the reverse side of the picture as well. It may be stated without the least fear of contradiction that the Charaka and Sushruta, through the Channel of Arabic, Persian and Latin translations still form the

(1) चारकशास्त्र सदृश तथा यन्त्र ख्यात गुद्गार्थिमि सुप्रौढः प्रकाशः।
चारकशास्त्र तत्परस्तीश भालि से समासान कृति’ यत्; ये॥

Siddhánta Shiromani (Bhaskarachārya) Gobhodyāya.

(2) भात्रायणं पृच्छन्ति सदृश यम्मानसौमिदवम्।
शरिराद्वारं कथयति वातायणं तथा। वदसर तत्किंतं रक्तं चंसले अक्षयं दिक्षते; तत्पर विभिन्ना
रोगा ज्यौने राजस्वथः।। भावप्रकाशः। (Bhāvaprakāsha).

The Hārīta Samhitā, which according to certain scholars, is older than the Sushruta Samhitā, refers to the circulation of blood in describing Pānduraga (Anemia). The disease, he observes, is caused by eating clay which thus blocks the lumen of veins and obstructs the circulation of blood. Bhāvanisrā, the celebrated author of Bhāvaprakāsha, and who is a century older than Harvey, has the above couplets bearing on the subject.

(3) Vaiṣṇavika Darśana by Kanāda.
basis of all systems of scientific medicines in the world (1). Of these, the Sushruta Samhita is the most representative work of the Hindu system of medicine. It embraces all that can possibly appertain to the science of medicine (2).

Sushruta prior to Charaka:—The general consensus of expert opinion is to place Charaka prior to Sushruta in respect of time. But the Puranas unanimously describe Sushruta as a disciple of Dhanvantari, the first-propounder of medical science. The long compounds (samāsās) fixed by him, the prose and metrical portions of the Sushruta after the models of Jaimini, Patañjali, and other philosophical writers who had adopted prose or metre according to the expository or rationalistic tenor of the subjects in their works, have all been cited to prove Sushruta a contemporary of the Darshanas, or of the Buddha. But these may serve, at least, to fix the date of the recension by Nagarjuna, i.e., the Sushruta Samhita as we have it, but can never help to determine the chronology of Sushruta, the disciple of Dhanvantari “who was churned out of the primordial ocean in the golden age (Satya Yuga) (3). On the other hand, it

(1) A. “The great works of Charaka and Sushruta were translated into Arabic, under the patronage of Caliph Amanur, in the seventh century. The Arabic version of Sushruta is known by the name of “Kelake Shawshoore-al-Hindi.” These translations in their turn were rendered into Latin. The Latin versions formed the basis of European medicine, which remained indelate to the Eastern science of medicine down to the seventeenth century.”—History of the Aryan Medical science (Thākūr Sāheb of Gondal) P. 196.

B. For the indebtedness of Arabic school of medicine to the works of Indian masters, see Puschmann P. 162.

C. Bede’s, Book IV, Ch. II. 286-299.

(2) Dr. Wise (Hindu system of medicine).

(3) चारुदमवण जेवों इंकी धनवामिष्यमुति।

विषान कःधुमु पुस्थानातें सहिष्यत।

चारुऽमवणात्सु मुरुगा स कर्मात्।

the testimonies of the Puranas have any historical worth, we can safely place him somewhere in the Satya Yuga, (age) at least in those dim centuries which immediately succeeded the composition of the Atharvan. Charaka, too, in connection with his discourse on the development of the foetal body has cited the opinion of Dhanvantari (1) on the subject (the same as promulgated in the Sushruta Samhita) & referred his disciples to the Dhanvantari school of surgeons (meaning Sushruta and his school) in cases where surgical aid and knowledge are necessary; this proves that Sushruta was before Charaka.

Sushruta as a Surgeon:—Sushruta was emphatically a surgeon, and the Sushruta Samhita is the only complete book we have which deals with the problems of practical surgery and midwifery. Almost all the other Samhitás written by Sushruta's fellow students are either lost to us, or are but imperfectly preserved. To Sushruta may be attributed the glory of elevating the art of handling a lancet or forceps to the status of a practical science, and it may not be out of place here to give a short history of the Ayurveda as it was practised and understood in Pre-Sushruti times it only to accentuate the improvements which he introduced in every branch of medical science.

Commentators of the Sushruta Samhita:—We would be guilty of ingratitude if we closed this portion of our dissertation without expressing a deep sense of our obligation to Jejjada Acharya, Gaytidasa, Bhiskara, Madhava, Brahmadeva, Dallana and Chakrapani Datta, the celebrated commentators and scholiasts of the Samhita, who have laboured much to make the book a repository of priceless

(1) वर्णस्ठितपिक्षयुपविदित धनवतिः ।
Charaka, Shāriasthānam. Chap. V.

तत्र धान्वतायानासविकारः विवाहिचे ।

वातां खल्लोकान्य अथरोपरिष ॥
Charaka, Chikitsāsthānam. Chap. V.
wisdom and experience. Dallana has made use of all the commentaries in revising and collating the texts of Sushruta Samhitā.

**Origin and History of the Ayurveda:**—In the science of medicine, as in all other branches of study, the ancient Aryans claim to have derived their knowledge from the gods through direct revelation. Sushruta in his Samhitā has described the Ayurveda as a subdivision (Upānga) of the Atharvan (1), while according to others the science of the Ayurveda has its origin in the verses of the Rik Samhitā (2). Indeed the origin of the science is lost in dim antiquity. Death and disease had been in the world since the advent of man; it was by following the examples of lower animals in disease, that our primitive ancestors acquired by chance the knowledge about the properties of many valuable medicinal drugs. There is a verse in the Rigveda which shows that the lower animals were the preceptors of man in matters of selecting food stuffs and medicinal simples (3). Individual experiences in the realms of cure and hygiene were collected, and codified, and thus formed the bases of the present Ayurveda. The verses in the Vedas clearly mark each step in the progress of medical knowledge. The properties of a new drug were always hymned in a Vedic verse with a regularity which enables us to put our finger upon the very time when a particular drug of our Materia Medica first came to be of service of man (4).

(1) Sushruta Samhitā, Sutrasathānam. Ch. I. 3.

(2) चार्यवर्मण सहाये चतुर्वेकः

Charana Vyuha by Vyāsa.

(3) गीतिकेन च चावलम्। चावले १२। १४। १४।

(4) A. श्रेष्ठः अविद्। यथिकृतां वस्त्रम्य महाबध्दोपनी।


dhīrastānāsāh vikāryam abhavati pabhāyati vātaka vātānaśīpa

Athravan Samhitā

B. See also Ibid I 2 II. 4. 7. 9. 25, 27 and 36.
Discrepancies accounted for:—Verses on medicine, hygiene, and surgery, etc. lie scattered throughout the four Vedas. Those having bearing on Medicine proper occur most in the Rigveda, and perhaps it was for this reason that Agnivesha, who was a physician, has ascribed the origin of the Ayurveda to revelations in the Rik Samhitá. Precepts relating to the art and practice of surgery are found most in the Atharvan (1), which amply accounts for the fact of Sushruta's opinion of holding the Ayurveda as a subdivision of the Atharvan, as he was pre-eminently a surgeon himself.

Different kinds of physicians:—Vedic India, like Ancient Egypt, recognised the principle of the division of labour among the followers of the healing art. There were Shalya Vaidyás (surgeons), Bhisaaks (physicians) and Bhisag-Atharvans (magic doctors), and we find that at the time of the Mahábhárata, which nearly approaches the age of our author, the number of the sects had increased to five which were named as Rogaharas (physicians), Shalyaharas (surgeons), Vishaharas (poison curers), Krityaharas (demon-doctors) and Bhisag-Atharvans (2).

In the Vedic age (before the age of Sushruta) physicians had to go out into the open streets, calling out for patients (3). They lived in houses surrounded by gardens of medicinal herbs. The Rigveda mentions the names of a thousand and one medicinal drugs (4). Verses eulogising the virtues of water as an all-healer, and of certain trees and herbs as purifiers of the atmosphere are not uncommon in the Vedas. Indeed the rudiments of Embryology, Midwifery, child management (pediatrics) and sanitation were formu-

(1) तत्ताद्विवासात्विवाच भाषान द्वाराविवाच वृत्तान्।
Rik Samhitá I M. 116-16.

(2) Mahábhárata, Shántiparva, Rájadharméndhásan Parvádhyáya.

(3) तत्र विषयः।
Rigveda. IX M. 112.

(4) तत्र न द्वारा विषय सर्वत्वमातृत्वान्। Rik.
lated in the age of the Vedas and Brāhmaṇas, and we shall presently see how from these scanty and confused materials Sushruta created a science and a Samhitā which invite the admiration of the world even after thousands of years of human progress.

**Origin of Ayurvedic Surgery** :- In India, as in all other countries, curative spells and healing mantras preceded medicine (1); and the first man of medicine in India was a priest, a Bhisag Atharvan, who held a superior position to a surgeon in society. The first Aryan settlements in the Punjāb were often assailed by the dark aborigines of the county, and in the wars that ensued surgeons had frequently to attend to the Aryan chiefs and soldiery. So in the Rigveda (2) we find that legs were amputated and replaced by iron substitutes, injured eyes were plucked out, and arrow shafts were extracted from the limbs of the Aryan warriors. Nay we have reasons to believe that many difficult surgical operations were successfully performed, though some of them sound almost incredible. But although the aid of surgery was constantly sought for, surgeons were not often allowed to mix in the Brāhmaṇic society of Vedice India. This is hinted at by our author when he says that it was during the wars, between the gods and demons that the Ashvins, the surgeons of heaven, did not become entitled to any sacrificial oblation till they had made themselves eligible for it by uniting the head of the god of sacrifice to his decapitated body. The story of the progress of Ayurvedic surgery is long and interesting, but it must suffice here to mention that with the

(1) Bedroe’s Origin of the Healing Art, and Sir John Lubbock’s Prehistoric times.

(2) सची घरावायन रसुपालय वन दिहितमं अवधानम्

तথा सची घरावायन ध्वज दसाहितसारायनम्

Rik Samhitā I A. 8 Ad. 186 S. 116. 5.
return of peace, the small Aryan settlements grew in number and prosperity. And the rich Aryan nobles now travelled in stately carriages, and as there were constant accidents there arose a class of surgeons who exclusively devoted themselves to the treatment of injured animals. The surgeons, now no longer required in camps and on battle fields, had to attend on the rich ladies at baronial castles during parturition, the magic doctor (Bhisag Atharvan) who could assuage fever and concoct love potions (1) being held as the greatest of them all. But the Vedic Aryans had a regular armoury against pain and suffering, which is in no way inferior to our present day Materia Medica. But of that we shall speak later on in connection with the therapeutics of Sushruta.

The scope and nature of Sushruta's Surgery:—So much for the history of Vedic Surgery. It is in the Sushruta Samhita that we first come across a systematic method of arranging the surgical experiences of the older surgeons, and of collecting the scattered facts of the science from the vast range of Vedic literature. Sushruta had no desire of abandoning the Vedas in the darkness and pushing on an independent voyage of discovery. The crude methods and the still cruder implements of incision such as, bits of glass, bamboo skins etc., laid down and described in the Samhita, may be the relics of a primitive instrumentality which found favour with our ancestors long before the hymnisation of any Rik verse. Practical surgery requires a good knowledge of practical anatomy. The quartered animals at the Vedic sacrifices afforded excellent materials for the framing of a comparative anatomy (2). Sushruta devoted his whole life to the pursuit of surgery proper, to

(1) Śrāvaṇa śrāवणिḥ śārīrāḥ शरीराः वनविचारम्।
शया मयाहि वाधे भक्तय सन्तिष्ठिष्ठे परिष्ठः॥

Rik Samhita. X M. 145 S. 1.

