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THE

Surgical Instruments of the Hindus

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THE

SURGICAL INSTRUMENTS OF THE HINDUS

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A Comparative Study of the Surgical Instruments of the Greek, Roman, Arab and the Modern Eouropean Surgeons.

D3026 (9)

BY

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TO

THE HON'BLE

SIR ASUTOSH MUKHOPADHYAY, Kt.,

Saraswati, Sastra-vachaspati,

C.S.I., M.A., D.L., D.Sc., F.R.A.S., F.R.S.E., F.A.S.B.,

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VICE-CHANCELLOR, CALCUTTA UNIVERSITY,

Ex-President of the Asiatic Society of Bengal,

AND

Chairman of the Board of Sanskrit Studies,

In recognition of his love of Science, his pre-eminent services to the cause of University Education, his administrative ability, and his generous liberality to scholars

AS WELL AS

In grateful remembrance of many acts of kindness,

THIS VOLUME IS

DEDICATED

BY

THE AUTHOR

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PREFACE.

For researches into the state of medicine among the Ancient Hindus, we have several sources of information to scrutinise. The remarks of Dr. Payne regarding the sources of information of Anglo-Saxon Medicine may apply here with still greater force.[1]

First is the evidence of contemporary literature about the craft of physicians and surgeons, since we are sure that there has always been a class of medicine men of one kind or another. Thus we find in the Ṛgveda, the use of artificial limb as a substitute for a limb accidentaly lost[2]. From the Mahābhārata,

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[1] Payne's English Medicine in the Anglo-Saxon Times, P. 7.

[2] चरित्रं हि वैरिवाच्छेदि पर्णम्
आजा खेलस्य परितक्म्यायाम् ।
सद्यो जङ्घामायसीं विश्पलायै
धने हिते सर्त्तवे प्रत्यधत्तम् ॥

Ṛgveda—15th Ṛk., 1st Mandala, 116 Sūkta.

अगस्त्य पुरोहितः खेली नाम राजा तस्य सम्बन्धिनी विश्पलानामस्त्री, संग्रामे शत्रुभिः छिन्नपदा आसीत् । पुरोहितेन अगस्त्येन स्तुतौ अश्विनौ रात्रौ आगत्य आयोमयं पादं समधत्ताम् । तदेतदाह 'आजा'—आजौ, संग्रामे, अगस्त्य पुरोहितस्य—खेलस्य राजतः सम्बन्धिन्याः विश्पलाख्यायाः, 'चरित्रं'—चरणं, 'वैरिव'—वैः पक्षिणः, 'पर्णं' पतनम् इव, 'अच्छेदि हि'—पूरा छिन्नमभूत् खलु । हे अश्विनौ ! युवां अगस्त्येन स्तुतौ सन्तौ, 'परितक्म्यायां'—रात्रौ, आगत्य, 'सद्यः'—तदानीमेव, 'सर्त्तवे'—सर्त्तुं गन्तुम् इत्यर्थः, विश्पलायै 'आयसीं';—लौहमयीम्, 'जङ्घां'—जङ्घापलक्षितं पादम्, 'प्रत्यधत्तम्'—सन्धानम एकीकरणमित्यर्थः कृतवन्तौ ।

Sāyana's commentary.

we learn that when Parīkṣit, the king of the Kurus, became certain of his approaching death by snake-bite, due to a curse uttered by a sage, he tried to protect himself by the constant attendance of a number of physicians, who were well supplied with antidotes.[1] Again it is stated that when the great warrior Bhīṣma was wounded in war, the skillful army surgeons came to him with the necessary medical and surgical appliances to treat his wounds.[2] From the Mohāvāgga, we learn that Jīvaka, the personal physician of Buddha, practised cranial surgery with success.[3] In the Mālavikāgnimitra, we find the use of charms—a signet

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[1] संमन्त्र्य मन्त्रिभिश्चैव स तदा मन्त्रतत्त्ववित्।
प्रासादं कारयामास एकस्तम्भं सुरक्षितं।
रक्षाञ्च विदधे तत्र भिषजश्चौषधानि च।
ब्राह्मणान्मन्त्रसिद्धांश्च सर्व्वतो वैन्ध्यवीजयत्।

Mahābhārata, Adi Parva, Ch. 42.

[2] उपातिष्ठन्नथो वैद्याः शल्योद्धरणकोविदाः।
सर्व्वोपकरणैर्युक्ताः कुशलैः साधु शिक्षिताः।
तान् दृष्ट्वा जाह्नवीपुत्रः प्रीवाच तनयं तव।
धनं दत्त्वा विसृज्यन्तां पूजयित्वा चिकित्सकाः।
एवं गते मयेदानीं वैद्यैः कार्य्यमिहास्ति किं।
चतुर्धर्म्मं प्रशस्तं हि प्राप्तोऽस्मि परमां गतिं।
नैष धर्म्मो महीपालाः शरतल्पगतस्य मे।
एभिरित्येवमाहं दग्धव्योऽस्मि नराधिपाः।
तच्छ्रुत्वा वचनं तस्य पुत्रो दुर्य्योधनस्तव।
वैद्यान् विसर्ज्जयामास पूजयित्वा यथार्हतः।

Mahābhārata, Bhīṣma Parva, Ch. 121, Vs. 5745—5750. (A.S.B. Ed.)

[3] Mohāvāgga, VIII. 1.18.

ring as a healing talisman for the cure of snake-bite;[1] and also we find there a reference to a class of physicians who specialised themselves in Toxicology (Viṣa-Vaidya),[2] and were held in high esteem for their professional skill by the public.[3] From the Bhojaprabandha, the administration of some kind of anæsthetic by inhalation before surgical operations can be ascertained. Similarly from the books of Law, we know the relations of the profession to society in general. In the Manusaṁhitā, we have unmistakable testimony of the decline of Hindu surgery as the author prohibits the eating of cooked rice from the hands of a surgeon.[4]

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[1] सहि ! देवीए इदं सिप्पिसचासादी आणीदआगमुद्दासणाइं अहुलीअअं सिणिद्धं णिभालअन्ती तूह उवालभे पडिदग्गि ॥

Mālavikāgnimitra, Ch. I.

अय।—जेदु जेदु भट्टा। धुवसिद्धी विअवेदी। उदकुम्भविधाणेण सप्पमुद्दिआ कप्पिदआ। ता अवसीअदुत्ति। धारि।—एदं सप्पमुद्दअम् अहुलीअअम्। पच्छा मह इत्थे णम्।

Ibid, Ch. IV.

[2] परि।—ईदी दंशस्य दाही वा चतस्यारक्तमीक्षणम्। एतानि दष्टमात्रायामायुष्याः प्रतिपत्तयः ॥ (संप्रति विषवैद्यानाम् कर्म्म।)

राजा।—जयसेने ! ध्रुवसिद्धिः चिप्रमाह्वयताम् ॥

Ibid, Ch. IV.

[3] निपु।—पसअमुहवण्णी दीसदि। अवि अ धुवसिद्धिणा चिट्ठसिदी। मा से अमङ्गणिज्जं पावं ॥

Ibid, Ch. IV.

[4] चिकित्सकान्देवलकान्मांसविक्रयिणस्तथा।
विपणेन च जीवन्तो वर्ज्याः स्युर्हव्यकव्ययोः ॥

Manusaṁhitā, Ch. III, 152.

चिकित्सकस्य मृगयोः क्रूरस्योच्छिष्टभोजिनः।
उग्रान्नं सूतिकान्नं च पर्याचान्तमनिर्दशम् ॥

Ibid, Ch. IV, 212.

Secondly, monuments or inscriptions scattered about the country have to be searched, as references found therein to the science of medicine, are more trustworthy than documents which may have been more or less tampered with by interpolations of subsequent writers. Thus we learn from the Edicts of Aśoka, that hospitals were established by him in different parts of his kingdom, not only for the treatment of suffering humanity but also for the brute creation[1].

Thirdly, personages and scenes in connection with medical practice, and figures of herbs may have been represented in works of art which must be thoroughly examined. But unfortunately we do not possess any such work of art and so we can learn nothing to our purpose from this source. In the interpretation of the subject of the Friezes of the Rani Naur and Ganesha's Cave, Dr. R. L. Mitra says,—"The shampooing in the Ganesa Cave may be for a parent, but the close seat with the right hand round the neck of the male personage in the other, would be highly unbecoming in an unmarried female. But if the stooping figure be taken to be that of a wounded man, a wounded priest for instance, the lady may be a maiden nursing him without any offence to propriety. It is true that the appearance of the figure on the mattress does not indicate suffering from a wound, but in the Rani Naur frieze, the stooping head affords some indication of it."[2]

पूयं चिकित्सकस्यान्नं पुंश्चल्यास्त्वन्नमिन्द्रियम्।
विट् वार्धुषिकस्यान्नं भस्त्रविक्रयिणो मलम्॥

Manusaṁhitā, Ch. IV, 220.

[1] Rock Inscriptions, Edict II.

[2] The Antiquities of Orissa, Vol. II, p. 11.

Fourthly, the various kinds of surgical instruments preserved in museums are to be examined and the reports of finds of surgical appliances in various localities are to be studied. We know what a flood of light has been thrown on ancient Greek surgery by the steady progress of archæological discovery and finds of instruments at Pompeii, Herculaneum and elsewhere, and by the study of the specimens preserved in the Naples museum, the Athens museum and other museums of Europe. But as far as I have been able to trace, our museums contain no finds supplying us with any information on the subject.

Fifthly, the literature of medicine itself should be thoroughly inquired into and excerpts elucidative of our subject should be compared with one another. "The detailed descriptions of the very numerous Hindu instruments not being very minute or precise, Professor Wilson says, we can only conjecture what they may have been, from a consideration of the purport of their names, and the objects to which they were applied, in connection with the imperfect description given."[1] We are fortunate, however, in possessing a copious medical literature of great merit from very early times. We shall describe the important books in the introductory chapter, with short notices of their authors.

Sixthly, the comparative study of the science at the same period in other countries also furnishes us with valuable materials as regards the state of medicine in a country. It is well known that Sanskrit works are often written in a very terse language

[1] Royle's Antiquity of Hindu Medicine, foot-note, p. 59-60.

and it might be said with greater truth about the works of early Sanskrit authors, the comment of a learned critic about the style of Thucydides, the famous historian,—"the most obvious and characteristic of his peculiarities is an endeavour to express as much matter as possible in as few words as possible, to combine many thoughts into one, and always to leave the reader to supply something of his own. Hence his conciseness often becomes obscure." I could not form any idea as to the shape of some of the surgical instruments from the descriptions given in the text books, and the commentators are often silent on those passages. But when I read the accounts of similar instruments in Greek and Roman literature, my difficulties at once cleared up. We know with what brilliant results comparative mythology and comparative philology have been studied of late years, and I am sure that a comparative study of medical science by scholars will lead to interesting discoveries. So I have added descriptions of the instruments according to the Greeks, Romans and Arabs at the end of the descriptions given in Sanskrit books: the former serving as commentaries on the latter.