(2) Vide Aitareya Brāhmaṇa I. 2. 11. 12. III. 37.
which he brought a mind stored with luminous analogies from the lower animals. It was he who first classified all surgical operations into five different kinds, and grouped them under heads such as Aharya (extractions of solid bodies), Bhedya (excising), Chhedya (incising), Eshya (probing), Lekhya (scarifying), Sivya (suturing), Vedhya (puncturing) and Visravaniya (evacuating fluids). The surgery of Sushruta recognises a hundred and twenty-five different instruments, constructed after the shape of beasts and birds, and authorises the surgeon to devise new instruments according to the exigencies of each case. The qualifications and equipments of a surgeon are practically the same as are recommended at the present time. A light refreshment is enjoined to be given to the patient before a surgical operation, while abdominal operations, and operations in the mouth are advised to be performed while the patient is fasting. Sushruta enjoins the sick room to be fumigated with the vapours of white mustard, bdelium, Nimva leaves, and resinous gums of Shila trees, etc., which foreshadows the antiseptic (bacilli) theory of modern times. The number of surgical implements described in the Samhita is decidedly small in comparison with the almost inexhaustible resources of western surgery, and one may be naturally led to suspect the authenticity of the glorious achievements claimed to have been performed by the surgeons of yore; but then their knowledge of the properties and virtues of drugs were so great that cases, which are reckoned as surgical nowadays, were cured with the help of medicines internally applied. “Surgery,” says Tantram, is not doctoring (1). It should only be employed when the

(1) A. नियोजितं विना दंति न्यायिक्या तुमिश्लका।

केदार्यं तुमसे या ज शुद्धिकर्मे व्यावहारी ॥

सनातनं वि निरोजितं पवित्रालं न्यायं पुनः पुनः ॥

किं तम् तद्यवाहं क्या नृहि निरोजितार्थं ॥
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Affected vital energy is not strong enough to alone effect the cure that the surgeon is justified to handle his knife. We find in the Samhitā that ophthalmic, obstetric and other operations were performed with the utmost skill and caution.

Plastic and Rhinoplastic Operations:—Doctor Hirschberg of Berlin says—“the whole plastic surgery in Europe took a new flight when these cunning devices of Indian workmen became known to us.” The transplanting of sensible skin-flaps is also an entirely Indian method (Sushruta, Sutrāsthānam, Ch. XVI). It is Sushruta who first successfully demonstrated the feasibility of mending a clipt earlobe with a patch of sensible skin-flap scraped from the neck or the adjoining part.

To Sushruta is attributed the glory of discovering the art of cataract-couching which was unknown to the surgeons of ancient Greece and Egypt. Limbs were amputated, abdominal sections were performed, fractures were set, dislocations, hernia and ruptures were reduced, hemorrhoids and fistula were removed, and we take pride in saying that the methods recommended in the Sushruta Samhitā sometimes prove more successful than those adopted by the surgeons of modern Europe, as we shall have occasion to observe later on. In the case where the intestines are injured, Sushruta advises that “the protruded part should be gently replaced by following with the anger.” A surgeon should enlarge the wound in it, if necessary, by means of a knife.

ব্যাজারম ম্যাথ্য যহ সেবনে তেঁই বিনামিল।
শ্রাগে দুঃখে তস্কান প্রায়শ্চিত্ত নিপোতে ন।
পুন: বঞ্চনায় তব চালাদান কি প্রায়শ্চিত্ত।
বক্তায় সমাপি মিতি মর্যাদায় সমুদ্রিণ ন।

Mahānīlātantram, Patola X. Vs. 72-74.

B See the Article on “Heredity and some of its Surgical Aspects,” By F. C. Titzell, in J. The Medical Advance, Vol. LXIV, June 1906, Page 357.
In the case where the intestine is severed, the severed parts should be held together by applying living black ants to their ends. Then their bodies should be cut off leaving only the heads to serve the same purpose which in modern improved European surgery an animal tissue like catgut is expected to fulfill. After this the intestine should be fairly replaced in the abdominal cavity and the external opening stitched and properly dressed. We abstain here from a lengthy description of the different methods recommended by the Sushruta in cases of abdominal and peritoneal wounds. We only ask our readers to compare this Chapter (II Chikitsasthamam) of the Sushruta Samhita with the Chapter in any work on European chirurgery which deals with the same subject. Certain medicinal plasters were used to be applied to localise the shafts of arrows embedded in the limbs of wounded soldiers and their exact locations were ascertained from the inflammation caused by the application of such a plaster with a precision which would be sometimes welcome even in these days of Rontgen rays.

Lithotomic Operations: - In these cases, elaborate instructions have been given for making the perineal incision, as well as about the care and general management of the patient after the operation. In a case of Shakra-shamari (seminal or spermatic concretion) the formation and existence of which have been very recently discovered by English pathologists, Sushruta enjoins that the stone, if in the urethra, should be removed with the help of Amalakam and urethral enemas, filling which the penis should be cut open and the concretion extracted with the help of a hook. Kaviraj Umesh Chandra Gupta in the introduction to his Vaidyaka Shavda-Sindhu remarks, that he and Dr. Durgadisa Gupta M. B. translated the Chapters on lithotomic operations and instrumental parturition of the Sushruta Samhita for the perusal of Dr Charles, the then Principal of the Medical College, Calcutta.
‘Dr. Charles highly praised the process of delivery in difficult cases and even confessed that with all his great experience in midwifery and surgery he never had any idea of the like being found in all the medical works that came under his observation.’

Amputation: Amputations were freely made and medicated wares were given to the patients as anaesthetics (1). These conclusively show that the surgery of Sushruta does not rest content with the mere bursting or opening of an abscess, and the healing of the incidental wound, but lays down processes for major operations as well. The removal of the cicatrix until it becomes of the same colour with the surrounding skin and the growth of hair thereon are suggestions which we find nowhere else.

Ophthamlogic Surgery: Of the seventy-six varieties of ophthalmic diseases, Sushruta holds that fifty-one are surgical (Uttara Tantram Ch. VIII). The mode of operation which is to be performed in each case has been elaborately described in the Samhitā, and does not unfavourably compare in most instances with modern methods of ophthalmic surgery. Sushruta was aware of the fact that the angle of reflection is equal to the angle of incidence, and that the same ray which impinges upon the retina serves the double purpose of illuminating the eye and the external world, and is in itself converted into the sensation of light.

Midwifery: It is in the region of practical midwifery that one becomes so much impressed with the greatness of Sushruta. The different turning, flexing, gliding movements, the application of the forcis in cases of difficult labour and other obstetric operations involving the destruction and mutilation of the child, such as craniotomy, were first systematically described in the Sushruta Samhitā long before fillets and forceps were dreamt of in Europe, and thousands of years before the birth of Christ. Sushruta, who

(1) For the use of Samohinis (anaesthetics) for surgical purposes, see Bhāja Prabandha by Ballāha Pandita.
Advocates Caesarean section in hopeless cases of obstruction, lays down that the instrument should be employed only in those cases where the proportion between the child and the maternal passage is so defective that medicated plasters, fumigations, etc., are not sufficient to effect a natural delivery. His directions regarding the management of the puerperal state, lactation and management of the child and the choice of a wet-nurse are substantially the same as are found in modern scientific works of European authors. A feeling of pride and joy moves our heart when we contrast these glorious achievements of our ancestors with the meanness of results which modern Europe has gained in this department of midwifery. In those old days perhaps there were no hospitals to huddle patients together in the same room and thereby to create artificially septicemic poisons which are now so common and so fatal in lying-in rooms. A newly built lying-in room in an open space abundantly supplied with the rays of the sun and heat of the burning fire for each individual case, the recommendation of a fresh bamboo-chip for the section of the cord are suggestions the value of which the west has yet to learn from the east.

Dissection:— Sushruta, himself a practical surgeon, was the first to advocate dissection of dead bodies as indispensable for a successful student of Surgery. The Purushchitas of ancient Egypt perhaps learnt their art from the Purusachettas (Dissector) of ancient India. With a candour less common among western scholars Dr. Wise observes that, “the Hindu philosophers undoubtedly deserve the credit of having, though opposed by strong prejudice, entertained sound and philosophical views respecting the uses of the dead to the living, and were the first scientific and successful cultivators of the most important and essential of all the departments of medical knowledge, practical anatomy”. A bungling surgeon is a public danger and Sushruta says that, “theory without practice is like a one-winged bird that is incapable of flight”.
STUDY OF PRACTICAL SURGERY: To give efficiency in surgical operations, the pupils of Dhanvantari (Sushrutha etc.) were asked to try their knives repeatedly first on natural and artificial objects resembling the diseased parts of the body before undertaking an actual operation. Incision, for example, was practised on Pushpafala (cucurbita maxima), Alivu (Longenaris Vulgaris) or Trapusha (cucmis pubescusas), evacuating on leather bags full of water and on the urinary bladders of dead animals, scarification on the hides of animals on which the hair was allowed to remain. Venesection was practised on the vessels of dead animals and on the stalks of the water-lily; the art of stuffing and probing on bamboo reeds etc.: extraction of solid bodies on Panasa (Artocarpus Integrifolia) and such like fruit, scraping on wax spread on a Shimali (Bombox Malabaricum) plank, and suturing on pieces of cloth, skin or hide. Ligatureing and bandaging were practised on dummies, canterisation (both actual and potential) on pieces of flesh, and catheterisation on unbaked earthen vessels filled with water. It is almost with a feeling of wonder we hear him talk of extirpation of uterine excrescences and discourse on the necessity of observing caution in surgically operating upon uterine tumours (Raktiruvudu). These facts should be borne in mind as they would help us a good deal in accounting for the numerous anomalies that are to be found in the anatomical portions of the Sanshita.

STUDY OF PRACTICAL ANATOMY:—We have stated before that the quartered sacrificial animals afforded excellent materials for the framing of comparative anatomy. The Aitareya Brahmaṇa contains special injunction for the quartering of such animals (1) and we are told that the preceptors availed themselves of the religious meetings to

(1) The Aitareya Brahmana describes a particular way of dividing the organs and viscera of the sacrificial animals which was kept secret among the priests. Aitareya Brahmana VIII 1.
demonstrate the lessons on practical anatomy. We come across such terms as the heart, stomach, brain, intestines, anus, liver, spleen, uterus etc. in the Rigveda, and the Aitareya Brahmana (1). There is an entire hymn (Rik) devoted to the subject and treatment of Pithisis (Raja Yakshma) which becomes utterly unintelligible in the absence of an accurate knowledge about the structure of lungs, and mechanism of the human heart. The Vedic Aryan fully understood the resultant nature of the human organism. The Rik Mantra, which to this day is recited on the occasion of a funeral ceremony, amply testifies to the fact that he used to look upon his mortal frame as the product of the combination of the five physical elements (2). He understood the effects of different drugs upon digestion and the office which the tendons, muscles, flesh and nerves, etc. respectively serve in the economy. It is in the Sushruta Samhita that we find a systematic attempt at arranging together the facts of anatomical observation. The age of Sushruta, the Acharyaic age of the Ayurveda, was a period of scientific investigation. The sturdy Aryan colonists exchanged their simple mode of living for luxury and ease. The number of general diseases was great. In

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(1) A. नया समय भर्ष्मारिष्य सिंगियत्रिक
Rik Samhita X, M, I, 3, 5, 98.

(2) The nature of the human body as the resulting effect of the combination of the five elements have been clearly described in the verse.

Which being translated reads :- Let his eye go to the sun, let his breath wind mix with the wind of the atmosphere, and to the sky, earth and the areas the ports which have sprung out of them, &
vaśñ did the holy Narada (1) preach the gospel of plain living and high thinking, and exhort them, like Cato, to return to their simple mode of life. The long peace brought opulence in its train and wealth begot indolence and disease. Men like Bharadvaja, Angirā, Yamadagni, Athreyya, Gautama, Agastya, Vāmadeva, Kapisthā, Asamathya, Bhirgava, Kūshika, Kāpya, Kashyapa, Shākraksha, Shaunaka, Manmathayāni, Agnivesha, Charaka, Susrūta, Narada, Pulāśīya, Asita, Chyavana, Paingi and Dhaunya, etc., began to write Samhītas. Each hermitage was a college of Ayurveda, and the empirical method of investigation was introduced into each department of the science of cure.