Seventhly, in the accounts of historians, travellers and pligrims from foreign countries, may be found notices of medical science, as they saw it practised during their sojourn in a country, and such impressions, if properly collated, may bear impartial testimony to the progress of the science at the time. Again, we must enquire if the original treatises of medicine can be proved to have been translated into different languages and whether the remedial agents of a country can be traced in the Pharmacopœias of different nations. Thus we

learn from the accounts of Houen Tsang and Fa Hian that charitable institutions such as hospitals, dispensaries and Pûnyasālās (Houses of Charity) were quite common in ancient India.[1] Arrian informs us in his *Indica* that the study of medicine among the Brahmans was in great favour.[2] We know that the standard works on medicine were translated in Arabic in the 8th Century B. C.,[3] and that various medicinal herbs of Indian origin found their way into the Greek Materia Medica.[4]

Eighthly, we must enquire whether the medical practice of ancient times is still resorted to by the physicians of the present days. The Hindu system of medicine is still being practised all over India, more or less in its original form, and so can still be studied at first hand. But for our present purpose, we derive little or no help from the *Vaids* of the present generation. They know practically nothing about anatomy and surgery which began to decline during the Buddhist era, and finally all vestiges of the science became lost during the Mahomedan rule. I have spared no pains to exhaust these sources of information so far as surgical instruments are concerned. Whether or not I have been fortunate enough to give just the necessary details of instruments from the best accessible authorities without at the same time loading my pages with superflous matter, must be left to the judgment of my readers to determine.

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[1] Beal's Buddhist Records of the Western World, Vol. I., P. 165, 198 and 214; Vol. II., p. 188 and 303.

[2] Arrian's *Indica* c. 27.

[3] Alberuni's India, Sachau's Preface, p. XXX—XXXI.

[4] Royle's Antiquity of Hindu Medicine, p. 77-113.

Now it may be asked why the Science and Art of Surgery, which was successfully practised in Ancient India, is so much neglected by the present generation of *Vaids*. So let us consider the causes that led to the downfall of Hindu Surgery:

1. The Hindus from a very early period have given up the dissection of human bodies—the only trustworthy method of acquiring anatomical knowledge—merely because it may occasion ceremonial uncleanliness. The Ancient Hindus were, however, free from such prejudices. Manu lays down that mere bathing will purify a Brahman who has touched a corpse,[1] whilst stroking a cow or looking at the Sun, having only sprinkled his mouth with water will remove the defilement due to touching a dead bone.[2] But even in the Manusaṁhitā, we can trace the decline of Hindu surgery, and his law forbidding any one from eating food from the hands of a doctor evidently refers to a surgeon.[3]

2. The interference of the priests in India, as in Europe played an important part. They began to cure diseases by spells, charms, texts and drugs; and temples have served as consulting rooms for the treatment as much of the diseases

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[1] दिवाकीर्त्तिमुदकां च पतितं सूतिकां तथा।
अवं तत्स्पृष्टिनं चैव स्पृष्ट्वा स्नानेन शुध्यति॥

The Institutes of Manu, Ch. V, 85.

[2] नारं स्पृशन्ति सक्षेत्रं स्नात्वा विप्रो विशुध्यति।
आचम्यैव तु निक्षेत्रं गामालभ्यार्कमीक्ष्यवा॥

Ibid, Ch. V, 87.

[3] Ibid, Ch. III, 152; Ch. IV, vs. 212 and 220.

of the body as of the soul. The example of such a temple we still find in Tārakeśvar where many sick people repair to have their maladies cured by dreams, hypnotic suggestions and incubation or temple-sleep. Similar practice was prevalent in Egypt and Greece in olden times. The modern practice of using galvanic rings and abdominal belts is merely an advanced method of indulging in superstitious ideas.

3. The patients always dreaded the surgeon's knife—especially when the use of a general anæsthetic was unknown. At the same time, the comparative success of poultices, actual and potential cauteries, and other external applications have influenced the lay mind that operations by knife are not always needed.[1] The Hindu surgeons themselves believed in similar tenets, for Suśruta, the surgeon, remarks that "of all cutting instruments and their substitutes, caustics (or vegetable alkalies) are the most important, because by means of them, deep and superficial incisions and scarifications may be made, and derangements of the three humours (air, bile and phlegm) may be rectified"; and again he says that "with

[1] दिव्यौषधि विना देवि शस्त्रविद्या सुनिष्फला।
वैरूप्यं कुरुते या च दुश्चिकित्स्यं व्यधान्नरे॥
जायन्ते हि यथार्शांसि पाटितानि पुनः पुनः।
किं तत्र शस्त्रसाध्यं स्यात् सुसिद्धैर्भेषजैर्विना॥
धातुनां व्यापदि यत्र भेषजं नैव सिद्धति।
व्याधये दुस्तरे तस्मिन् शस्त्रमेव विधीयते॥
पुनः संशमनं तत्र धातुनाम् हि प्रशान्तये।
प्रदातव्यं महादेवि शस्त्रादर्ब्वाक् ब्रवीमि ते॥

Mahānilatantra, Paṭola X, vs. 72-74.

regard to surgical treatment, actual cautery is said to be superior to caustics, in as much as diseases treated with the actual cautery do not reappear, and because it can cure diseases which are incurable by medicines, instruments and caustics."[1] Thus we see that the Hindus were partial to external applications as a cure of surgical diseases, and gradually they neglected the surgical operations—one of the most important means of acquiring knowledge in Morbid Anatomy and of testing the correctness of diagonosis, in the absence of the post mortem examinations of the cadavers. Thus not only surgery but medicine also suffered materially.

4. The Hindus always cherish a high regard for the writings of their sages, and the earliest works on medicine became the standard works and were held sacred. Any violation of their opinions was considered a sacrilege ; and all knowledge thus soon became stereotyped. In later times, none dared to question the validity of the statements contained therein, and though about three thousand years have elapsed, and though the votaries of the science are still honoured and wellpaid, the science instead of improving has markedly deteriorated. In fact, only two authors—Caraka and Suśruta—are original; the later authorities—and there is a vast number of them—were merely their servile copyists who only differed from them when they indulged in some grave errors. We have a parallel in the history of medical science in Europe, where Galen

[1] चारादग्निर्गरीयान् क्रियासु व्याख्यातसद्भ्यानां रोगानामपुनर्भावाद्भेषजशस्त्रक्षारैरसाध्यानां सत्साध्यत्वाच्च।

Suśruta, Sûthrasthânam, Ch. XII.

held his sway over the profession for about two thousand years.

5. One of the potent causes of progressive decadence in the knowledge and practice of surgery amongst the Hindus is the rapid spread of Buddhism in India. Though Buddha sanctioned the use of the lancet in some cases, in cases of a doubtful nature he prohibited the use of instruments in the treatment of even surgical diseases. For example, he allowed the surgical treatment of boils by knife,[1] but he prohibited not only the use of the lancet for treatment of fistula-in-ano but the use of clysters also.[2] As it would be interesting to know the reasons of this prohibition, I quote the story in full from the Mohāvāgga (Sacred Books of the East):[3]

1. Now when the Blessed One had remained at Sâvatthi as long as he thought fit, he went forth on his journey to Râgagaha ; and wandering straight on he arrived at Râgagaha; and there at Râgagaha he stayed at the Veluvana in the Kalandaka-nivâpa.

Now at that time a certain Bhikkhu was suffering from fistula. And the physician (named) Âkâsa-gotta lanced it. And the Blessed One when he was going round through the sleeping-places came to the place where that Bhikkhu dwelt.

2. Âkâsa-gotta, the physician, saw the Blessed One coming from afar; and when he saw him he said to the Blessed One: 'Let the venerable Gotama come and look at this Bhikkhu's orifice;

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[1] Mohāvāgga, VI. 14. 4 & 5.
[2] Ibid, VI. 22. 3.
[3] Ibid, VI. 22.

it is like the mouth of an iguana!' And the Blessed One thinking, 'This foolish fellow is making fun of me,' kept silence and turned away. And in that connection, and on account of that, he called a meeting of the Bhikkhu-samgha, and asked the Bhikkhus: 'Is there, O Bhikkhus, in that Vihâra a Bhikkhu who is sick?'

'There is, Lord.'

'What is the matter, O Bhikkhus, with that Bhikkhu?'

'That venerable one, Lord, has a fistula, and Âkâsa-gotta the physician, has been lancing it.'

3. The Blessed Buddha rebuked (that Bhikkhu), saying, 'This is improper, O Bhikkhus, for that foolish one, unbecoming, indecent, unworthy of Samanas, not allowable and ought not to be done. How can this foolish fellow, O Bhikkhus, allow a surgical operation to be performed in that part of his body? The skin there, O Bhikkhus, is tender, the wound is difficult to treat, the knife is difficult to guide. This will not redound, O Bhikkhus, to the conversion of the unconverted.'

And having rebuked him, the Blessed One, after delivering a religious discourse, said to the Bhikkhus: 'You are not, O Bhikkhus, to allow a surgical operation to be performed upon you in that part of your bodies. Whosoever allows that, is guilty of thullakkaya offence."

4. Now at that time Khabbaggiya Bhikkhus, since a surgical opperation had been forbidden by the Blessed One, used a clyster.

They told this thing to the Blessed One.

'Is it true, as they say, O Bhikkhus, that the Khabbaggiya Bhikkhus use a clyster ?'

'It is true, my Lord.'

He rebuked them, and having delivered a religious discourse, said to the Bhikkhus: 'No surgical opperation is to be performed within a distance of two inches round the anus, and a clyster is not to be used. Whoever does so, is guilty of a thullakkaya offence.'

And thus we find that Jīvaka, the famous surgeon, is said to have cured a case of fistula-in-ano by the single application of an ointment.[1] The operation fell into such disuse that when Śaṅkarāchāryya suffered from the same disease, no surgical aid was thought necessary by the physicians, though it is said that he was treated by renowned doctors of the time.[2]

From Megasthenes," we learn that "among the Sarmans the Hylobioi (living in woods) were held in most honour, and next to them the physicians, who are mendicants and also ascetics, like the class above them and the class below them,

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[1] "And Gîvaka Komârabhakka healed the fistula of the Magadha King Seniya Bimbisâra by one anointing."