**Anatomical Anomalies in the Samhīta:** Having got so far in our analysis, before passing on to the study of the Anatomical portion of the Susrūta Samhīta, we must try to account for the many anomalies and discrepancies that have crept into or have been suffered to remain in the present recension of the book. Take, for example, the line in which Dhanvantari is made to speak of three hundred bones in the human organism. It is impossible that the human frame, in so short a time, has got rid of so many of its skeletal accessories simply through disuse, or because of their becoming superfluous in the altered condition of its environments. More absurd is it to think that Susrūta, who discards all authority except the testimony of positive knowledge, would write a thing which none but the blind would believe in a dissecting room. The spirit of the age in which the flourishing precluded the possibility of such an error.

**Anomalies accounted for:** In ancient India, subjects chosen for the demonstration of practical anatomy were always children (2), and naturally those bones, which are

\[ \#1 \] Vide Athreyya Bāhmana VII. 13.

(2) The injunction of the Hindu Shastras is that "corpses of persons more than 2 years old should be burned." Cremation of dead bodies being
fused or anastomised into one whole during adult life, have been separately enumerated—a circumstance which may, to some extent, account for the excess in the number of bones described in this Samhitā (1). Likewise the theory that Sushruta might have included the teeth and the cartilages within the list of skeletal bones comes very near the truth, but it does not reflect the whole truth either. The fact is that the original Sushruta Samhitā has passed through several recensions; and we have reasons to believe that the present one by Nāgarjuna is neither the only nor the last one made. The redactors, according to their own light, have made many interpolations in the text, and when Brahmanas they have tried to come to a sort of compromise at points of disagreement with the teachings of the Vedas (2). Therefore it is that we come across such statements in the Samhitā as “there are 360 bones in the human body, so it is in the Vedas, but the science of surgery recognises three hundred skeletal bones.” What lends a greater colour to the hypothesis is that Sushruta, who in the Chapter on Marma Shīrirām, has so accurately described the unions of bones and ligaments, anastomoses of nerves, veins and arteries etc.

obligatory on Government, as well as on private individuals, it was almost impossible to secure a full-grown anatomical subject in Paurānic India, the more so when we consider that the Hindus look upon the non-cremation and mutilation of a corpse with a peculiar horror as it prevents the spirit from purging off its uncleanness in the funeral fire, and bars its access to a higher spiritual life. Naturally in later and more ceremonial times the interred corpses of infants, less than 2 years old, had to be unsealed and dissected for anatomical purposes; and these portions of the Sushruta Samhitā might have been modified by the subsequent commentators in order to conform them to occult proofs.—T. R.

(1) See Gray’s Anatomy (1897) p. 288 and 301 Figs. 248 and 262.

(2) “विद्वान् विज्ञानं प्रति: वनाधिके: शास्त्राणां।”


“विद्वान् वनाधिकानि मानानां न द्रवीषु मर्यादेन।”

Charaka. Shāstrasangāna,
must have described their courses and locations, as otherwise it would have been quite impossible for practical surgeons, for whom it was intended, to conform to the directions of the Samhitā in surgically operating on their patients' limbs, and to avoid those vulnerable unions or anastomoses as enjoined therein. These Marmas have been divided into three classes such as, the Sadya-prāna-hara: Kāla-prāna-hara, and Vaikalya-kara, according as an injury to any of them proves instantaneously fatal, or fatal in course of time, or is followed by a maimed condition of the limb concerned. The fact is that the study of practical Anatomy was in a manner forbidden in the reign of Ashoka Piyadarshi inasmuch as all religious sacrifices were prohibited by a royal edict (1), and the subsequent commentators (who were also redactors on a small scale) of the Sushruta Samhitā, in the absence of any positive knowledge on the subject, had to grope their way out in darkness as best they could: hence, this wanton mutilation of texts and hopeless confusion of verses in the Shirira Sthiānam of the present day Sushruta Samhitā, which should be re-arranged and restored to their proper chapters before any definite opinion can be pronounced on the anatomical knowledge of the holy Sushruta.

Sushruta as a Biologist:—In the first chapter of his Shirira Sthiānam, Sushruta discusses the question, what is man, wherein lies his individuality, why does he come into being, why does he die at all? Like all Indian philosophers, Sushruta argues the question down from the universe to man. The factors or laws, that govern the evolution of the universe in its physical aspect, are extended to cover the evolution of the physical aspect of man (organic evolution). There is but one law and one force which run through the three plains of mind, matter and spirit. Physiology, that fails to look

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into the nature of life and its background and tries to explain away this intelligent, living force as the product of chemical action of the organic cells, is no Physiology at all. Cell is not life, but there is life in a cell. Cells may be called the true bearers of life. Dr. Weismann insists that it is more correct to speak of the community of the general protoplasm than of the germ cell. Professors Geddes and Thomson observed that, "the bodies are but the torches which burn, while the living flame has passed throughout the organic series, unextinguished. The bodies are the leaves which fall in dying from the continuously growing branch. Thus, although death takes the ineradicable grip of the individual, the continuity of the life is still in a deep sense unaffected, the reproductive element, i.e., have already claimed their protoplasm immortality, are already recreating a new body." But to invest these reproductive cells with immortality, and to deny the same to the individual self, which directs and controls these protoplasts, and is before and behind them, is like the statement of Prot. Huxley when he admits the chance of the physical transmigration of the organic constituents of the human body, but yet denies the possibility of an individual self continuing in any other form. "It is sensibility," observes Sushruta, "that precedes the self, and self, the sensibility process from the self to whom all such conditions are rejected as mine."

Sushruta's Theory of Cosmogony is based on the old Sankhya Doctrine of Prakriti (Object) and Puruha Subjective. The two are co-extensive realities. Out of the Avyakta (unmanifest) Prakriti has evolved the Majus, the universal cosmic matter. Out of this cosmic matter has evolved Vaikriti, the sense of individuality or more properly egoism which is divided into three kinds, such as: Vaikriti, phenomenal, drought-form, Taijas (kinetic), and Bhutadi (pertaining to the first form of matter). This Vaikriti, Ahankara, in combination with the Taijas Ahankara has gathered
the eleven sense organs, which, in combination with the
Buddhi, have produced the five Tanmatras or proper
sensibles of touch, sight, hearing, etc. The material
principles of sound, light, taste, smell, etc., are but the
modifications of these five Tanmatras, of which Akasa
(ethercon), Vayu (ether), light, and sound, etc., are the
greater forms. In other words, these Tanmatras may be defined
as the atomic essences of the material principles of sound,
light, ether, etc. In addition to these, Sushruta, like
Kausika, admits the existence of a kind of atom-like units
of consciousness, which he calls Purush. The combination
of the sixteen aforesaid categories and the Purusha is
for the expansion and liberation of the latter. A human
being (individual), who is the subject for medical
treatment, is the product of the combination of Purusha
with the five primary material principles (Mahabhutas).
The Purushas, real selves of beings, the sources of
their vital energy, and the controllers and directors of
all organic and mental actions, are extremely subtle in their
essence, and manifest themselves only through the
combination of the soul, material elements of the
material element. In the Karma dynamics of acts
done by a person in a prior existence which determines
the nature of the body it will be clothed with, as
well as the nature of the womb it shall be conceived in,
in its next incarnation.

Nature of Self:—Self is a simple substance, and, as
such, is immaterial. Force is substance and substance is
force. It is endowed with constructive intelligence, and
like gravitation and cohesion, can permeate a material body
without, in any way, disturbing it. It is adaptive or
elective, or, in other words, elects that kind of selves for
its parents as are best suited to the purposes of its being.
Man is the outcome of an influx of a self, a force, a dynamics
with its path determined by the dynamics of the deeds
of its prior existence. To think that vitality starts from
protoplasm is insanity. Chemically examined protoplasm is but, C, O, H, N and S. But no amount of C, O, H, N and S put together will constitute life. The idea that life has nothing prior to it, that the force which controls the co-ordination of man's economy perished with the death of his organism, is quite puerile. Life is expansion and not creation, and, as such, is linked to those unseen realities which constitute its prior and future selves. We see only the middle link in the chain of existence which we call life, but take no notice of the preceding or succeeding ones which are invisible (1). The grosser material body is linked to a finer, immaterial one, in as much as nothing can exist without being attached to its antecedent. So at each conception there is the influx of a new self, for the lifeless constituents of a human body can not create a man, no matter how many chemical or physiological actions may be postulated to run to their rescue.

**Ayurvedic Embryology** :- Before entering into the discussion of Sushruta's theory of conception, we shall take a little more trouble to enunciate fully the Vedic theories on the subject. “The child is the fruit of the combination of sperm and ovum” (2). It lies with its head downward inside the uterus, a fact which facilitates its passage out of, and protects its form from the effects of any injury done to that viscus. (3) The eyes of the child are originated.

1. श्वासादीन शृणु अकम्भारि भारत।
   श्वासांगत्यापथ तत्तर परिवंदना॥
   Bhagavat Gita II 28.

2. युवं श्वासमिव सार्यः समवेते गणोद्विदतः।
   समं संययये युक्तत्वाधिनस्तेष्यस्य॥
   Astāṅga Hridayam (Vāgbhat)
   Shāriya Sīlānam. Ch. I. 1.

3. त्यक्ति वसंभोगवाच्याणम् परि च सहविना।
   * * * * त्यक्ति संभोगम् परि।
   Aitertiya Brāhmaṇa VI. 10.
as the cephalic portion of the fetal body is first developed. The factors, which are essential to the development of the fetal body, from the time of fecundation to the appearance of the characteristic sense-organs, have been described in a verse of the Rig Veda (1). In the Vedic mythology each organic function is consecrated to the tutelage of a presiding deity, and a Vedic Aryan loves to call a thing oftener by the name of its divine custodian than by that of its own. Rightly translated, the verse would read as follows:—"May Vishnu (the presiding deity of ether and nerve-force) expand thy uterus, may Tvashtá (the presiding deity of heat and metabolism) bring about the full differentiation of the limbs, and the sex of the fetus, may Prajapati (the presiding deity of the ovum) sprinkle thy uterus, and may thou conceive through the blessing of the lord of human destiny. May Sarasvati (goddess of intellect) and the Ashvins, the surgeons of the gods (the presiding deity of fission, etc.) help thee in taking the seed." Now, the development of the fetal body takes place after the pattern of its father's species, and this conformity to the pattern of its species represents an act of intellection. Hence, the aid of the goddess of intellect has been invoked with that of the celestial surgeons, who preside over the process of cell-division, so essential to the formation of the fetal limbs. Divested of its allegory, the verse would mean

(1) विष्णुविशलेखनं कल्यातं नारायणर्न्ध्रमं यंत्र ।
वासुपुर्वेष्ठिन्तर्वशा नमः धन्यं च तः ॥

Rik Samhitá X. M. 184, S.
that the sperm led into a healthy and well-developed uterus through the agency of the Vayu (increased activity of the local nerves) meets the maternal element (ovum) in that viscus. Then the impregnated matter undergoes a process of fission, and takes shape after the pattern of its father's species. When we think of so many idle speculations as regards the process of fertilisation, which obtained credence so late as the beginning of the 18th century in Europe, and the controversies that arose between the Ovists, Perfomists and Animalculists (1), we cannot help regretting that the Ayurvedic Embryology, which started under such happy auspices, could not fully solve the problem of fertilisation even before the advent of the Tintrik age. The fundamental principles with which the Embryology of the Achirayyas (Sushruta, Dhanvantari, etc.) was started are substantially the same as have now been discovered by the researches of the Western workers. Sushruta in his dissertation on the subject showed the illegitimacy which lay at the root of his predecessor's theory (Shariraathanam Chap. II.) and took up research exactly where the Vedic Rishi had left off. He clearly demonstrated the fact that: "by a physiological process known as Rasapika (metabolism) the lymph chyle is metamorphosed into sperm in men, or into ovum in women, in the course of a month. The cutamenial fluid is carried down into the uterus through its proper ducts. The sperm or ovum is thus the quintessence of a man's or a woman's body. The sperm meets the ovum (Artavam) in the uterus, which resembles a lotus-bud in shape, and whose aperture is shut up with a mucous deposit as soon as fecundation takes place. The most favourable time for fecundation is between the fourth and twelfth day after the appearance of the flow (Garbhaakshay) as has

(1) For a short history of the Theories of Fertilisation, Vide Evolution of Sex (Prof. P. Geddes and J. A. Thompson) Chap. XII. pp. 169 178
been lately demonstrated by the researches of Prof. Von Ott. (1).