Mohāvagga (Sacred Books of the East), VIII. 1. 15.

[2] अचिकित्स्यभगन्दराख्यरोगप्रसरच्छीणितपङ्किलस्रवाद्यां ।
अनुगुप्स्यविशीघनादिरूपां परिचर्यामकृताऽस्य तौटकार्य्यः ॥
* * * * * * * *
निगदिते मुनिनेति भिषग्वरा विदधिरे बहुधागदसत्क्रियाः ।
न च अशाम गदीवहुतापदीविमनसः पटवो भिषजोऽभवन् ॥

Śaṅkaravejoya, Ch. XVI.

which consisted of sorcerers and fortune-tellers;"[1] and Strabo[2] mentions that these physicians "cured diseases by diet rather than by medicinal remedies, which were chiefly unguents and cataplasms."[3]

6. No science can flourish without the support of the government of the day. The Hindus became a subject race; and any departure from the traditional store of knowledge in the shape of improvement in the quality and additions to its quantity was neither tolerated by the people, who are proverbially conservative, nor countenanced by the royal court, for the conquerors brought with them and patronised their own hakeems and doctors. Neither the Mahomedans nor the English have taken any real interest in the Indian Medical Science from preconcieved notions that it contains nothing worthy of their perusal. The *Kavirajes* again are so conservative in their opinions that they can not boldly advocate even the use of such drugs as are of unquestionable value in the treatment of diseases, as for example the use of Quinine in Malaria. To this may be contrasted the behaviour of Bhâvamiśra, who lived about three hundred years back and, who adopted many medicaments of foreign origin. The consequence can easily be imagined, and in the language of Elphinstone, can be thus described: "Physicians follow the practice of their instructor without inquiry, and surgery is so far neglected, that bleeding is left to the barber, bone-setting to the herdsman, and every one is ready to administer

[1] The Invasion of Alexander the Great. M'Crindle. Appendices. p. 358.
[2] Geography, XV. i. 58-60.
[3] The Invasion of Alexander the Great. M'Crindle. Appendices. p. 368-69.

a blister, which is done with the juice of the euphorbium and still oftner with the actual cautery."[1]

But we need not enlarge any further. The object of this essay is not to write out an exhaustive dissertation on the Hindu medical science but by a few suggestive facts, however imperfect and fragmentary, to stimulate curiosity and divert attention of the diligent scholars to a vast field of research, which seems as yet to have been only partially explored.

It is proper here to acknowledge that I have on all occasions freely availed myself of the labours of Drs. Wise, Thakore Saheb of Gondal, and the translators of Suśruta Saṁhitā in the Bibliotheca Indica, namely, Dutt and Hoernle. It is a great pity that this translation has not as yet progressed beyond three fasciculi. Hoernle's recent contribution, "Osteology of the Hindus," is a move in the right direction and we hope it to be followed by similar enquiries in other branches of the science. Royle for the first time proved beyond doubt the high antiquity of Hindu medicine, and established its right position in the history of the science. Wise is the pioneer of systematic research in this field of study, and his sympathetic appreciation of the Hindu system of medicine will always be remembered with gratitude by our countrymen. Dutt's Materia Medica of the Hindus is a work of great merit; and I have derived material assistance from the excellent treatise, "History of Aryan Medical Science," by the Thakore Saheb of Gondal. Dr. Ray's History of Hindu Chemistry is a valuable contribution in the cognate subject of chemistry. I have borrowed from these writers largely, but

[1] Elphinstone's History of India, 5th Ed., p. 160.

I flatter myself it will also be found that I have further collected from various sources a store of valuable information, for which I am in no way indebted to any of my predecessors in the same field of research. The descriptions of the surgical instruments of the Greeks, the Romans and the Arabs, I have taken from the excellent English translations of Paulus Ægineta, the Extant Works of Ætius and the Genuine Works of Hippocrates, prepared by the renowned Adams, for the Sydenham Society. I have also laid the recent monograph, "Surgical instruments in Greek and Roman times" by Dr. Milne, largely under contribution; I only regret that I had no access to the book a little earlier, otherwise much of my labour in search for descriptions of the instruments of the Greeks would have been saved. For the last five years, I have been engaged on this investigation and it was when I had nearly finished, that Milne's book was mentioned to me by the Hon'ble Mr. Justice Asutosh Mookerjee, the Vice-Chancellor of the Calcutta University and the President of the Asiatic Society of Bengal.

To complete the subject, I have added plates of nearly all the varieties of instruments; but they are more or less hypothetical as we do not possess any actual specimens of the instruments of the Hindus. Written descriptions of surgical instruments are uninteresting and often fail to convey the true idea, which could be easily made evident by the pencil. For purposes of comparison I have given drawings of instruments of the Greeks, the Romans and the Arabs, when I thought that they might be of value for the proper elucidation of my subject. I am indebted to many authors

I am indebted to many authors for some of the engravings of the instruments. I have been careful to give the source whence the borrowed ones are taken, as far as I have been able to ascertain them. If this has been omitted in any case, it is from inadvertence, not from design. My best thanks are due to them and I here acknowledge my indebtedness to the authors for availing myself of their labours without their permission. But many new illustrations will be found, and I have appended my name to those drawn by myself. These figures of the surgical instruments would be found to tally better with the descriptions of the instruments given in the Sanskrit books than the illustrations of the previous authors. The drawings of surgical instruments as given by me would look more like the figures in a modern catalogue of surgical instruments. Some of my friends could hardly believe when they saw the plates that these instruments were known to the ancient Hindus at such an early age. This feeling of amazement and incredulaty as regards the surgical instruments used by the ancient Hindus has its parallel in the observations of Billroth[1] about the surgical instruments found in the excavations at Pompeii and now preserved in the museum at Naples. He says: "It made a peculiar impression upon me; when I saw before me this two thousand years old surgical armamentarium of a Roman colleague, differing but slightly in the form of the more ordinary instruments from those of our time. *Ars longa vita brevis.*" Milne[2] also remarks: "The works of those (Paré, Scultetus and Heister) are profusely illustrated with instruments, some of which can plainly be seen to tally exactly with the descriptions of the classical authors."

[1] Billroth's Surgery, Vol. I, Introduction, Page 7. Syd. Soc. Ed.

[2] Græco-Roman Surgical Instruments, P. 8.

In describing the surgical instruments, I have confined myself strictly to the texts of the authors and commentators whom I have quoted, and h ve given the original Sanskrit passages in the foot-notes. Thes : will be of great help to scholars who will try to study the subject at first hand, and prosecute further historical inquiries. The references in the foot-notes do not refer to pages of any particulars edition of the work, as such pagination causes inconvenience to the readers who may not secure the edition in question; so we have given the section, and chapter of the book which will be found in any edition.

In the translations of Sanskrit passages, I have endeavoured to follow the original as closely as possible, except where a somewhat free rendering was necessary to make the meaning clear.

The dates of the ancient Hindu authors of Sanskrit medical books cannot be ascertained with certainty. In the first chapter I have endeavoured to discuss briefly their approximate ages. But as I have compared the surgical instruments of the ancient Hindus with those of the Greeks, Romans and Arabs, a concise summary of the chronological dates of the Græco-Roman, Arab, and the later authors would be a great help in the proper elucidation of my text.

Authors.	*Date.*
Pythagoras ...	... 580-504 B.C.
Megasthenes ...	... 300 B.C.
Ktesias ...	... 400 B.C.
Hippocrates ...	... 460 B.C.
Hero of Alexandria	... 285-222 B.C.

Authors.	*Date.*
Dioscorides ...	... First century A.D.
Celsus ...	... 25-30 B.C. to 45-50 A.D.
Scribonius Largus ...	... 45 A.D.
Soranus ...	... First century A.D.
Rufus of Ephesus ...	... 98-117 A.D.
Galen ...	... 131-201 A.D.
Marcellus Empiricus	... 300 A.D.
Antyllus ...	... 3rd century, A.D.
Oribasius ...	... 326-403 A.D.
Theodore Priscianus	... 4th century A.D.
Caelius Aurelianus...	... 4th or 5th century A.D.
Moschion ...	... 5th century A.D.
Actius... ...	... 5th century A.D.
Alexendar of Tralles	... 525-605 A.D.
Paulus Æginetа	... 660 A.D.
Serapion ...	... 800 A.D.
Rhazes ...	... 850-932 A.D.
Haly Abbas ...	... After 950 A.D.
Avicenna ...	... 980-1037 A.D.
Abul Cassim ...	... x 1106 A.D.
Avenzoar ...	... x 1162 A.D.
Paré	... 1509-90 A.D.
Scultetus ...	... 1650 A.D.
Heister ...	... 1739 A.D.

I can not suffer this work to go forth without offering at least an explanation of, if not an apology for, the delay which has occurred in the publication of this thesis. It is mainly due to the accidental fire which reduced the types and the blocks

for this work to ashes and distroyed a part of the manuscript. This portion had to be written again. Again the task of reading proof sheets was laid on me entirely. The occupation of a laborious profession encroached on my time; and I was not fortunate enough to secure the co-operation of any worker in this field of research. The result might be anticipated and no one is more conscious of the unsatisfactory issue than myself. I had no experience in proof reading, and so mistakes are not uncommon. Some of the errors will be found corrected in the corrigenda. As regards the corrections of many of the proof sheets of the Sanskrit foot-notes I was assisted by my son Hirendranāth Mukhopādhāya, who helped me much in getting this book completed. The author will feel obliged if informed of any errors that may be detected and of references to informations which ought to have been given, and also for any hints that may make a future edition more useful to the readers. But I have this consolation in my mind that I have not pushed this work through the press hurriedly or prefunctorily and I have done my best. I have laboured with the usual drawbacks of an active professonal life and if this be admitted by the critic as an excuse for errors and failures, I shall be grateful to him.

A copious index has been provided for this work, whereby anything material in the whole book may be readily found out; of which it may be said that it wants no other advantages than such as the author had not power to give.

It would not be out of place here to mention that part of this essay was read before the Asiatic Society of Bengal in June, July and August, 1908. The learned President in his annual address remarked as follows: "In the course of the last

session Dr. Girindranath Mukerjee submitted to the society a paper of considerable extent, in which he elaborately examined the subject of the surgical instruments of the ancient Hindus. The questions he has raised, as to the priority of Hindu medicine over that of the Greeks, the Romans and the Arabs, are likely to arouse controversy, but in whatever way the question of priority may be decided, it seems to me truly remarkable that the descriptions given in our most ancient books on medicine, of the surgical Instruments then in use, should bear a close resemblance to the descriptions given not only in Greek, Roman and Arab medical writings but in many cases with the descriptions given in modern works on surgery. I trust that this subject, so peculiarly Indian, will not be left alone and will receive the attention from investigators which it undoubtedly deserves."[1]

As regards the transliteration of Sanskrit words, we have employed the method adopted in the Congress of Orientalists and circulated in the Journal of the Royal Asiatic Society, ignoring in fact, the unpleasant characters of the Sacred Book of the East.

[1] Journal and Proceedings of the Asiatic Society of Bengal, Vol. V, 1909, Annual Address, p. XXX.

I

SANSKRIT AND ALLIED ALPHABETS.

अ . . . . *a*	ओ . . . . *o*	ट . . . . *ṭ*	ब . . . . *b*
आ . . . . *ā*	औ . . . . *au*	ठ . . . . *ṭh*	भ . . . . *bh*
इ . . . . *i*	क . . . . *k*	ड . . . . *ḍ*	म . . . . *m*
ई . . . . *ī*	ख . . . . *kh*	ढ . . . . *ḍh*	य . . . . *y*
उ . . . . *u*	ग . . . . *g*	ण . . . . *ṇ*	र . . . . *r*
ऊ . . . . *ū*	घ . . . . *gh*	त . . . . *t*	ल . . . . *l*
ऋ . . . . *ṛ*	ङ . . . . *ṅ*	थ . . . . *th*	व . . . . *v*
ॠ . . . . *ṝ*	च . . . . *c*	द . . . . *d*	श . . . . *ś*
ऌ . . . . *ḷ*	छ . . . . *ch*	ध . . . . *dh*	ष . . . . *ṣ*
ॡ . . . . *ḹ*	ज . . . . *j*	न . . . . *n*	स . . . . *s*
ए . . . . *e*	झ . . . . *jh*	प . . . . *p*	ह . . . . *h*
ऐ . . . . *ai*	ञ . . . . *ñ*	फ . . . . *ph*	ळ . . . . *ḷ*

ं (*Anusvāra*) . . . *ṁ*	ऽ (*Avagraha*) . . . '
ँ (*Anunāsika*) . . *m̐*	*Udātta* . . . . . ◌̍
ः (*Visarga*) . . . . *ḥ*	*Svarita* . . . . . ◌̎
×ः (*Jihvāmūlīya*) . *ḫ*	*Anudātta* . . . . . ◌̱
≍ः (*Upadhmānīya*) *ḫ*	

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and commentaries. Vāgbhaṭa I,—Aṣṭāṅga Saṁgraha, his age, edition and commentary; Vāgbhat II: Aṣṭāṅga Hṛdaya Saṁhitā, editions and commentaries; Vagbhaṭā III—Rasa Ratna Samuccaya; Mādhavakara:—Nidāna; Vṛnda Madhava:—Siddhayoga; Cakrapāṇidatta:—Cikitsāsāra Saṁgraha, editions; Śāraṅgadhara:—Śārṅgadhara Saṁgraha, editions and commentary; Bhāva Miśra:—Bhava Prakāśa, editions.

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Krauñcamukha or Curlew forceps. Bhṛṅgarājamukha or Butcher-bird forceps. Añjalikarṇa forceps. Avabhañjanamukha forceps. Nandimukha forceps. II. The Sandaṁśa or Pincher-like forceps: Forceps with and without handles. Forceps with Smooth and rough ends. Epilation forceps. Mucuṭī or Mucundī. Vaṁśabidala or Bamboo forceps. III. Tāla-Yantra or Picklock-like instrument: Ectāla and Dvitāla. The Ear-scoop. IV. The Naḍī-Yantra or Tubular instruments: Kaṇṭhaśalyāvalokinī or Throat speculum. Pañcamuka and Trimukha. Tubular instruments for inspection of arrows. Śalyanirghātanī. The Impellent. Tubular instruments for Piles—for inspection and medication. Śamī. The Rectal Speculum. Calopter. Tubular instruments for the Fistula-in-ano. Tubular instruments for the nose: Nasal Speculum. Nathu-karanī and Yamaka-nathu-karanī. Nasal tubes. The Aṅguli-trāṇaka or Finger-guard. Yoni-Vraṇekṣana or Vaginal Speculum. Diopter. Bivalve Speculum. The tubular instruments for wounds—Vraṇa-vasti or Wound-Syringe. Tubular instrument for ascites. Dākodara yantra or Canula. Tubular instruments for Hydrocele. Tubular instruments for rectal stricture. Tubular instruments for injection into the rectum—Vasti Yantra or Rectal clyster. Uttaravasti or urethral, vaginal and uterine tubes. Catheters. Tubular instruments for inhalation and fumigation. Disinfection of rooms, clothes &c. Tubular instruments for cupping. Śṛṅga or horn. Alābu Yantra or gourd. Ghati Yantra. V. Śalakā

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„	308	...	„ 1	„ diagnosis	„ diagonosis.
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„	12	...	„ 3	„	
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„	35	... 13	...	„ Skilful	„ Skillful.
„	40	„ 8			
„	37	„ 11	...	„ Sesame	„ Seasame.
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„ 262	„ 10	...	„	Round...four cornered	„	four cornered.....round.
„ 285	„ 15	...	„	Hippo	„	Hyppo.
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„ 352	„ 22	...	„	Firoz	„	Firroz.
„ 354	„ 11	...	„	Areca	„	Arecha.
„ 355	„ 12	...	„	Dvārusita	„	Davrusita.

WORKS BY THE AUTHOR.

1. Muscles of the Human Body, arranged in Tabular forms. Fourth Edition. Re. 1

2. Tropical Abscess of the Liver.

Thesis approved for the degree of Doctorate in Medicine, Madras University. Rs. 5

3. Glossary of Indigenous Medicinal Plants.

(In the Press)

4. Notices, Biographical and Bibliographical, of the Indian Physicians and their Works on Medicine.

(In the Press)

5. Medicine in the Vedic times.

(In preparation)

THE STAR MEDICAL HALL,
80, Russa Road North, Bhawanipur,
CALCUTTA.

THE

Surgical Instruments of the Hindus.

CHAPTER I.

INTRODUCTION.

ANCIENT MEDICAL AUTHORS AND THEIR WORKS.

The Science and Art of Medicine, like many other different branches of learning originated with the Hindus. They consider the art of healing as an Upaveda and it is generally known as Āyurveda, that is the art of prologing life. Like the Vedas, they trace the origin of the science to God, the fountain of all true knowledge. Bramhā transmitted this heaven-born science to this world for benefit of the mortals in one of the sacred writings, the Āyurveda.

It was composed as a sub-division of the Atharva Veda and consisted originally of a *lākh slokas* or a hundred thousand stanzas, divided into a thousand chapters. Then considering the short span of life and inadequate intelligence of man, he divided the book into eight parts[1] as follows:—

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[1] तद्यथा ॥ शल्यं शालाक्यं कायचिकित्सा भूतविद्या कौमारभृत्यमगदतन्त्रम् रसायनतन्त्रं वाजीकरणतन्त्रमिति ॥

Suśruta Saṁhitā, I. i.

कायचिकित्सा शालाक्यं शल्यहर्तृकं विषगरवैरोधिकप्रशमनं भूतविद्या कौमारभृत्यकं रसायनानि वाजीकरणमिति।

Caraka Saṁhitā, I. xxx.

वेदो ह्यायुषेऽथर्वणः स्वस्त्ययनबलिमङ्गलहोमनियमप्रायश्चित्तोपवासमन्त्रादिपरिग्रहात् चिकित्सां प्राह।

Ibid.

1. Śalya Tantra or Major Surgery.
2. Śālākya Tantra or Surgery of parts above the Clavicles.
3. Kāya Cikitsā or Inner Medicine.
4. Bhūtvidyā or Demnology.
5. Kaumārabhṛtya or the Science of Pædiatries.
6. Agada or Toxicology.
7. Rasāyana or Treatment to prolong life.
8. Vājikaraṇa or Treatment to stimulate the sexual power.

The book is no more available now, Suśruta being the authority for the above information.[1]

A different view is held by others, who trace the origin of Hindu Medicine in the verses of the Ṛgveda.[2]

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[1] इह खल्वायुर्व्वेदो नाम यदुपाङ्गमथर्व्ववेदस्यानुत्पादैव प्रजाः श्लोकशतसहस्रमध्यायसहस्रञ्च कृतवान् स्वयम्भूः। ततोऽल्पायुष्टमत्वमेधसाञ्चावलोक्य नराणां भूयोऽष्टधा प्रणीतवान्॥

Suśruta Saṁhitā, I. i.

तत्र खैत् प्रष्टारः सुः चतुर्णामृक्सामयजुरथर्व्ववेदानां कं वेदमुपदिशन्त्यायुर्व्वेदविदः। किमायुः कस्मादायुर्व्वेदः किंप्रायमायुर्व्वेदः शाश्वतोऽशाश्वत इति। कानि चास्याङ्गानि कथायमध्येतव्यः किमर्थञ्चेति॥

तत्र भिषजा पृष्टेनैवं चतुर्णामृक्सामयजुरथर्व्ववेदानाम् आत्मनोऽथर्व्ववेदे भक्तिरादेश्या।

Caraka Saṁhitā, I. xxx.

The origin of medical science, as quoted in the above passage of Caraka, does not however agree with the view expressed by the author in the Sūtra Sthāna, Ch. I. (See footnote 1. P. 4). In Ch. XXX, we find that an attempt had been made to make a compromise between the two views of Agniveśa and Suśruta. Evidently this was the work of a later redactor, possibly Dṛḍhavala.

न त्वायुर्व्वेदस्याभूत्पत्तिरुपलभ्यते। अत्यल्पावधीपदेशाभ्यामेतदेवमधिकृत्य उत्पत्तिमुपदिशन्त्येके स्वाभाविकत्वात् लक्षणमधिकृत्य वदन्तम् इह चार्य्येचार्य्ये * * * ॥

Caraka Saṁhitā, I. xxx.

[2] ऋग्वेदस्यायुर्व्वेद उपवेदः।

Carana Vyūha by Vyāsa.

ATHARVA VEDA.