**Sexual Diámmorphism** :—Some light is thrown on the relative preponderance of the sperm and ovum in the birth of a female child. "When the maternal element preponderates the child is female; when the paternal element is stronger the child is male. When both the elements are equal, the child is of no sex." In theory at least Sushruta admits the possibility of the birth of many children at a single conception. "When the seed is divided into two by its inherent force (Váyu), twins are born in the womb"—a statement which points to the irresistible conclusion that multiplicity of birth is the outcome of the multifarious fission of the seed in the womb under certain abnormal conditions. Sushruta gives a reason for believing that, in exceptional circumstances, and without sexual union, the unfertilised ovum may give rise to perfect offspring, thus giving a prevision of the modern theory of parthenogenesis. Pathological parthenogenesis has occasionally been noticed in higher animals. Ocellacher has noted this in respect of hen's eggs, and Jamosik has observed it in the ovarian ova of many mammals such as the guinea-pig, etc. (2) Sushruta extends the probability to the human ova under certain conditions. He admits the possibility of conception without the admixture of the male germinal element, though he observes that: like all asexual genesis the development does not proceed far in the case. From such a hypothesis it is but one step to the theory which enunciates the possibility of conception without proper sexual union.

But to understand his theory of sexual diámmorphism, it

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(1) Vide the chart of menstrual wave prepared by Von Ott given in Man and Woman (Havelock and Ellis) Chap. XI.

(2) The Evolution of Sex Ch. XIII. P. 185.

*Profil, P. Geddes and J. A. Thompson.*
is necessary that one should fully comprehend the meaning of such Ayurvedic terms on the subject as Ichchhā Shakti (will-force), Shukra-Vāhulyam (1) (preponderance of the male reproductive element) and Shonita-Vāhulyam (preponderance of the female reproductive element) etc. Sushruta, in common with the Brāhmānic philosophers of Ind, believed that distinction of sex has evolved from a primordial hermaphroditism. Manu in his Institutes has emphasised the fact (2), though in a highly poetic style. He observes that “the Purusha (Logos), by a stroke of Will, divided its body (animated cosmic matter) into two, one of which was male, and the other female.” The Tantra says that, “the male part was endued with an energy (force) of its own, which is called Pitrikā Shakti; and the corresponding female part, with the one, which is called Mātrikā Shakti. Pitrikā Shakti is a disruptive force; Mātrikā Shakti is a constructive energy. Though the conception of force in Sanskrit sciences is but partially physical, the nearest approach to the connotations of the Pitrikā and Mātrikā Shakti is made by the terms Anabolism and Katabolism of the Western physiologists. Sanskrit physiology recognises the two opposite poles of vital force in a living organism, and has not taken inconsiderate pains to determine their exact locations in man and woman. Mātrikā Shakti, it observes, predominates in the left half of a woman’s organism, which is negative as regards vital magnetism. (3) Now, Sushruta says that, in cases where female offspring is desired, the enceinte should

(1) Shārylicsthānam Ch. II.
(2) विशालायणी देशन्तरित युक्तविक्षेपनः।
पर्यं गारी तथा स विवाहविन्यस्न महः।
Manu Samhitā Ch. I. 32.
(3) देशप्राप्त: अतिन: स्वयं सामवेदिनिवाकरः।
smushed through her left nostril (the expressed juice of certain herbals), while the same should be administered through her right nostril where male issue would be the object. In other words, the anabolic (Mātrikā) or katabolic (Pitrikā) forces of a mother’s organism can be so adjusted with the help of drug-dynamics, as to determine the sex of the child in the womb. The birth of a male child is usually presaged by the appearance of the milk (which according to Sushruta is metamorphised menstrual blood) in the right breast of the enceinte; and where that has been effected with the help of suitable medicines, it must be presumed that the Katabolic pole of her life-force has been acted upon, as desired.

The original hermaphroditism, which forms the anterior condition of all subsequent sex distinctions, and the character of the two opposite poles of vital energy, have been very clearly set forth in the Puranik allegory of Ardhā-Nārishvara(1). The figure, observes the Puranik rhapsodist, is half male, half female; half life, half death (since, death, in fact, is the father of life) (2); half anabolism, half katabolism; with the crescent moon, the premise, the symbol of progressive evolution on its brow, is made to sit on the eternal bull, the representative of the immutable law of the universe (lit.:—the four-footed order). The Rishis and Rasasiddhas of ancient India were fully aware of the fact that, conception is effected only at an enormous sacrifice on the part of the mother; that the Mātrikā Shakti is the real manufacturer of life, and that the Pitrikā Shakti (paternal element) evokes, or calls it into play only through its disintegrating or disruptive effect by separating the two opposite life-poles, that lie neutralised through contact. It is love that governs these two complementary

(1) Vishnu Purānam Ch. 7. Vs. 10-11.
(2) बाल: संचेति अनु-त बाली मम्मयति प्रभात: ||
अन्तमातः वर्धे-प्रथामासा काल प्रभासिये भवे ||
Mahābhārata.
forces of life and death (1) (though in fact they represent the two different aspects of the same energy) and controls its evolutionary rhythms through the desire of seeing itself many though one in reality. Does not modern biology endorse the same view when it says that the reproductive cells, as protozoons, are immortal, and that bodies are the natural appendages which blossom forth and fall off round these cells for the fructification of their innate purposes of being (2)?

A little more investigation into the biological thesis of the Rishis would be necessary for the clear comprehension of “Shukra-Vāhulyam” and “Shonita-Vāhulyam” of Sushruta and other Tantras (3). Man is both animal and spirit; and the Ayurvedic physiology recognises two distinct sets of apparatus in his organism answering to the different phases of his existence. The one helps him in performing the organic functions, which are so essential to his animal existence, and keeps intact the co-ordination of those internal functions with the incidents of his environments. The other is attuned to the finer forces of nature, and responds

(1) The Evolution of Sex, Ch. XVIII.

Prof. P. Geddes and J. A. Thomson.

(2) “The body or soma”, Weismann says, “thus appears to a certain extent as a subsidiary appendage of the true bearers of the life, the reproductive cells”. Ray Lankester has again well expressed this:—“Among the multicellular animals, certain cells are separated from the rest of the constituent units of the body, as egg-cells and sperm-cells; these conjugate and continue to live, whilst the remaining cells, the mere carriers as it were of the immortal reproductive cells, die and disintegrate. The bodies of the higher animals which die, may from this point of view be regarded as something temporary and non-essential, destined merely to carry for a time, to nurse, and to nourish the more important and deathless fission-products of the unicellular egg.”—Quoted in the Evolution of Sex (P. Geddes and J. A. Thompson) 1901. Chap. XVIII.

(3) (A) रक्षारित्वा विद्वानोरि व्यवहारिका: पुण्यम्।
सम्बोधः: वस्तुविद्यमानं नवंतिविश्वित्विविष्णु।

Sāradā Tilak Tantram.

(B) Sushruta Samhitā (Śaṅkha Śāhnam Ch. III)
to the call of his higher or psychic self. The one is *organic*, the other is *psychic*. The one chains him down to the phenomenal, and is governed by the laws of growth and decay; the other opens on the region of absolute realities where growth and decay have no room to be. Growth is not the only condition of life. Man may exist without food (1) or respiration, only if he can manage to dive deep into the realities within himself. Between these two sets of apparatus there is the Jivatma, which, by its own peculiar energy (*the will-force*), can operate in phenomenal or organic plain, or recede from thence into the psychic one, thus being in contact with the world of the senses, and the one that is beyond the darkness of death. Death, in fact, is the grand usherer to life, which is only the rise of the curtain over the life's drama, all equipments for which are made in the green room of death.

A man can not propagate at will. No amount of willing on the part of the parent-animal can help him in creating progeny. The self of the child, who is about to come into life, chooses its own parents, according to the dynamics of its own acts or Karma, from the region of the lunar Pitris or quiescent life, if it be warrantable to use such an expression (2). The self of the would-be child mixes with the self of its human father, and hovers over the reproductive cells of the latter's organism, and regulates the intensity of its father's sexual desire, according to the nature of the sex, determined necessary for the fruition of the purposes of its advent into the world. A greater intensity of its father's *desires* ensures the preponderance of the Pitrikā Shakti (katabolism) in the impregnated ovum, which

(1) रसीदाराम्य सा विहितः स्वस्तं श्रवणं नहोऽवहनम्।

(2) सर्वेषा विकाृतिः नात्र।

Skanda Purāṇam quoted by Shridhara Svāmi in his commentaries on the Viṣṇu Purāṇam. Ch. VI. V. 16.

Shruti.
determines the male sex of the child, while such a thing, on the part of the mother at the time, is followed by the relative preponderance of the Mátriká Shakti (anabolism) which accounts for the femininity of the issue. Equal intensity of sexual desires in both the parents creating an absence of the relative preponderance of the Pitriká and Mátriká Shaktis in the impregnated ovum, leaves the sex of the child practically undetermined. The relative preponderance of the Pitriká or Mátriká Shakti, as evidenced by the greater or less intensity of the sexual desire of either of the parents, which results in the speedier emission of the paternal or maternal element (sperm or ovum) during an act of successful fecundation, is contemplated by the term "Shukra-Váhulyam," or "Shonita-Váhulyam," by the framers of the Samhitá, as may be fully substantiated by a couplet by the venerable Dárubáhi (1).

So far Sushruta is at one with the modern Western theory of preponderant kataabolism or anabolism in the ovum as the determining factor of the sexual diammorphism to the extent that seeds or reproductive cells are the bearers and not the manufacturers of life, only containing those categories which foster life, and help its evolution into an organic being. To deny this would be to admit the chemical, or physiological basis of life, which, as a theory, was never acceptable to the biologists of ancient India. The number of reproductive cells may be increased by suitable dietary, and to say that the immortal reproductive cells, as the creators of life, come out of the mortal, organic food stuff, is to say that darkness is the father of light. The question of the immortality of the seed (germ plasm) has

(1) क्रौंधसमी; सुसमयी सबधी विबंधेत स्वार्ण।
प्रति तत्; प्रभासीरो माक्षे सक्षात् हकः।
चन्द्रशेषाशिता पूर्वं विषेसंहस्तस्युद्दाय।
सतीश्वरावतम् वर्णा माणे इदमस्य।

Dárubáhi (Quoted by Arunadatta in his commentaries on Vágbhat)
been elaborately discussed in the commentaries on the Sánkhya Darśāham(1). The Ojah Vindus (germ cells) pulsate with the vibrations (rhythmic movements), which are the relics of the primordial ethereal vibrations, which ushered in the birth-throes of the universe. As such, they are essential to the evolution of life; and man, as an offspring of the universe, still retains them in his reproductive cells as the best condition for calling out the life in his offspring, when its self enters into the impregnated ovum in the mother's womb. Life is the essence of self, and not the product of any chemical or physiological process. It is an influx; and microscopes and spectrosopes may not expose to view the hinterlands of birth and genesis. Perhaps it was this theory of will-force and intensity of parental desire as determining the sex in the child, together with the facts of parthenogenesis observed in lower animals, from which Sushruta was disposed to extend the analogy to the human species, and believed that conception without sexual union is possible in women.

The conception of the nature of these Mitriká and Pitriká Shaktis is more clearly set forth in the Pauránika myth regarding the origin (etiology) of fever; Sushruta relates the story as follows:—Daksha, the father of the universal mother, (or constructive metabolism in man) insulted the divine father, her consort (destructive metabolism), by withholding his quota of sacrificial oblations. The wrath of the insulted deity broke out in the shape of a morbific heat (hyperpyrexia) which is fever. The process of digestf0h in man has been often compared to an act

(1) (A) पार्थर्ष्टीत्ति कथा रौशासु देवम् ।
Sánkhya Sutra Ch. I. 122.