"On examining the contents of the Atharva Veda more in detail, we find that the hostile charms it contains are directed largely against various diseases or the demons which are supposed to cause them. There are spells to cure fever (takmān), leprosy, jaundice, dropsy, scrofula, cough, ophthalmia, baldness, lack of vital power, fractures and wounds; the bite of snakes or injurious insects, and poison in general; mania and other ailments. These charms are accompanied by the employment of appropriate herbs. Hence the Atharva Veda is the oldest literary monument of Indian Medicine."[1] This Veda can not belong to a period later than 1000 B. C., but possibly earlier.[2] It exists in the recensions of two different schools. That of the Paippalāda is only known in manuscript, discovered by Prof. Buhler in Kashmir and described by Prof. Roth in his tract Der Atharva Veda in Kaschmir (1875). The printed text, edited by Roth and Whitney in Berlin 1856, gives the recension of the Śaunaka School.[3] It has been translated into English Prose by Whitney, 2 Vols.; into English verse by Griffith, 2 Vols., Benares, 1897, and with the omission of the unimportant

[1] Medonnel's Sanskrit Literature, P. 196.

अथर्ववेदस्य ∘∘∘∘ चतुर्थं वेदत्वेऽपि प्रायेणाभिचारयज्ञविद्यायामनुपयोगाच्चानिर्देशः। तथाहि ऋग्वेदेनैव होत्रं कुर्वन् यजुर्वेदेनाध्वर्यवं सामवेदेनौद्गात्रं यदेव त्रयी विद्याय मूलत्वेन ब्रह्मत्वमितियुते स्वयीसम्पादत्वं यज्ञानां ज्ञायते।

Kallāka Bhaṭṭa's Commentary on Manu Saṁhitā, Ch. III, Śloka I.

[2] On the date of Atharva Veda, see pp. CXL—CLXI, Prof. Lanman's Edition of Whitney's Transl.; Prof. Medonnel's Sanskrit Literature, pp. 185—201.

[3] Index Vervorum in the Journal of the Am. Or. Soc. Vol. XII.

hymns, by Bloomfield[1] into English Prose, with notes, in Vol. XLIII of the Sacred Books of the East.

CARAKA SAṀHITĀ.

In the Caraka Saṁhitā we find that Brahmā taught Dakṣa the science of medicine; Dakṣa became the preceptor of the Aśvin twins; they in their turn became the teachers of Indra and Indra imparted this knowledge to Bharadvāja who was sent by a conclave of sages to learn the art for the welfare of the human race.[2] Bharadvāja had Punarvasu Ātreya and the others as disciples. Ātreya's students were Agniveśa, Bhela, Jatukarṇa, Parāśara, Hārita and Kṣārapaṇi, all of whom became celebrated as the authors of treatises on Medicine; the Caraka Saṁhitā being a revised and improved edition of the treatise of Agniveśa, which was declared to be the best production.[3] Caraka did not, however, redact the whole

[1] He has also edited the Kauśika Sûtra of the Atharva Veda, with extracts from the commentaries of Dârita and Keśava (see Vol. XIV Journ. Am. Orient. Soc.). It is very useful as a help to the proper understanding of the meaning of a hymn.

[2] दीर्घञ्जीवितमन्विच्छन् भरद्वाज उपागमत्।
इन्द्रमुग्रतपा बुद्धा शरण्यममरेश्वरम्॥
ब्रह्मणा हि यथा प्रोक्तमायुर्व्वेदं प्रजापतिः।
जग्राह निखिलेनादावश्विनौ तु पुनस्ततः॥
अश्विभ्यां भगवान् शक्रः प्रतिपेदे ह केवलम्।
ऋषिप्रोक्षो भरद्वाजस्तस्माच्छक्रमुपागमत्॥

Caraka Saṁhitā, I. i.

[3] अथ मैत्रेयः पुरुषमायुर्व्वेदं पुनर्व्वसुः।
अग्निवेश्यो दत्तवान् षड्भ्यः सर्व्वभूतानुकम्पया॥
ऋषिर्वेदश्च भेलश्च जतुकर्णः पराशरः।
हारीतः क्षारपाणिश्च जगृहुस्तमुनेर्वचः॥
तुल्यैर्विशेषसत्त्वासौ प्रोपदेशान्तरं मुनेः।
तन्त्रस्य कर्त्ता प्रथममग्निवेशो यतोऽभवत्॥
अथ भेलादयश्चक्रुः स्वं स्वं तन्त्रं कृतानि च।
आवयामासुरार्येभ्यं सर्षिसङ्घं मुनेर्वचः॥

Ibid, I. i.

book;—the last forty-four chapters[1] were edited by Dṛḍhavala,[2] a native of Panchanadapura, long supposed to refer to Punjab (the land of five rivers) but at present identified with a town in Kashmir by Dr. Hoernle.[3] Two other works, the treatises of Bhela and Hārīta, are still extant; the former existing in manuscript in the Tanjore Library[4] and the latter as printed texts by *Kavirājes* K. C. Sen and B. L. Sen, of Calcutta.[5]

Now as regards the age of Caraka, there is great divergence of opinions. The Indians generally believe him to be a Ṛṣi of great antiquity while the European scholars try

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[1] For a discussion on the part added by Dṛḍhavala, see Hoernle's Studies in Ancient Indian Medicine, J. R. A. S. 1908, P. 997-1002. Also see pp. 11-15 in the Vanauṣadhi Darpaṇa, Vol. I., by Kavirāja Birajā Charan Gupta, 1908.

[2] चतसृणीत्तममिदं चरकेणातिबुद्धिना।
संस्कृतं तत् तु संक्षिप्तं विभागैर्नोपलक्ष्यते॥
इदमन्यूनमभ्यर्थं तन्त्रं दीर्घविवर्जितं।
चक्रपाणेर्थं दृढबली जातः पञ्चनदे पुरे॥
कृत्वा बहूनि तन्त्राणि विशेषाच्च बलीश्वरम्।
सप्तदशौषधाध्यायसिद्धिकल्पैरपूरयत्॥

Caraka Saṁhitā, VIII, xii.

अस्मिन् सप्तदशाध्यायाः कल्पाः सिद्धय एव च।
नासादयन्तेऽग्निवेशस्य तन्त्रे चरकसंस्कृते॥
तानेतान् कापिलबलः शेषान् दृढबलोऽकरोत्।
तन्त्रस्यास्य महार्थस्य पूरणार्थं यथातथम्॥

Ibid, VI, xxx.

[3] Hoernle's Studies in the Medicine of Ancient India, Part I, Osteology, Introduction, p. 2. See also his article on "The authorship of Caraka Saṁhitā" in the *Archiv für die Geschichte der Medizin*, 1907.

[4] See Burnell's Tanjore Catalogue No. 10773 of Sanskrit Mss., P. 63.

[5] It is doubtful whether the Hārīta Saṁhitā is the genuine work of the Ṛṣi, Hārīta. The printed text refers to Caraka, Suśruta and even Vāgbhaṭa, who were decidely posterior to Hārīta, See the Footnote 3, P. 6.

to connect him with historical events of more modern times. Sylvain Lévi has recently discovered in the Chinese Translation of the Buddhist *Tripiṭaka* that Caraka was the Court Physician of the Indo-Scythian King Kaniṣka, in the first century A.D.[1] But the following objections are to be met with before his conclusions can be accepted as proved :—

1. The age of Kaniṣka is not yet settled, the probable limits of his reign being from the first century B. C. to the second century A. D.[2] Moreover in the Buddhist *Tripiṭaka* referred to, the name of Caraka is simply mentioned as the Court Physician of the King Kaniṣka but there is nothing to identify him with the author of the book. The same name, found in different places, does by no means signify the same person.

2. The time assigned to Caraka by the Indian medical tradition is of great antiquity. With regard to the chronological position of the three old authors, he is mentioned as anterior to Suśruta and Vāgbhaṭa I.[3]

3. Dr. Rāy has pointed out that the name Caraka is patronymic in the Veda.[4] It is quite possible that a much

[1] See Journual Asiatique—July to December 1896, p. 444 to 484 and January to June 1897, p. 5 to 42; also Indian Antiquary Vol. XXXII, 1903, p. 382 and Viena Oriental Journal, Vol. XI., p. 164.

[2] See V. A. Smith's Early History of India, P. 225-26.
Dr. Fleet in J. R. A. S., 1906, P. 979.
Dr. Bhandarkar in J. R. A. S. (Bombay Branch), Vol. XX, P. 269.
J. A. S. B. Vol. XXXIX, 1870, p. 65 and 126.

[3] चरक: सुश्रुतश्चैव वाग्भटश्च तथापर:।
मुख्याश्च संहिता वाच्यास्त्रिष एव युगे युगे॥
चरि: कृतयुगे वैद्यो द्वापरे सुश्रुतो मत:।
कलौ वाग्भटनामा च गरिमाच प्रकथ्यते।
Hārita Saṁhitā, Pariśiṣṭādhāya.

[4] Dr. P. C. Rāy's History of Hindu Chemistry, Introduction, P. X.

later namesake of his, is referred to by the *Tripiṭaka*, just as we know that more than one Vāgbhaṭa appeared as successful physician. Again we have evidence that eminent physicians in later times were called Caraka by way of a compliment and so Vāgbhaṭa was called Caraka of Sindh or Sindhicara.

4. Pāṇini wrote special Sūtras for the Agniveśas and the Carakas.[1] These names must have been famous before Pāṇini's time, otherwise he would not have written special Sūtras for them. Prof. Goldstucker has conclusively proved that Pāṇini could not have flourished later than the sixth century B. C.[2]

5. Patañjali wrote a commentary on Caraka.[3] He flourished during the second century B. C. Both Cakrapāṇidatta and Bhoja allude to him as the redactor of Caraka Saṁhitā.[4] So Caraka must have flourished long before him, for unless his work was regarded as a standard work of authority, Patañjali would not have taken so much pains to write notes on the book, and still more for issuing a redaction.

6. The internal evidence of the book itself speaks against such an assumption. There is no salutation to any diety at the

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[1] कठचरकाभ्याञ्। Pāṇini 4. 3. 107.

गर्गादिभ्यो यञ्। Ibid, 4. 1. 105.

गर्ग। वत्स। * * * * अग्निवेश * * * * पराशर। जतुकर्ण। * * *.

[2] Goldstucker's Pāṇini; and Journal of the Asiatic Society of Bengal, Vol. XLII, P. 254.

[3] चारीणामि अनुभवेन वस्तुतत्त्वस्य कात्स्न्येन निश्चयवान्, रागादिवशादपि नान्यथावादी यः स इति चरके पतञ्जलिः।

Quoted in Laghumañjuṣā of Nāgeśa Bhaṭṭa (Rāy).