(B) समपप्तिः संधिति
Ibid. Ch. III. 3.

(c) वेष्टते वषु सहस्रायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंतरायंতরायंতরाय।
Sánkhya Prabachana Vāshya (Vijnān Bhikshu) Ch. I. S. I.
of Homa sacrifice (1) in the Ayurveda. Stripped of its allegory the myth may be explained quite in a pathological line. It means that when the Pitrīkā Shakti, the process of destructive metabolism (Pitā, father or Śiva in Hindu mythology being the god of destruction or disintegration) of the body is not properly served by the factors, which nourish its constructive metabolism (Father of the Matrikā Shakti), the excrements and excretory process of the body are arrested (by the wrathful deity), and the heat generated in consequence is fever. Fever, then, is a disease of defective digestion and excretion. Wherever this Pitrīkā Shakti is disturbed or not properly served there is fever, and heat is one of its essential effects.

With a precision and love of details, which mark the best days of Brähmanic literature, Sushruta lays down rules of diet and conduct to be observed by the enceinte, from month to month, during the whole period of gestation, and gives medicinal recipes for the development of a partially atrophied child in the womb.

A perusal of the Chapter on Marma Śāriram would leave no doubt for the conclusion that anatomical knowledge was cultivated by surgeons and soldiers alike. A knowledge about the locations of the vulnerable joints, or nerves, or vein anastomoses where a blow or a little pressure may enable him to make short work of his man could not but be dearly prized by the soldiery at a time when the fate of a war was often decided by the success of a single champion, and we have reasons to believe that a scientific system of wrestling was formulated in the light of the Sushruta Samhitā, and practised by the gentry of ancient India much like

(1) पाण्डितायं सदा यथाखल्लानांश्चर्चीति वः।
पदविकश्च रत्नानि ताक्षिको भिततीतः।

Charaka Samhitā.
the Jiu-jitsu (Skr. Yuyutsu, the intending fighter) of modern Japan, (s).

Sushruta's Physiology:—But if Sushruta is admired so much for his practical and scientific cast of mind, it is his writings on Physiology, (which is practically the same as the one adopted by all schools of the Ayurveda) which have appeared as a stumbling block to the intelligence of many a Western and Eastern scholar. European Sanskritists have thought fit to translate “Váyu,” “Pittam” and “Kapham” (the three main physiological functions) as air, bile and phlegm. But nothing could be more misleading, or erroneous than that. A right understanding of the science of the Ayurvedic medicine, in all its branches, hinges on a right conception of the Váyu, Pittam and Kapham, so we should like to clear up the nature of these three physiological factors before proceeding farther in our enquiry.

Antiquity of the division:—A reference to these three physiological factors of Váyu, Pittam and Kapham, under the name of Tridhátu, is first met with in the Rikveda, (3). Sáyana explains the term as a synonym for Váyu, Pittam and Kapham. The Vedic physicians possessed at least a considerable knowledge of the process of digestion,(4), the circulation of gas in the human organism, and of

(1) It is curious that the phonetic and etymological resemblance between Sanskrit “Yuyutsu” and Japanese “Jiu-jitsu” (would be fighter) should be so close. Perhaps it was the Buddhist missionaries (and they were not always peaceful hermits) who had carried with them a system of scientific wrestling from India, which was subsequently developed in Japan. Compare with the complete Kano, Jiu-Jitsu (Judo) by H. Irving Hancock and Katsukuma Higashi. Chart I and III.

(3) * * * तिष्ठति वृक्षे वेगम वस्त्रली ।

Rik. Samhita, I. 3. 6.

Sáyana explains it as

, वातिष्ठवृक्ष वातुमवीप मनविन्वय सुख वचन ।

(4) चाय: दौताऽपः विशरोणे। तत्तथ: य: निहिताः भूमिः संगमसमवान घरसमि, वेरपमसात्तिन्त, दीर्घिन्त: : स: प्रभः। दर्श: स्रीम ! समानालो नितिन्ता ि खर्न: सृष्टेष्टले तत। नारिमेंशत्सत- रस्वस : स: भुताऽपस्यायनः शेतिलिङ्ग: स जीवः: सहस्त्रेष्टिर ।

Chhândagya Bréhmana.
the properties and functions of flesh, fat, muscles, tendons, ligaments and cartilages. But to the Acharyas of the Ayurveda belongs the glory of first formulating a systematic physiological science, to which end Sushruta as a surgeon did contribute no mean a quota. In the light of Western science, the actions of living matter, varied as they are, may be reduced to three categories, viz. (a) Sustentative, (b) Generative, and (c) Correlative functions. The second is not co-extensive with the entire existence of a living organism, Sushruta observes some such distinction among the functions of a living organism when he denominates the living body as the “three supported one” (Trishunam), and describes the normal Vāyu, Pittam and Kapham as its three supports. We wonder how the term Vāyu, meaning nerve force, can be confounded with the same term meaning air, since Sushruta derives the former from the root “Vā,” to move, to spread. Vāyu, according to Sushruta, is so called from the fact of its sensory and motor functions such as, smelling, &c. But the Vāyu in the Ayurveda is not wholly a physical or organic force, it has its spiritual aspect as well which does not legitimately fall within the scope of our enquiry. It is safe to aver however, that the Ayurvedic physiology, like its sister science in modern Europe, is concerned more with the invisible molecular components of the human organism, than with the workings of its gross members. The holy Agnivesha warns the students of physiology against the danger of regarding the human system as something other than the aggregate of molecules (1).

1) अग्निवेष अनुसार परनायकविद्वांशाय सर्वान, अवतरष्ठायानि चैत्याचारायणाम्

Charaka Samhita Shāriraśāhānam, Chap. VII.
INTRODUCTION.

The three fundamental principles of Vāyu, Pittam, and Kaphah:—The actions of living matter vary and so may be reduced to three categories. They are either—(1), functions which affect the material composition of the body and determine its mass, which is the balance of the processes of waste on one hand and those of assimilation on the other. Or (2), they are functions, which subserve the process of reproduction which is essentially the detachment of a part endowed with the powers of developing into an independent whole, or (3), they are functions in virtues of which one part of the body is able to exert a direct influence on another, and the body, by its parts as a whole, becomes a source of molar motion. The first may be termed Sustentative, the second Generative, and the third Correlative functions. The above is the sum and substance of the works which a living matter has to perform. But setting apart the processes of reproduction as a subject for future discussion, we shall now try to examine what the other two functions are as understood by Oriental thinkers. In the Mahābhārata the Prāna vāyu is described as a force, akin to electricity. It is somewhat like a flash of lightning (1). This fact attests the errors of confounding Prāna vāyu with an effete material—with gases generated during the processes of digestion. Shushruta describes it as a force, (2) which sets the whole organism into motion. Self-evolved, it acts as the principal

(1) प्रायम् यथा भुतानां प्रायं श्वासिष्ठति ।
प्रविक्ष्यम् मेकानानु प्रायम् प्रायम् मयां ॥
प्रवाहं ग्राहम् प्रवाहं मयां ग्राहम् ॥
चलते खेत्रस्थिति तद्यथा तद्यथालस्ति: ॥

Mahābhārata, Sānti Parva S. 39.

(2) Force may be defined as that which tends to produce motion in a body at rest, or to produce change of motion in a body which is moving. —Daschanel.
factor that determines the genesis, continuance and disintegration of the living body. It is the primary cause—an all-in-all that governs our organic as well as our cognitive faculties. Its special feature is that the vibration, that is produced in it, instead of travelling like light in a transverse direction, takes a course as the controller of the correlative functions of the system. It maintains an equilibrium between the Pittam and Shleshma which are said to be inert. (1) But for this adjustment the living body would stand in imminent danger of being consumed like fuel by its internal heat or fire. Taking into consideration the various functions the living body has to perform, Sushruta attempts a classification of Vayu into Prana, Udana, Samana, Vyana and Apana, which, in detail, correspond to the divisions of functions performed by the Cerebro-spinal and Sympathetic nerves of the Western physiology. Tantric literature abounds in the descriptions of the Nadichakras (nerve plexuses) and contains a more detailed account of the motor, sensory, and mixed nerves according to their differences in their functions and relations. In short, the term Vayu may not only be rightly interpreted to mean the nerve force, but is often extended to include any kind of electro-motor or molecular force (as when we speak of the Vayu of the soil), though the term is loosely applied now to signify gas or air. The Rishis of yore gave the name of Vayu to the bodily force in the absence of any suitable nomenclature, little suspecting that it might be confounded with the atmospheric air by the foreign translators of their works.

(1) A यात्रयेक्षत्रोपदेश; प्रवर्तकवृक्षदानन्

Charaka, Sutrasthānam. Chap. XII.

Inert is Pittam, inert is Kapha, inert are the Malas & Dhatus. Like clouds, they go wherever they are carried by the Vayu.
Pittam:—The function of the Pittam consists in, metamorphosing the chyle, through a graduated series of organic principles, to a protojasmic substance like sperm in men, and the ovum in women. Thus we see that the Pittam of the Ayurveda corresponds to metabolism of Western physiology. But by a confounding carelessness of terms the excreted portion of Rasā and blood though ultimately connected with those normal physiological processes has been respectively styled as the Doṣhas or dañaling principles of Kaphah and Pittam. Again, as in the case of soil, the terms Vāyu, Pittam and Kaphah are extended to denote magnetism, kinetic energy and humidity of its molecules. The circulation of blood is connected with the Pittam, while the circulation of lymph chyle (Rasa) is related to Shleshmā the two combinedly forming what is called the sustentative function of the Western Physiology.

The term Pittam, which, by its etymology, signifies the agent of metabolism, has been loosely used by our Ayurvedic physiologists to denote two different organic principles from an observed similarity in their nature and functions. Pittam in Sanskrit means both bile and metabolism of tissues as well as the bodily heat which is the product of the latter.

Hence a few commentators lean towards the view that Pittam is the heat incarcerated in the bile, and the principal agent in performing digestion (1). The real import of the term may be gathered from the five subdivisions of the Pittam, made by our Rishis according to their functions and locations, and which are called the Pāchaka, Ranjaka, Sādhaka, A’lochaka and

(1) दृष्टेष्वव: यद्यवर्तमानसिद्धापितावत्त| अविष्कासित: विनाशीवत्त| नेत्रनिःस्मादायथाय विणवेदः।

परस्परवृत्तचतुर्क्षण: विविधाय एव प्राप्त: सत्यायम्।

Madhukosha.


**Bhrájaka.** All metabolic processes in the organism, whether constructive or destructive, are called Pittam, which is said to be in the products of those processes whether serum, bile, blood, albumen, etc., which are either essential to the substance of the body, or to the proper performance of any organic function. Hence we learn that Pittam is latent in Lasiká (Serum), blood, lymph chyle, albumen etc., and in the organs of touch and sight. In other words, metabolism goes on in those principles and regions of the human organism (1) either as a sustentative or as a cognitive physiological process. First, we have the Páchakágni or the heat of digestion, which is situated in the region between the stomach and the intestines: (2) and being a liquid fire or fluid heat incarcerated in the secretions of the liver (bile), it is primarily concerned in digesting the four kinds of food (as they meet it in the abdomen). Thus we see that the Páchakágni of our Ayurveda is the same as the bile of Western physiology, its other function being to differentiate (precipitate) the nutritive essence of the food from its unutilisable portion, and to act as an excrementitious matter. It is this Pittam, which makes metabolism in other parts of the body possible, (3) by helping the organism in acquiring fresh energy.

1. नामिरतम; सहिष्नीवातनिधिर्म रसः।

इक्त्यतःन प गिताय नामिरत्म विनिभवत्॥

Bágbhat (Sutra Sthánam ch. XII.)

2. The bile assists in emulsifying the fats of the foods, and thus rendering them capable of passing into the lacteals by absorption *. The bile has been considered as a natural purgative ***. The bile appears to have the power of precipitating the gastric proteases and peptones, together with the pepsin, which is mixed up with them. *** As an excrementitious substance, the bile may serve as a medicine for the separation of certain highly carbonaceous substances from the blood.

Kirk’s Physiology Ch. XIII. pp 377-378.

3. तवं निविद्याद्भव वेदानामात्माव्यवस्थितः

वरोलि पञ्चानिन ग्रामयम नात तत् तस्म॥

Bágbhat Sutra ch. XII.
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The second kind of Pittam is called *Banjaka* or pigment Pittam from the circumstance of its imparting the characteristic colour to the lymph chyle as it is transformed into blood by coursing through the liver and spleen, where it is located (1).

The third kind of Pittam (*Sadhaka*) is situated in the heart, and indirectly assists in the performance of cognitive functions in man by keeping up the rhythmic cardiac contractions (2). Perhaps it is this view of the heart's contraction that predisposed many of our ancient physi-

(1) A. The colouring matter of the bile is derived from and is closely related to that of blood, since the qualities of the bile pigment secreted are markedly increased by the injection of substances into the veins which are capable of setting free hemoglobin.

Kirk's Physiology—(Metabolism in the liver.) Ch. XII. p. 505.

B. There seems to be a close relationship between the colouring matters of the blood and of the bile, and between these and that of urine (urobilin) and of the feces—*Ibid* Ch. VIII. p. 376.

C. It seems probable that the spleen, like the lymphatic glands, is engaged in the formation of blood corpuscles. For it is quite certain, that the blood of the splenic vein contains an unusually large number of white corpuscles. *†††* In Kottiker's opinion, the development of colourless and also coloured corpuscles of the blood, is one of the essential functions of the spleen, into the veins of which the new formed corpuscles pass, and are conveyed into the general current of the circulations.

*Ibid.* Ch. XII.

(2) A. The contraction (of the heart) can not be long maintained without a due supply of blood or of a similar nutritive fluid. *+++* The view that is at present taken of the action of the heart is *++* that in heart muscle, as in protoplasm generally, the metabolic processes are those of anabolism or building up, which takes place during diastole of the heart *+++* and the katabolism or discharge which is manifested in the contraction of the heart. Kirk's Physiology (metabolism of the heart). Ch. VI.

Bhāgavat Sūtra. Ch. XII. 13.
logists to hold it as the seat of cognition (*Vuddhi Sthānam*). (1)

The fourth, which is the Aloahaka or the Pittam of sight, indicates the metabolic process in the substance of the reśīna (Drishti) which gives rise to visual sensation. (2)

The fifth is the Bhrājakāgni or the Pittam in the skin which produces perspiration or helps exudations from the skin by evaporation. In short it is the Pittam which keeps active, under certain circumstances, the secretions from the sweat and sebaceous glands of the human skin.

**Kaphah** :- Sushruta is one in holding with Foster that "the animal body dies daily, in the sense that at every moment some part of its substance is suffering decay, is undergoing combustion." The etymological significance of the term Shāriam (Skr. Shri, to wither up) testifies to his knowledge of the combustion that goes on within the human system: Three kinds of fire are detected in the body, which are sure to feed upon its constituent principles in the absence of proper fuel in the shape of food and air. It is food and the fundamental bodily principle of Shleshmā, which is cooling or watery in its essence, that fly to the rescue of the organism, the latter (Shleshmā) surcharging it with its own essential humidity and keeping intact the integration of its component molecules.

The Rasa, or lymph chyle which is formed out of the ingested food, prevents the internal bodily fires from

(1) The seat of the moon is at the root of the palate and that of the sun is at the root of the navel; the place of the air (or brah) is above the sun, and mind dwells above the moon. Chittam (or the passage between the mind and the spiritual soul) dwells above the sun, and life dwells above the moon.


(2) It is supposed that the change effected by the light, which falls upon the retina, is in fact a chemical alteration in the protoplasm, and that this stimulates the optic nerve-endings. Kirk's *Physiology* Ch. XVII.
praying upon the vitals by coursing freely through the whole organism. The Rasa, thus generated, undergoes a sort of purification, the purified portion being called *Prasadaḥ», and the excreted portion *Malabhuṭa*, such as are found as effete products deposited in certain pores of the body. Kaphah or Sleshma is that portion of Rasa which fills all the intercellular spaces of the body, thus holding them together in a kind of cooling embrace (Skr. Slish to embrace) and prevents (1) the dreadful conflagration which would otherwise have been caused by organic heat. Our *Āchārjas* have classified the Kaphah into five different kinds such as the *Kledaka*, *Avalamvaka*, *Vodhaka* and *Shlesmaka* according to their different functions and locations in the economy.

**Dosha**:—The lymph chyle, born of the digested food, and which courses through the body, potentially contains the elements which build the different tissues of the human organism. Under the influence of metabolic heat it is progressively transformed into blood, flesh, fat, bone, marrow, semen and *Ojah*. In other words, under the process of physiological metamorphosis, the lymph chyle sets free that part of its constituents (2) which possess blood-

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(1) A [Sanskrit text]—Bāgbhat.

(2) A [Sanskrit text]—**Bhāva Mishra.**
INTRODUCTION.

making properties, and are ultimately transformed into blood—its unutilised or excreted portion being eliminated through the natural apertures of the body, and so on, through the progressive series of metabolism to Ojah Dhátu. Thus with the derangement of the bodily Váyu which causes the free coursing of the lymph chyle through its vessels, the Pittam (metabolism of tissues), in any particular part of the body, is also affected by reason of its incarceration, and thus causes an increase or diminution in the excreted portion of the Rasa, which is another name for Kapham during the progressive metabolism. Thus we see that Váyu, Pittam, and Kaphah, which, in their normal state, are the three supporting principles of the body are transformed into morbific diathesis by increasing or diminishing the bodily heat, secretions, or excretions.†

Thus congestion and inanition (atony) are the two main forms of disease recognised by the Ayurvedic Pathologists, the former being held amenable to resolution or elimination, and the latter to local feeding or nourishment.

Agni and Dhátvagnis:—We can not better conclude this portion of our dissertation than by speaking a word or two about Agni. Sushruta raises the question whether there is any kind of fire in the human organism other than the Pittam; or are they identical? Sushruta holds that the Pittam is the only fire present in the system, in as much as all acts from the digestion of food to the disintegration of tissues are performed with the help of the Pittam, which includes within its signification what is connoted by Anabolism and Katabolism of Western Physiologists. But Agniyósha and certain sections of the Ayurvedic Acharyayas hold that there

† A भवस्व भवायपि द्वेषोगिन्: वशतः।

भवस्वस्वाभापि मधी होवा प्रति क्षति:॥

Bhávaprakásha Part I.

B भवस्वस्वाभापि मधी होवा प्रति क्षति:॥

Charaka Sutrasthánam Chap. I.
are five Anjáli-fuls of Agni (1) in the human organism. This discrepancy is best explained away by including one Yava measure of Agni (enzymes, ferment) in the five Anjáli-méasures of Pittam.

The Ayurvedic Physiology recognises the existence of another kind of Agni, which is called Dhátvágni (proto-plasm) and which it classifies into seven different kinds. Arunadatta, the celebrated commentator of the Ashtángahrídayam, holds that there are as many Dhátvágánis as the constituents of the body. (2)

(1) चच विलस —Charaka Samhitá.
(2) A एवं पाचमूलिका बड़हः —एक समर्थः —समस्फुकं भवनामां पति भगीरिष्यतः। नवपारिष्ठाचार्याः प्रकाश वृत्तः —वायुचार्यः —पर्याप्त धातु-गत्य पाचमूलिकाश्च तत्त्वाय पारिष्ठाचार्याः। तेष पारिष्ठाचार्याः प्रकाशः —पर्याप्तः। Arundatta.

H. तथा सातूदि चित्रायते सौमित्रिक्षमाति।

चचु यावथिती भगिनं च पाचमूलिकााँज्ञाति। Ibid.

C. तत्सौ द्वारां सम्बन्धं महत्वं च पद्यते।

पितारिकाः स प्राप्त रजसक्रमविष्मानं।

वायुसृजितं रुतुस्कम चार्यसंसर्गम।

विकसत सर्व चार्यं सर्वं लोक्षणम यथासन्तरम्।

अजितं ज्ञानामुखिकोष्ठिकां सीमीभिषमातिः।

प्रविधानाविविधकानं संहिता: लोकाभागाः।

आपनं प्रबोधकं स्वविद्धशः तत्त्वदानम।

विदितं तत्र द्रीपादेशेऽ च समीक्षयं।

यद्वादृष्टं पूर्वनसो वेदीयं च मया तत: वृत्तः।

tतत्त्वाय मृत्तम व: इथं द्रष्टं संवाचारं च:।

वायुसृजितामित्वं: सीमीं सवेदेतिकः। Charaka Samhitá, Chikitsásthánam. Chapter XV.

D. कामद्विष्णु चतुरीयो दिनविं च प्रकाशः।

चचालकालिः: पाच्यं बनिन्तं विविध प्रकाशः।

Vid Ibid Chap. XX.
called, Dhātuṣ or fundamental principles of the economy, when in virtue of their correlative and substantive functions, or with the help of their subservient processes of metabolism and lymphatic circulation, they ensure an equipoise among the different vital and physiological processes in the whole economy which is essential to its perfect health. Biologically considered they are but the primary subtle dynamics of organic life, or as Sāyana expresses it, the three fundamental principles of the body. But when this healthy equilibrium is disturbed either through the agency of any extrinsic or idiopathic factor, when any one of them is abnormally augmented or dominates the other two, thus altering their mutual relation in the economy, naturally certain pathological conditions arise which form the esse of a disease; or in the parlance of the Ayurveda they are said to have been transformed into Doshas or morbillic diathesis. Even blood, which, according to our Acharayyas, forms one of the fundamental principles (Dhātu) of the organism, may be designated as a Dōsha (morbillic diathesis), when owing to its congestion in any particular organ or member of the body, it brings about a disturbance in its general vascular system and produces pathological conditions which are offshoots of its own deficient or disturbed circulation. They are denominatd as Malas, when observed still in grosser or superficial principles of the organism producing those excretions, or organic lesions which appertain to the sphere of morbid Anatomy. Thus we see that the Ayurvedic principles of Vāyu, Pittam and Kaphah embrace both the biological and pathological...
principles of the organism; or in other words, the Ayurvedic physiology elucidates and investigates the causes through which the same principles, which sustain life and the organism, are transformed into the dynamics of disease, lastly pointing out the grosser excretory changes and organic lesions in the external or superficial plane of existence, which form the subject of morbid anatomy and are sometimes confounded with the disease itself. In the Vāyu, Pittam and Kaphah of the Achāryayayas we have at once a complete picture of the finer sustentative forces of the human economy as well as their antithesis, the constructive as well as the expulsive forces of the inner man, together with an exhaustive analysis of their grosser products which legitimately fall within the sphere of morbid anatomy. A real knowledge of the nature and functions of the Vāyu, Pittam and Kaphah may be useful in giving a deeper and clearer insight into the principles of true biology or pathology. It is incorrect to translate Vāyu, Pittam and Kaphah as air, bile and phlegm, except under certain circumstances. Vāyu, Pittam and Kaphah are air, bile and phlegm only when they are transformed into Malas or grosser organic excretions which are supposed to be so very intimately connected with factors, pathogenetic or pathological, but they are not air, bile and phlegm in those planes of their functions which determine the genesis, growth and continuance of the organism, as well as its death, decay and disintegration. The knowledge of a region without that of its antipodes is but a half knowledge, and the principle of Vāyu, Pittam and Kaphah is the only one of its kind that tries to embrace the whole sphere of organic existence.