[4] पातञ्जल—महाभाष्य—चरकप्रतिसंस्कृतैः।

मनोवाक्कायदोषाणाम् हर्त्रेऽहिपतये नमः॥

Vide salutation in the Āyurvedārthadīpikā.

beginning of the book,—a custom invariably found to be observed in the more modern compilations. There is complete absence of Paurāṇic theology in the Caraka Saṁhitā, nor is there any reference to Śākya Muni and his religion. Kaniṣka was a great patron of Buddhism, and it might naturally be expected from the Court Physician of the king to describe the charitable hospitals which we know from the edict of Aśoka, to have flourished in every quarter of India. On the contrary we find descriptions of a hospital as reserved for rich men only at their own houses. Those gods and godesses that figure so prominently in the Purāṇas were unknown during his time.[1] Beef was not then, apparently, a

[1] No doubt the names of Lakṣmi, Kṛṣṇa and Vāsudeva occur in Cikitsita Sthānam, Chapter XXV, but it should be remembered that they occur in the Supplement added by Dṛḍhavala in later times.

सर्व्वयज्ञा न तत प्रभवन्ति न चाग्निश्चत्वरुपचीरा: ।
लक्ष्मीय तत भजते यत महागस्वहस्थिति ॥
पिथमाण इमज्ञात सिद्धं मन्त्रमुदीरयेत् ।"
मम माता जया नाम विजयी नाम मे पिता ॥
सोऽहं जयो जयापुत्रो विजयीऽथ जयामि च ।
नम: पुरुषसिंहाय विष्णवे विश्वकर्म्मणे ॥
सनातनाय कृष्णाय भवाय विभवाय च ।
तेजो ज्वालाकपे: साक्षात् तेजो ब्रह्मेन्द्रयीर्य्यमे ॥
यथाहं नाभिजानामि वासुदेवपराजयम् ।

Caraka Saṁhitā, VI, xxv.

But Kṛṣṇa and Vāsudeva are mentioned in Pāṇini as demigods, having many adherents who formed a class. "वासुदेवार्ज्जुनाभ्यां वुन" Pāṇini, 4. 3. 98. Again the passage may be an interpolation of a subsequent *Vaiṣnaka Vaid.*

So Bṛsavadhvaja is also mentioned in Dṛḍhavala's Supplement, as a god to be worshipped during the preparation of some medicines :

ब्रह्मघोषप्रहृष्टनरोनिनादै: सिद्धं सितवृषवक्रतक्षायं गजस्कन्धमारोपयेद्भगवन्तं वृषध्वजमभिपूज्य तं खेडं विभागमाचिक्रमद्भक्त्याग्रो:स्तुतिदेवतार्च्चनैर्वेखिं गमयेत् ॥

Ibid, VIII, xii.

forbidden food, for it is spoken of as an article of diet that should not be indulged daily,[1] nor should it be used in excessive quantity as it is mentioned as a cause of the disease, Vāta-Rakta.[2]

The style of the book is antiquated and decidedly savours that of the Brāhmaṇas. Nāya and Vaiśeṣiki systems occur in the text,[3] and so probably the book was written long before the compilation of these Sūtras.

Editions.—The book had undergone several editions. It was edited by Jībānanda Vidyāsāgar, Calcutta, in 1877 and 1896 (2nd Ed.); by Gaṅgādhar Kaviratna, Berhampur, 1879; by Gupta, Calcutta, 1897; with commentary by Cakrapāṇidatta, Calcutta, 1892-93; by Jaśodānandana Sarkār, with Bengali translation, 1894.

Translations.—It had been translated into English by A. C. Kaviratna, Calcutta, 1897. Caraka was translated from Sanskrit

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And we find that the antidote to poisen called महागन्धहस्ती is said to have been told by Tryambaka (Śiva) to Baiśravaṇa (Kuvera):

अगदोऽयं वैश्रवणायात्र्यम्बकेण पुराऽऽहृतः।
Caraka Saṁhitā, VI. xxv.

Also we find the name of Kārttikeya mentioned in Sec. IV. ch. viii.

प्रसुप्त लमविक्लिष्टमविक्लिष्टा शमानने,
कार्त्तिकेयद्युतिं पुत्रं कार्त्तिकेयाभिरक्षितमिति॥

[1] कुर्चिकांश किलाटांश क्षीरं मत्स्यमामिषं।
मद्यान् दधि च माषांश यावकांश न क्षीलयेत्॥
Ibid, I. v.

[2] कुलत्थमाषनिष्पावश्राकादिपललैर्युभिः।
दधारनालसंवीरयूकतक्रसुरासवैः॥
Ibid, VI. xxix.

[3] Vide Caraka, III. viii.

into Arabic in the beginning of the eighth century and his name "Sharaka Indianus" occurs in the Latin translations of Avicenna, Rhazes and Serapion. "A translation of the Karaka[1] from Sanskrit into Persian and from Persian into Arabic is mentioned in the Fihrst, (Finished 987 A.D.). It is likewise mentioned by Albērūnī[2]; the translation is said to have been made for the Barmekides."[3] Albērūnī's chief source on Medicine was "Caraka, in the Arabic Edition of Ali Ibn Zain, from Trabaristan."[4]

Commentaries.—

1. Patañjali—2nd century B.C.—not available.
2. Cakrapāṇidatta's Caraka Tātparya Tīkā, or Āyurveda-dīpikā[5]—1060 A.D.
3. Haricandra[6]—1111 A.D.—not available.
4. Śibadāsa's Caraka-Tattva-Pradīpikā.
5. Gaṅgādhar's Jalpa-Kalpa-Taru—1879 A.D.

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[1] Proceedings of the As. Soc., Bengal, 1870, September.

[2] Reinaud, *Memoire sur l'Inde*, P. 316.

[3] Maxmuller's Science of Language, Vol. I., P. 168, Foot Note.

[4] Sachau's preface to India, P. XL.

[5] See Caraka Saṁhitā with Cakrapāṇidatta's Commentary by *Kavirāja* Harināth Viśārada, Calcutta, 1895.

[6] A Commentary written by Haricandra is referred to in the Sanskrit Ślokas narrating the geneology of Maheśvara, the author of Viśvaprakāśa and Sāhasāṅkacarita, who flourished during the reign of Sāhasāṅka, king of Gazipur in 1033 Saka (1111 A. D. Wilson).

श्रीसाहसाङ्कपतेरखवद्यविद्या-
वैदग्धीधुरन्धरं पदमवाप्तिमेव विभ्रत्।
यश्चन्द्रचारुचरितो हरिचन्द्रनामा
सद्याख्यया चरकतन्त्रमलंचकार ॥

SUŚRUTA SAṀHITĀ.

The next treatise on Hindu Medicine is the Suśruta Saṁhitā. Suśruta was the son of the sage Viśvāmitra,[1] a contemporary of Rāma. He learned the Science of Medicine from Divodāsa, surnamed Dhanvantari, king of Benares, at his Himalayan retreat. According to Suśruta, Divodāsa was the incarnation of Dhanvantari, the celebrated physician of the gods in heaven, and he first propounded the Art of Healing in this world.[2] Suśruta represented the Surgical School while Caraka was pre-eminently a Physician in practice.

As regards the authorship of the book, opinions differ. To Suśruta, Dhanvantari addressed his lectures on Major Surgery,[3]

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[1] Mahābhārata, Anuśāsana Parva, Ch. 139, Vs. 8-11.

धन्वन्तरिर्धर्मभृतां वरिष्ठो वाग्विशारदः ।
विश्वामित्रात्मजसर्षिं शिष्यं सुश्रुतमब्रवीत् ॥
Suśruta Saṁhitā, V. ii.

अष्टाङ्गवेदविदं दिवोदासं महामतिं ।
क्षिप्रमासाद्य सन्देहं सूक्ष्मागमनिबोधनं ।
विश्वामित्रसुतः श्रीमान् सुश्रुतः परिपृच्छति ।
Ibid, VI. lxvi.

सर्वज्ञास्त्रार्थतत्त्वज्ञ स्वपीदृष्टि रुदारधीः ।
वैश्वामित्रं प्रशास्त्राथ शिष्यं काशिपतिर्मुनिः ॥
Ibid, VI. xxviii.

[2] अथ खलु भगवन्तमशरवरसचिवगणपरिवृतमाश्रमस्थं काशिराजं दिवोदासं धन्वन्तरिमौपधेनववैतरणीरभ्रपौष्कलावतकरवीर्यगोपुररक्षितसुश्रुतप्रभृतय ऊचुः ।
Ibid, I. i.

[3] अथ कस्मै किमुच्यतामिति । त ऊचुः । अस्माकं सर्वेषामेव ज्ञस्यज्ञानमूलं ब्रूत्वोपदिशतु भगवानिति । स उवाचैवमस्त्विति । .....अस्माकमेकमतीनां मतमभिसमीक्ष्य सुश्रुतो भगवन्तं प्रच्छति ।
Ibid, I. i.

which he reproduced in this work. But in the opening lines of the book, salutation is offered to Brahmā, Dakṣa, Aśvins, Indra, Dhanvantari, Suśruta and others.[1] This shows that Suśruta can not be the author of the work or at least of the work in its present shape, for no author can offer salutation to himself. By "the others" are no doubt meant the notable surgeons who practised and taught the Science of Surgery and who were either contemporary with or posterior to Suśruta. Possibly the original Suśruta Saṁhitā had been recast and the redactor could appropriately offer a salutation to the original author and to other surgeons who flourished before him. There is also an Indian medical tradition, noted in Dallaṇacārya's Commentary, which assigns the improved and supplemented edition of Suśruta's original work to Nāgārjjūna,[2] the celebrated Buddhist Chemist, who is said to have been a contemporary of the king Sātvāhana.[3]

In the third chapter, Suśruta enumerates the subjects described by him,—the chapter forming an index of the book. Therein he mentions the five principal divisions of his book and says that the Uttara Tantra or the Supplement would be

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[1] नमो ब्रह्मप्रजापत्यश्विवज्रभिद्वन्वन्तरिसुश्रुतप्रभृतिभ्यः ।

Suśruta Saṁhitā, I.

[2] यत्र यत्र परीक्षे निर्योगस्तत्र तत्रैव प्रतिसंस्कर्तृ भूयं ज्ञातव्यमिति । प्रतिसंस्कर्तापीह नागार्जुन एव ।

Dallaṇa's Commentary to Suśruta, I. i.

See also Dr. Cordier's Recentes Decouvertes, pp. 12-13.