Ojah-Dhātu:—From what has been stated before it will appear that during the process of tissue-formation, the lymph or chyle, under the influence of Pittam, or metabolic heat, is transformed into the same, the refuse or un-utilisable portion of it being passed off through the
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... apertures of the body, as excretions. The Ojah-Dhātu is present in the reproductive energy that lies latent in every organic principle, viz. lymph, blood, muscles, bone (synovia), marrow, and in the male & female reproductive elements. Hence, it is not a matter of surprise when we find in Ayurvedic works this Soma, or Ojah-Dhātu mentioned as lying diffused in the human organism and described as the essence of the lymph chyle, blood, &c. (1). The terms Rasagata Ojah, Raktagata Ojah are therefore used: perhaps in the sense of modern serum-albumen, blood-albumen, &c. The male & female reproductive elements, according to this view, form the essence of the body as a whole, and the Ojah, which is abundantly found in these protoplasmic cells, is the quintessence of a quintessence. The muscle of the heart alone, according to Charaka, is chiefly associated with this energetic substance, which is of a bloody yellowish colour & possesses both cooling & heat-making virtues. (2)

In diseases caused by defective assimilation it is said to be ejected through the kidneys and to pass off with the urine (as in certain types of Prameha) (3), whereby the patient gradually loses strength, flesh, and healthy glow of complexion inasmuch as these are but the accompaniments of its

(1) शीघ्रत्व निमीच्छन्तिः प्रकाशानां परम्पूर्वकः सतम ।
ह्रद्विश्लक्ष्याति यथाष्टर्गतिर्भवति ॥
Vāgbhart

(2) पूढिः नैतरिति वधुभं विनयवर्तं विभववर्तम cognition.
पोलाः प्रीति संञाहारं तत्रात्मारं विद्याविद्याः
Charaka (Sutra Sthānam) Ch. XVII.

(3) A. सत्राहतिनिहित्रोल भादाय निष्कर्षः
वदा विषसं तद्भव क्रीडा शुभे ऐवं प्रवचनं ॥
Charaka (Sutra Sthānam) Ch. XVII.

B. चोल; पुनर्महान्नवायू; सत्राहति वधुच वस्तुवालैह जलस्यमुदितम् भवेत्
Charaka (Sharīra Sthānam) Ch. IV.
healthy continuance in the human organism. "Health and strength," observes our Rishi," reside latent in the Ojah-dhātu, as butter (Ghritam) lies latent in milk. (1)

Dallana Mishra, the celebrated commentator of the Sushruta Samhitā, has defined Ojah as a fatty substance completely combustible in its character. Thus in the course of tissue combustion its excess quantity is deposited especially in the female body as fat which produces that peculiar softness and elegance. (2) The presence of Ojah in urine is said to induce Madhumeha (3). Taking this fact alone into consideration one is inclined to the belief that Ojah must be something of the nature of sugar. As a consequence of these different interpretations of Ojah the question arises whether there is present in the human organism any such common element that produces either of these two important oxidising materials, viz. fat and sugar.

It is a demonstrated fact in modern Physiology that glycogen is found in other tissues and organs besides in the liver. Tissues of embryos and of young animals as well as newly formed pathological growths may be said to contain glycogen. The activity of the heart, as well as the development of the fetal body (4) is largely dependent

(1) A. चौथ: सर्वमार्दरक्ष्य किच्च शैत्य रीर रीर खितम | शैत्याक्ष्य शवीरक्ष्य बलपुटितर सतम || Bhāvaprakāsha. Part I.

B. चौरं द्वारसिद्धि गतां चाक || Bhāvaprakāsha.

(2) देशोऽवायं कलम्: दधासामायं धातुसब्रसिद्धिक्षेत्रसः दधात वधायं एवां श्रीरोक्ष्य मस्तिष्कीयं भवति तत् सादां शैलसायं भवति || Bhāvaprakāsha.

(3) See Note 3 (B) Page iv.

(4) स्वं बालादि सर्वमं वदवयप्रेमसायसः || समस्मासः ददयं समाबिष्टित वन्य पुरा || Charaka Sutrasthānam, Chap. XXX.
upon this Ojäh-dhātu which may be best translated as glycogen in the parlance of Western physiology. In fact, our Achāryayayas have used the term “ojah” to denote that vital principle in the organism which is essential to the maintenance of a healthy combustion in its tissues and to the due performance of their normal functions and activities, no matter whether that principle is patent in the form of protoplasm, protoplasmic albumen, glycogen or mucosin (Prākrita shleshmā) in accordance with the difference of their functions, geneses, and conditions of protoplasmic metabolism. In short, they were cognisant of the fact that fat and sugar are evolved out of a common basic principle in the organism as has been very eruditely demonstrated by Dr. S. N. Goswami, B. A., L. M. S. in his treatise on Pumsavanam. It is far from our intention to thrust this opinion on anyone; we have simply stated our conclusion in the matter and will welcome the result of fresh enquiries on this subject.

A. प्राक्षामण्यु वश संश्रेा विना नव रभुलयि।

श्रेयोमक्ष्य: क्षुद्धि काष्टिः प गाढीपदिषिनयि।

Charaka Samhitā-Sutrasthānam, Chap. XVII.

B. दशस्थावरूप्यालाम्बव्ययान्य आग्नविधाय वाघ्यविधाय।

Chakradatta’s Commentary S. Samhitā, Sutrasthānam Chap. XV.

† “From these extracts it appears to us still more vividly that our countrymen did also discover, like Dr. Pavy, the importance of fat and sugar in the animal economy, as well as the mode in which they can be elaborated from one common principle. (76-78). A comparative study of the two systems of medical science, Indian and European, has led us to arrive at this conclusion; if we, therefore are not inclined to identify Ojah with albumen, as it has been done by some modern Indian commentators, we have reasons to believe that the aforesaid extracts have not as yet received sufficient consideration from them, as forming the nutritive basis of the procreative elements; in short the subject has hitherto been neglected or, at least, been placed in the background, from want of attention on the part of those whose business it was to investigate into the truths of Science. To hold that Ojah is kept in deposit in the heart, as a reserved food material, for the maintenance of its own work.
Space does not permit us to give a synopsis of the physiology of Sushruta. It is enough for our purpose if we can create an interest in the various physiological problems discussed by our author in this part of his work, or in his description of the physiological processes, which are essential to the healthy continuance of human economy. But if Hindu physiology is startling in its demonstration of the as well as for the production of germinal seed, is to admit that efficiency of reproduction depends entirely upon the efficiency of this important substance in the body.”

(76) गृह्यसिद्धान्तात्यथा विद्यामुदाहरिताः समस्ताः।

वधिर्मिहाय निद्रानाविनुष्ठानाः संगीतयुताविनुष्ठानाः।

विनिवा लोकम विविध सांविधानिकम पश्चातः।।

तैरात्वस्तिः वैषयेऽपि तात्त्वकः श्रवणः।।

उदाहरणं दर्शिद्धेऽक्तीयाँ व्रजते। प्रवकः।

(77) प्रत्येक तिमिरं ज्योतिरं ज्योतिरं ज्योतिरं ज्योतिरं।।

विद्यामुदाहरिताः।

(78) निद्रानाविनुष्ठानाः संगीतयुताविनुष्ठानाः।

विनिवा लोकम विविध सांविधानिकम पश्चातः।।

अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः अः

76. Those who partake of heavy and cooling food abounding in acids and salts, of new rice, and beverages, or constantly enjoy sleep and luxuries, or neglect the exercise of body and mind, or who habitually abstain from the use of corrective medicines, help to accumulate in their bodies phlegm, bile, fat and flesh; and these interfere with the functions of the Vayu, which causes the Ojah to be displaced from its proper place down in the bladder and produces glycosuria.

77. As Ghee pervades the whole of milk, so Teja (ojah) permeates all the tissues of the body.

78. Teja (Ojah) too is combustible: in course of tissue-combustion, the excess quantity of it gets deposited especially in the female body as fat which produces softness and elegance.
fact that growth is not the only condition of life, that vitality is somewhat independent of the physiological processes, that the inner man, with the help of Yoga, can long survive even without food and respiration, and that death and decay may be arrested to a considerable degree by completely stopping many of those physiological processes in the body,† which are considered so very essential to living by the savants of the West, then Hindu pathology is unique in its conception of the nature of disease.

Sushruta's Pathology:—What is it in a man, asks Sushruta, that falls sick? What is that that we treat medicinally? The body or the mind? Sushruta says that, "anything that afflicts the inner man (self or Purusha) is disease; and that disease has its primary seat in the inner spring of vitality from which it flows out to the surface, the external body". In man, as in everything else in the universe, the direction of the inherent force is from the centre to the circumference. The shock is felt first at the centre of vitality, whence it is transmitted outwards and thus affects the energy which holds the molecules together, Dvyanuks and Tryanuks (Binary and tertiary atoms) of which the gross body is composed, and further opposes the dissolution of those molecules into their elemental constituents in the living organism. Even in cases of external injuries such as snake-bite, etc. the potency of the virus is carried at once to that centre from whence it is almost instantaneously transmitted through the external channels of the body to its surface,

ब्रह्माचार्य सुभाषिणि निबन्धः

कृतानां अध्येयम्

Pñānjala Darshanam Vibhutiśa 29—30 A.

† शोषकम् निरपराधात सबो तत्तत्वस्कृत परासागारस्य बोधोः

Pñānjala Darshanam. Vibhutiśa. 21 A.

† गर्भानु पुष्पोदितानाम् तदुस्व संबोधनयो वाष्ण द्वाराश्च

otherwise what purpose does the vāyu (nerve force) serve in the human economy? What do those myriads of Chaitanyavāhini Nādis (sensory nerves) exist for in the human system? In all diseases the subjective sensations are the first to be experienced. "I am ill," "I feel hot," etc. are the voices of sensations, which form the "esse" of the disease. Disease then is a force and not matter.

Pathology of Tridosha:—Sushruta, though adopting the Vedic pathological dictum of Tridhātu, has expressed a very clear opinion on the subject. He observes that the relation between a disease and the deranged Vāyu (nerve force), Pittam (metabolism) and Kapham (unutilised product of the system), and the pathogenic factors which lie at the root of that disease, is not real but contingent. These morbid principles may permeate the whole organism without creating any discomfort, and it is only when they find a distinct lodgment, and are centred in some distinct part or tissue of the body, that they become the exciting factors of disease.

Drug Potency:—The next question which naturally arises in connection with such a theory of pathogeny, is what is medicine, or in other words, what is it in the drug that cures! Sushruta, after closely investigating all the theories on the subject, inclines towards the opinion that it is the potency of the drug that is curative, though he observes that inasmuch as potency cannot exist independently of a drug, a drug is of primary interest for all practical purposes in therapy.

Drug-Dynamisation:—"It is the potency of a drug that cures a disease". The potency is administered best

* That Hahnemann's theory of disease was long before fore-shadowed by Sushruta, will appear from the above extracts from his works. Hahnemann observes that, when a person falls ill, it is only this spiritual self-acting vital force, everywhere present in the organism, that is primarily deranged by the dynamic influence of a morbid agent inimical to life—Orgonon.
when the physical or chemical properties of a drug are annihilated. This is best performed by subjecting it to heat or pressure. In the medicated Ghritas or oils of our pharmacopoea, which are prepared by successively boiling or cooking them with drug-decoctions, we cannot even detect the trace of any of its component drugs, but still we know how potent and efficacious they prove in the hands of our Vaidyas. When Sushruta formulated the process of preparing medicinal oils and Ghritas, and laid down the use of Shatadhautam Ghritam (clarified butter, a hundred times washed with water in succession), Sahasrapak Tailam (medicinal oil, successively cooked a thousand times), or Kumbha-Ghritam (clarified butter, a hundred years old) it may be fairly said that he was in sight of the principle of drug-dynamisation.

Principles of Ayurvedic Treatment:—Ayurvedic physicians practically recognise two different sets of principles in the domain of practical therapeutics, which may be stated in the terms of their western colleagues as Laws of Similars and Contraries. This apparent contradiction has been fully accounted for and explained in the writings of the latter day commentators, but it does not fall within our province to enter into these disquisitions. In addition to those, Sushruta, in common with the Acharyayas of his time, never fails to emphasise the value of psycopathy in

* Similar in character to the exciting factors of a disease—Similar in character to the Easa of a disease—Similar in character both to the exciting factors and Easa of a disease.

Contrary in character to the exciting factors of a disease.
Contrary in character to the Easa of a disease.
Contrary in character both to the exciting factors and Easa of a disease.

शुच्राचर्य लक्ष्मीबाई भारतीयाचर्याचर्यांत

tीर्थराचर्यांमध्ये दुधारांक

Mādava Nidānām Ch I. V. 8.
those forms of mental or nervous distempers for which Mesmer rightly now receives so much honor. Since the creation of man, the touch of the “Saintly” has been credited with the virtue of curing the sick; and Avesha (auto-hypnotism) and Samádhi (higher phases of clairvoyance) have achieved many miracles in the art of healing in India, which was the first country where it was first successfully practised for the welfare of man.

Samshodhanam and Samshamanam:—All kinds of treatment may be grouped under two heads such as Samshodhanam and Samshamāham, i.e. either the body should be cleansed (Samshodhitam) of the morbid diathesis with the help of emetics or purgatives, or steps should be taken to restore the deranged Vāyu, Pittam and Kapham to their normal condition with the help of proper medicinal drugs without resorting to any eliminating process. But in cases of inflammation, Sushruta enjoins that, instead of any Samshamanam remedies, diaphoresis should be first resorted to. In cases where counter-irritants are indicated and in parts which are directly accessible, leeching and cauterisation should be practised with a due regard to the season of the year and the requirements of the case. We find in his Samhitā a detailed account of the several species of leeches with their habits and habitats.

Forms of medicine:—Powders, laumbatives, decoctions as well as medicated oils, Ghritas, confection and wines are the forms in which, according to Sushruta, medicines should be given. The different drugs such as roots, leaves, etc. should be culled in the seasons proper to each. He classified the soil into five different kinds for the purpose of growing drugs of different therapeutic properties. Even the virtues of different flavours and colours were ascertained with regard to their respective actions on the deranged morbidic principles of the body.

Basayham:—The Ayurveda being the science of life and health, the holy Agnivesha, at the very commencement
of the therapeutical portion of his work, has described several medicinal compounds, which improve general health and arrest the ravages of time. Theoretically speaking the science of the Ayurveda recognises no preordained limit to human existence. Life can be prolonged with the help of suitable medicines. By dint of observation and patient researches our Rishis devised many such adjuncts which can rejuvenate an old man, and supply those vital elements to an old and exhausted human body, which ebb away with the progress of years. Hence, we find many rejuvenating medicines to have been prescribed for men in health which would arrest decay and guard against the approach of senility by increasing the fundamental vital principles of the body and preventing Vayu, Pittam and Kapham from being transformed into morbid diatheses.

Diet—“A good and proper diet in disease is worth a hundred medicines and no amount of medication can do good to a patient who does not observe a strict regimen of diet.” Our Ayurveda, instead of being content with specifying the nature of diet in diseases in general, mentions the names of articles, which should, or should not be taken in any specific malady, judged by the light of their properties of aggravating Vayu, Pittam or Kapham. The dietic or therapeutic properties of a large number of articles of human consumption, as well as the chemical changes they undergo in the digestive apparatus of different mammals, have been studied and analysed, and so we find in our physique, medical Samhitás, such injunctions that barley-corns passed undigested with the feces of a "cow or
**INTRODUCTION**

Horse, should form the diet of a Prameh patient, that the milk of a she-camel should be given to a patient suffering from a cutaneous affection, and that the flesh of any carnivorous beast or bird should be given to one suffering from pulmonary consumption and so on. It was a cardinal doctrine with Ayurvedic dietists, that the longing of a patient for any particular kind of food in a certain disease, emphatically shows that his organism is in want of those elements which enter into the composition of the article offered. Hence elaborate dietetics were formulated, which cannot but be acceptable to the most fastidious patient.

**Therapeutics**—The exclusion† of salt and water from the food of an ascites or anasarca patient as laid down in our Samhitas shows that our Rishi possessed a higher chemical knowledge regarding the effects of organic matter on the human system than many of us are ready to accord to these pioneers in medical science.

**Medical Botany**—After therapeutics comes the subject of Medical Botany. Sushruta divides the whole vegetable

* खराँ गाँवानमि विद्यानिनि गुरुबिक्ष ।
  
  देहाकाय वैषयवा यमानि, कर्मेन गौणसामाय निमायः ॥

  Charaka Samhitā, Chikitsa Sthānam. Ch. VI. 35.

† The efficacy of such exclusion has been lately demonstrated by the researches of Dr. Benjamin Horniman (Lectures, Sanitarium, Park st., London.)

† A. मये गांवानमि विद्यानिनि गुरुबिक्ष ।
  
  * नायार्मार्मात अवरी तोषाणांच वर्जिणेत् ॥

  Charaka Chikitsā Sthānam Ch. XIII.

II. सूताखानुसारिणि संके दाने गीवेत्
  
  * Iuid Chap. 13.

C. सताईषैः लघुपर्य गावः विवेद्यनार्थार्थाः ।
  
  * गावां वल्लवं शरीरायमि च चिरागान्तु सूतीनार्था वा ॥

  Charaka Chikitsā Sthānam Chap. 12.
kingdom into Vriksha, Gulma, Vinaspati and Virudha. This classification has been minutely worked out in works on Hindu Botany where we find such nice subdivisions as Agravija (whose topplings are only planted), Mulaja (whose roots only are planted), Parnayoni, Skandaja, Vajruba (germinated from seeds) and Sannurudhaja. But the botany of Sushruta is more of the nature of a Materia Medica than a work on Botany proper, though sometimes he mentions the habitat and describes the foliage of certain plants so that they may be distinguished from others of a cognate species.

The uses of metals and minerals for therapeutical purposes in India are as old as the Rigveda itself. Sushruta describes the methods of preparing oxides, sulphates or chlorides of the six metals as the case may be. Mercury has been only once mentioned in the Samhitā and then very vaguely too. Processes for the preparation of alkalis and the lixiviation of ashes are very elaborately described. Beyond these the chemical knowledge of Sushruta scarcely extends.

Hygiene and Public Health:—As a writer of Hygiene and public health, Sushruta emphasises the importance of cleanliness of both spirit and body. Water whose disinfecting virtues have so often been hymnised in the Vedas forms the subject of discussion of an entire chapter of the Samhitā. Outbreaks of epidemic have been attributed to contrary seasons, to the floating of minute particles of poisonous flower pollen in the air, and to the sin or unrighteous conduct of the community. Earthquakes, famines, and physical phenomena, which are at present attributed to magnetic disturbances of the earth, have been

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Lead crystals (including diamond) gold and mineral poisons are mentioned in the I. 34, I. 49, I. 55, and IV 10. of the Atharva Samhita.

Rik Samhitā I. 23 b. 19a.
described by Sushruta as the usual precursors of devastating epidemics such as plague etc. Mortality among birds and an unusual death among rats and other harrowing rodents have been included among other presaging indications of a visitation by Providence? Interrogated as to the cause of such outbreaks, Dhanvantari observes that, the Vāyu (molecular energy) of the soil is disturbed or affected by earthquakes, and seasons of unnatural drought or deluge, deranging their Pittam (kinetic energy) and Shleshmā (humidity) which produce morbidic factors that affect a whole community. Sushruta, as a true physician, has elaborately dealt with the regimen of diet and conduct during the different seasons of the year (Ch. 24 - U. T. 64) which, strictly followed, should act as a good prophylaxis against attacks of many epidemic diseases, being framed with a most careful regard to the conditions of life which obtain in it, and ward off those sad breakdowns in health, which are, in many instances, the result of an unsuitable mode of living in this country.

**Twofold division of Time &c:**—It is a fundamental dictum of Sushruta that in a case of medical treatment the then prevailing season of the year should be taken into account. In his Samhitā we find two distinct classifications of seasons, one based on the peculiar physical phenomena which distinguish the different seasons of the year, a fact which emphatically proves that Sushruta was an inhabitant of the sub-Himalayan Gangetic Doab, the other is for the purpose of showing the respective accumulation, aggravation and subsidence of morbidic diatheses (Doshas). In the same manner the different quarters of the day and night have been minutely charted or set down to show the spontaneous aggravation and subsidence of the deranged Vāyu, Pittam and Kaphah during the 24 hours. The influence of planets as to the production of certain diseases such as small-pox, measles, scarlet fever, &c. is almost a proved fact. As it governs the prevalence and non-prevalence of certain maladies, the aggravation and
non-aggravation of certain existing disorders as well owe much of their origin to this potent factor. The vegetable kingdom from which we glean our daily food is also subject to this influence, and hence the discrimination we exercise in selecting our food on certain days of the lunar month.

Countries have been divided into Jângala of A'ñupa according as their physical features partake of the character of a dry plateau or of a swamp or marsh, a Sâdhârana one possessing features, which are common to both. Diseases, which are natural or are spontaneously relieved in each of these kinds of country have been treated with that scientific insight which marks modern medical works on sea-side or spring sanitariums. The virtues of the waters of different rivers of India were ascertained for the purposes of practical therapeutics. The therapeutic properties of the milk of a she-goat, she-buffalo, mare, cow-elephant, or woman, as well as of any of their modifications such as curd, whey &c. together with the properties of the flesh and urine of the several groups of she-animals, which are indigenous to the land, were studied and analysed, thus placing at the disposal of a practical physician a list of dietary in different diseases to soothe the taste of the most fastidious patient, and which is at the same time potent enough to cure the distemper he is suffering from without the help of any special medicine. Thus it is that we find our Vâdyâs prescribing the flesh of many carnivorous animals as a diet in consumption, goat's meat in phthisis, goat's milk in colitis and Tittira's flesh in fever &c.

Diseases of the Kidneys and Bladder:—In treating of the diseases of the kidneys, bladder and the urethra, Sushruta has described the symptoms and the colour of the urine in each specific variety without laying down any mode of testing the urine. But we know that Sushruta has enjoined his readers at the very outset of his work to refer to other allied branches of the science for information which is not contained in his book. In the same manner
we can account for the absence of any instructions as regards the feeling of the pulse as an important auxiliary in making a correct diagnosis. We need but repeat the statement that the readers of this Samhitā must look for this information in the Kanāda's Nādi Vijnānānam, which has made our Vaidyas such expert sphygmologists.

Kalpa:—In the Kalpasthānam of his Samhitā, Sushruta has described the symptoms of hydrophobia and snake bites, etc. as well as those developed in cases of vegetable poisoning, together with their therapeutical treatment and remedies, which, if rightly studied and investigated, may yet throw a new light upon the subject.

Sushruta as an Observer:—It has been lately discovered by a German physiologist that tubercular bacilli do not thrive in goat's blood. The importance of goat's milk in colitis as an efficient agent in checking ferments in the intestines, or of the close contact of a goat as a powerful auxiliary in curing tuberculous phthisis was first demonstrated by Sushruta. Not only this—but the inhalation of the air of a cattle-shed and especially the fact that exhalations of goats, bodies tend to destroy the phthisis germs did not fail to attract the attention of the Indian Rishis; the fumigation of the sick-room with antiseptic preparations such as चक्रधूप (Asthāṅga dhūpas) is purely Indian in its origin and in no way inferior to the modern introduction of Cogghill's respirators. The microscopic germs that are said to propagate septic fever otherwise called चुरायिस वायु विनियम are found very often to disappear under this Indian device where no medicines produce any impression. Thus many a wonderful discovery like the above hails from the dimness of a bygone age. Many truths lie embedded in the vast medical literature of the Brāhmaṇas which claimed close attention and devout study, even by the western savants. We have not laboured in vain if these pages can help a little to revive the old genius of the Ayurveda, or help the progress of human Science one step onward towards the attainment of its goal.
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1. Āṅgul yantra.

2. Ārsho yantra.

3. Aṣhmāryāhāṇa yantra.

4. Pāsti yantra.

5. Bīṃgāmukha yantra.

6. Darvyakritishalaka.

7. Gaṅgāshankha yantra.

8. Jalodar yantra.


11. Mūchē yantra.


13. Rīkṣhaṃukha yantra.


SEE CHAPTER VII.
PLATE No. III.

1. Indeunghara
2. Pim. n. c. e.
3. Ant...4
5. Lambo...
6. Lambo...
7. Lambo...
8. Antar...karetu

See Chapter VIII