[3] See Harṣacarita by Vāṇa.
Beal's *Buddhist Records of the Western World*, Vol II., P. 209, 212, 216.
Burgess' Archeological Survey of S. India.
Introd. a l'histoire du Budh. Ind., P. 508.

described afterwards.[1] Now the fact that the sixth part was appended to the work as a Supplement or Uttara Tantra (*i.e.*, after treatise) clearly shows that it was written afterwards by another surgeon and added to the original treatise. If the original Suśruta wished to have six divisions of his book, he would have mentioned it clearly in the index and would not have, after stating that his book consisted of five parts, added that "the Supplement would be described afterwards,"[2] which seems to be an interpolation of the Supplementor to pass his edition as the orginal work of the author. Again at the end of the fifth section, there is a passage describing the importantce of the Âyurveda, which was meant as the conclusion of the book by the author.[3] It is to be noted

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[1] प्रागभिहितं सविंशमध्यायशतं पञ्चसु स्थानेषु। तत्र सूत्रस्थाननमध्याया: षट्चत्वारिंशत्। पीड़श निदानानि। दश शारीराणि। चत्वारिंशच्चिकित्सितानि। अष्टौ कल्पा:। तदुत्तरं षट्षष्टि:।

अध्यायानां शतं विंशमेवमेतदुदीरितम्।
अत:परं स्वनाम्नैव तन्त्रमुत्तरमुच्यते॥

Suśruta Saṁhitā, I. iii.

[2] बीजं चिकित्सितमेतत् समासेन प्रकीर्त्तितम्।
सविंशमध्यायशतमस्य व्याख्या भविष्यति॥

तत्र सविंशमध्यायशतं पञ्चसु स्थानेषु। तत्र सूत्रस्थाननिदानशारीरचिकित्सितकल्पेष्वर्थवशात् संविभक्तेषु तन्त्रे शेषानर्थान् व्याख्यास्याम:।

Ibid, I. i.

[3] सविंशमध्यायशतमेतदुक्तं विभागश:।
दृष्टोद्दिष्टाननिर्द्दिष्टान्सञ्चान् वक्ष्याम्यथोत्तरे॥
सनातनत्वाद्वेदानामचरत्वात्तथैव च॥
तथा हृष्टफलत्वाच्च स्थितत्वादपि देहिनां।
वाक्समूहार्थविस्तारात् पूजितत्वाच्च देहिभि:॥
चिकित्सितात्पुण्यतमं न किञ्चिदपि सुश्रुत।
ऋषेरिन्द्रप्रभावस्यास्ततर्थीनेभिषग्गुरो:॥
धारयित्वा तु विमलं मतम् परमसम्मतं।
उत्ताहार समाचारर्दृह प्रेत्य च मोदते॥

Ibid, V. viii.

that at the end of no other sections do we find a similar passage. He also writes: "Thus one hundred and twenty chapters are described" but adds: "The other diseases shall be described in the Uttara Tantra": the latter part no doubt is an interpolation of the Supplementor. Moreover, in the opening lines which serve as a preface to the sixth part, the authority quoted for the diseases of the eye is Nimi, the king Janaka of Mithilā and not Dhanvantari.[1] But in the first chapter of the first section, it is described that the sages wanted Dhanvantari to teach them Śalyatantra or Major Surgery only and he consented to their request. And this subject he treated in detail in the five sections of the book. In the Supplement, on the other hand, are described the other branches of the science such as Minor Surgery, Inner Medicine, &c. Probably this part was added afterwards to give completeness to the treatise; and the original Suśruta was called Vṛddhya or the Old by the commentators to distinguish him from the Supplementor.

Suśruta's work is specially important to us as having two whole chapters (vii and viii of Section I.) devoted to the descriptions of Surgical Instruments and one whole chapter (xxv of Section I.) to the principles of Surgical Operations.

The age of Suśruta is also involved in obscurity. Nothing can be ascertained from the fact that he was a son of Viśvāmitra[2],

[1] अध्यायानां शते विंशे यदुक्तमसकृन्मया।
वक्ष्यामि बहुधा सम्यगुत्तरैरुक्तानिमानिति॥
इदानीन्तत् प्रवक्ष्यामि तन्त्रमुत्तरमुत्तमं।
निखिलेनोपदिश्यन्ते यत्र रोगाः पृथग्विधाः॥
आलाक्यशास्त्राभिहिता विदेहाधिपकीर्त्तिता॥

Suśruta Saṁhitā, VI. i.

[2] Viśvāmitra is the *gotra* name; so the simple name may either refer to the great Viśvāmitra or to his descendants.

for the age in which the latter lived is not known to us. But he must have flourished during the Vedic Age as many Vedic Hymns are ascribed to him. In the Mahābhārata, Suśruta is mentioned as one of the sons of Viśvāmitra[1] and in the Suśruta Saṁhitā the author is often described as his son. The age of the great epic has, with good reasons, been fixed at 1000 B.C. So Suśruta must have flourished much earlier. The latest limit which we can assign to Suśruta is 600 B.C. as "there are indications in the *Śatapatha Brāhmaṇa*, a secondary Vedic work, that the author of it was acquainted with the doctrines of Suśruta" as regards the Osteology. "The exact date of that work is not known, but it is with good reason referred to the sixth century B.C." Again in the Atharva Veda, in the tenth book, there is a hymn on the creation of man in which the skeleton is described according to Ātreya and Suśruta.[2] "The large portion of it (Books I to XVIII) indeed admittedly belongs to a much earlier period, possibly as early as about 1000 B.C.; and the hymn in question is included in this older portion"[3]. This shows that Suśruta could not have flourished later than 1000 B.C.

Again in Hasti-Āyurveda, a book on the Treatment of

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[1] ग्रामायनीश्च गार्ग्यश्च जावलिसुश्रुतस्तथा—

* * * * * *

विश्वामित्रात्मजाः सर्व्वे मुनयो ब्रह्मवादिनः ॥

Mahābhārata, Anuśāsana Parva, Ch. IV.

[2] See J. R. A. S., 1906, P. 915; 1907, P. 1.

[3] Hoernle's Studies in the Medicine of Ancient India, Part I. Osteology, Introduction, P. 9.

Elephants by Pālakāpya, we find the Surgical instruments described after the manner of Suśruta. Pālakāpya lived as a Veterinary Surgeon in the Court of Romapāda, King of Aṅga, which had as its capital the famous town of Campā, identified with the modern town of Bhāgalpur. King Romapāda was contemporary with king Daśaratha, the father of Rāma, the hero of Rāmāyana.[1] Here we have a corroborative evidence of the age of Suśruta.

Suśruta is mentioned in the *Vārttikas* of Kātyāyana[2] who flourished during the fourth century B.C.

We have alluded to Nāgārjjūna,[3] the Buddhist Chemist, as the redactor of the Suśruta Saṁhitā. He is said to have been a contemporary of king Kaniṣka that is about the first century B.C.

Another revision was undertaken by Candraṭe, the son of Tīsaṭa, the author of Cikitsā-kalikā. He revised the text which must have fallen then into a state of corruption. The probable date of Candraṭe is the ninth century A.D.[4]

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[1] अहिं शत्रुघ्नमासाद्य पितरं च वशङ्गिनम्।
एतस्मिन्नेवकाले तु रोमपाद प्रतापवान्।

Rāmāyana, Vālakāndam, Ch. IX.

See also Rāmāyana, i, 11, 13-20; Mahābhārat, iii, 110, 10008-9; Bhāgavat, ix, 2.i, 7-10.

[2] सुश्रुतेन प्रोक्तं सौश्रुतं।

[3] Possibly more than one Nāgārjjūna appeared in ancient India as a chemist. Albīrūnī says: "He lived nearly a hundred years before our time" (India, I. P. 189). Rājtarangini places him in the 3rd century B.C. (I. Vs. 172-173). The modern scholars are of opinion that the founder of the Mahāyāna system lived in the first century A.D.

[4] Hoernle's Osteology, p. 100.

There is no doubt of the tradition that Suśruta's work was redacted, for the author could not write such a passage as follows: "The surgical treatises of Aupadhenava, Aurabhra, Suśruta and Pouṣkalāvata from the basis of other treatises on the subject."[1]

Commentators.[2]—

1. Cakrapāṇidatta—Vānumati—1060 A.D.
2. Gayadāsa—{Nyāya Candrikā or Pañjikā}—11th century A.D.
3. Jejjaṭācāryya.
4. Bhāskara.
5. Mādhava.
6. Bramhadeva.
7. Dallaṇācāryya—Nibandha Saṁgraha—12th century A.D.
8. Ubhalta (Kashmir).

Editions.—Suśruta Saṁhitā has been edited by Madhusūdan Gupta, Calcutta, 1835; by J. Vidyāsāgar, 3rd Edition, Calcutta, 1889; by A. C. Kaviratna, Calcutta, 1888-95; by Prubhurām Jībanarām, Bombay, 1901; and by Vīrasvāmī, Madras.

This book has been translated into English in part only by U. C. Datta 1883, A. Chaṭṭopādhyāy 1891, Hoernle 1897, Calcutta, in the Bibliotheca Indica. It has been translated into Latin by Hessler and into German by Vullurs.

The book was translated into Arabic before the end of the eighth century A.D. It is called "Kitab-Shawshoon-al-Hindi"

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1 श्रीधन्वनन्तरिमं सौश्रुतं पौष्कलावतम्।
ग्रेषाणां शल्यतन्त्राणां मूलान्येतानि निर्दिशेत्॥
Suśruta Saṁhitā, I. iv.

2 * * * * श्रीसहनपालदेवनृपतिवल्लभः श्रीडल्लणः समभूत्। तेन श्रीजेज्झटं टीकाकारं श्रीगयदासभाष्करौ च पञ्जिकाकारौ श्रीमाधवब्रह्मदेवादीन् टीपनककारांश्चोपजीव्यायुर्वेदशास्त्र सुश्रुतव्याख्यानाय निबन्धसंग्रहः क्रियते।
Dallapa's Commentary, I. i.

and also mentioned as "Kitab-i-Susrud" or Book Suśruta by Ibn Abillsaibial. Rhazes often quotes Sarad as an authority in Surgery.[1]

VĀGBHATA I.

The next author of celebrity and whose work is still extant is Vāgbhaṭa I or Vāgbhaṭa the elder, the author of Aṣṭāṅga Saṁgraha (*i.e.*, Compilation of the Octopartrite Science). In later times, a namesake of his, wrote another work called Aṣṭāṅga Hṛdaya Saṁhitā (or the best Compendium *i.e.*, the Heart of the Octopartrite Science). In the Uttara Sthāna, Vāgbhaṭa the younger distinctly states that his Compendium is based on the Compilation of Vāgbhaṭa the elder.[2]

As regards the age of Vāgbhaṭa the elder, there is the same uncertainty as with his predecessors. We are however sure that he is posterior to Caraka and Suśruta for he refers to these writers by name.[3]

The chronological relation of the three early authors is described in a popular couplet that Ātreya, Suśruta and Vāgbhaṭa were the three great medical authors for the three Yugas—

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[1] "His next description is from an author named Sarad, whom he frequently quotes in other parts of his works".

Adam's Commentary on Paulus Æginetta, VI. lxi.

[2] षष्टाङ्गवैद्यकमहीदधिमन्थनेन योऽष्टाङ्गसंग्रहमहाऽमृतराशिराप्तः ।
तस्मादनल्पफलमल्पसमुद्यमार्थां प्रीत्यर्थमेतदुदितं पृथगेव तन्त्रम् ॥

Aṣṭāṅga Hṛdaya Saṁhitā, Uttara Sthāna, Ch. XL, v. 82.

[3] By name, *e.g.* in Saṁgraha, Bombay ed., Vol. I, P. 246; Vol. II, P. 421. Again quoted from Caraka, *Ibid.*, Vol. I, pp. 20, 93; Vol. II, pp. 212, 213, *et passim*; from Suśruta I, *ibid*, Vol. I. pp. 109, 121, 177, 247; Vol. II, p. 303, *et passim*. (Hoernle).

the Tretā, Dvāpara and Kali, respectively.[1] They are known as the Vṛddha Trayī or the Old Triad. This medical tradition goes much against the conclusion of Dr. Hoernle that Vāgbhaṭa I must have flourished early in the seventh century A.D. One of the reasons put forward by him is the fact, that "the Buddhist pilgrim I'Tsing, who resided ten years in the Nalandā University (in Bihar) from about 675-686 A.D., states in *Records of Buddhist practices* that the eight arts (*i.e.*, the branches of medicine) formerly existed in eight books but lately a man epitomised them and made them on one bundle (or book)."[2] Professor Jolly understands by it the Suśruta Saṁhitā while Dr. Hoernle points out with more reasons that it refers to Vāgbhaṭa I's work, the Aṣṭāṅga Saṁgraha (*i.e.*, the Compilation of the Octopartrite Science) and rules out Suśruta by the word "lately."[3] But the description that I'Tsing gives of the contents of the book does not warrant any reference to either. Moreover, he has not given any reason why Vāgbhaṭa II's book Aṣṭāṅga Hṛdaya Saṁhitā (the best Compendium of the Octopartrite Science) might not be alluded to by I'Tsing. Dr. Hoernle, however, rules him out by date for "he can not be placed earlier than the eightth century"—an assertion unsupported by any evidence whatsoever. All that he has proved is that "Accordingly it is probable that all these three medical writers (Mādhava, Dṛḍhabala and Vāgbhaṭa II) come in the period from the 7th to the

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[1] See foot-note 3, P. 6.

[2] I'Tsing: Records of the Buddhist Religion. Transl. by Professor Takakusu, P. 128.

[3] J. R. A. S., 1907, P. 413.
Hoernle's Osteology, Introduction, P. 10—11.

9th century A.D.[1] at no very great interval from one another," and this proof is based on the age of Vāgbhaṭa I as suggested by I'Tsing's remarks. Thus he has taken for granted what he is required to prove. He has shown that Susruta is anterior to Vāgbhaṭa I; and Vāgbhaṭa II is posterior to him. But in trying to prove that Vāgbhaṭa I lived in the seventh century he cannot assume that Vāgbhaṭa II lived in the eighth. Another evidence adduced in support of his conclusion is the fact that the non-medical version of the list of bones of the human body as contained in the Law-book of Yājñavalkya presupposes earlier uncorrupted forms of lists of bones both in Caraka and Suśruta, and "the corrupt recension, traditionally handed down, must have come into existence at a later date," that is to say, between the date of Yājñavalkya (350 A.D.) and Vāgbhaṭa I, the latter of whom is proved to have copied from the corrupt recensions of Caraka and Suśruta. Thus the older recensions still existed in the fourth century A.D. and if we add to it the interval of time necessary for the texts to have fallen into a state of corruption, we get the early seventh century A.D. for Vāgbhaṭa I. But we must remember that there is nothing to prevent against the supposition that Vāgbhaṭa I lived before Yājñavalkya. There might have been two recensions of the texts available during Yājñavalkya's time, one corrupted and it might or might not have been the work of Vāgbhaṭa I and another t .ie version which was availed of by the sage Yājñavalkya. And similar events have happened, as has been pointed out by Dr. Hoernle himself, in our own generation. Gaṅgādhar's recension of Caraka is a corrupted form of the text,

[1] *Ibid*, P. 16.

while the recension given in Jībānanda's edition is the traditional text of Caraka. No critic would I think jump into the conclusion that Gaṅgādhar lived three or four centuries after Jībānanda. Again if it be true, as he contends, that Suśruta was redacted by Vāgbhaṭa I, we could easily imagine that Yājñavalkya copied his list bones from the original Suśruta and not from the redaction of Vāgbhaṭa I. So we see that the age assigned to Vāgbhaṭa I, or the seventh century A.D. can not be accepted as proved. Dr. Hoernle says : "It should, however, be understood that these conclusions regarding the date and authorship of Vāgbhaṭa I, are not put forward as established fact."

Let us recapitulate the objections that can be urged against the conclusion that Vāgbhaṭa I lived in the seventh century A.D.

1. Vāgbhaṭa I is believed by the Indian medical men to have flourished long before the Christian era. By some, he is connected with the court of Yudhiṣṭhira, but his name is nowhere mentioned in the Mahābhārata. Ātreya, Suśruta and Vāgbhaṭa are described as the Old Triad or Vṛddhya Trayī and they were the authorities for the Tretā, Dvāpara and Kali Yugas, respectively. It is curious to observe that Dr. Hoernle in arguing against the conclusion of Prof. Jolly that Suśruta is meant by I'Tsing, takes advantage of this Indian medical tradition that Suśruta flourished during pre-historic times, but does not mention the same tradition with regard to Vāgbhaṭa I, which goes against his own conclusion. On the other hand the same objection does not apply against Vāgbhaṭa II.

2. The name of Vāgbhaṭa I's book, Compendium of the

Octopartrite Science, no doubt, agrees very well with the description of I'Tsing that "lately a man collected them into one bundle." But Vāgbhaṭa II's book "The best Compendium of the Octopartrite Science" is equally suggestive, though Dr. Hoernle says: "it cannot prevail by the side of the more suggestive name of the rival work of Vāgbhaṭa the elder."

3. Again in arguing against Prof. Jolly, Dr. Hoernle has attached much importance to the word "lately" by which Suśruta is ruled out by date. Admitting the validity of such reasoning, it does not follow that by the word "lately" I'Tsing meant any contemporary author or any one who preceded him by a short period only. To comprehend the meaning of the sentence we must understand the word "lately" in connection with the word "formerly" used before.[1] Now the sentence "The science of medicine formerly existed in eight books" no doubt refers to the division of Āyurveda into eight parts by Brahmā and to the treatises on the different branches of Medicine by Agniveśa, Suśruta and others. These treatises are believed to be of remote antiquity, and so any later compilation may be spoken of as recent in comparision with the old treatises of unknown ages. Thus the word "lately" may refer either to Vāgbhaṭa I or Vāgbhaṭa II, but the latter author's claim to the honour becomes reasonable considering his decided posteriority to the former and so coming within the limit of the time suggested by the word "lately."

4. Again I'Tsing refers to a book which was recognised as the standard throughout India. This may refer either to

[1] J. R. A. S. 1907. P. 174.

Vāgbhaṭa I or II. But if Vāgbhaṭa I's book occupied such a position at the time of I'Tsing, it becomes difficult to imagine why Vāgbhaṭa II should write another work principally based on the work of Vāgbhaṭa I after a lapse of a century or so. Moreover, we find at the present time, that Vāgbhaṭa II's book, Aṣṭāṅga Hṛdaya Saṁhitā, has a wider popularity than the book Astāṅga Saṁgraha of Vāgbhaṭa I. The former has been printed many times and is widely read by the students,—so much so Vāgbhaṭa is generally known as the author of Aṣṭāṅga Hṛdaya Saṁhitā.

5. Moreover, the Arabian physician Rhazes, who is said to have lived in the ninth century (882 A.D.) in treating of the property of ginger, the common plantain or musa and other drugs, quotes from an Indian writer, whom he calls Sindaxar or Sindicara.[1] Royle says: "But in the article De Allio another Indian author is quoted, whom I have not been able yet to trace out—*Ait Sindifar* (in another place written "*Dixit sindichar*") *indianus* valet contra Ventositatem." This Sindicara is identified with Vāgbhaṭa II of Sindh who was in his time known as a second Caraka or Cara, the syllable "ka" making no difference, as in words like "bāla" and "bālaka," both meaning a child.[2] We know that the Vāgbhaṭa's Aṣṭāṅga Hṛdaya Saṁhitā was one of the medical works translated by the order of Caliphs in the eighth century.[3]

6. The translations of the Caraka, the Suśruta and the Vāgbhaṭa occur in the Thibetan Tanjur.[4] "George Huth,[5]

[1] Antiquity of Hindu Medicine, Page 38.
[2] History of Aryan Medical Science, P. 196.
[3] Zeit. deut. morg. Ges. 34, p. 465.
[4] Jour. Asiatic Soc. XXXVIII. (1835).
[5] Zeit. deut. morg. Ges. T. (LXIX. pp. 279—284).

who has recently critically examined the contents of the Tanjur, concludes that the most recent date at which it can be placed is the 8th century A.D."[1]

So I cannot avoid the conclusion that of the three authors, Suśruta, Vāgbhaṭa I and II, to which I'Tsing's remarks may refer, the last has probably the best claims to that reference; and the date assigned to Vāgbhaṭa I may well suit Vāgbhaṭa II *i.e.*, "as late as the early 7th century A.D."[2] and possibly still earlier.[3] Again it is impossible for us to say whether I'Tsing's remarks may not appropriately refer to other authors whose works are lost to us.

Mention should also be made of the fact pointed out by Dr. Cordier that Vāgbhaṭa is mentioned in Rājtaraṅgiṇi and his date is fixed there as 1196-1218 A.D.[4]

But the name of Vāgbhaṭa does not occur in Stein's edition of Rāj, which is no doubt the most reliable, and so we can easily dismiss this view as untenable.

Editions.—Vāgbhaṭa I's book Aṣṭāṅga Saṁgraha has been printed in Bombay.

Commentary.—Aruṇadatta—about 1220 A.D.

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[1] P. C. Rāy's History of Hindu Chemistry, Intro., P. XXIX.

[2] Hoernle's Osteology, Intro., p. 10.

[3] Dr. Kunte places him "at least as early as the second century before Christ," Vide his Intro. to Vāgbhaṭa's Aṣṭāṅga Hṛdaya Saṁhitā.

[4] सिंहगुप्तसुतः परमवौद्धो वाग्भटाचार्यः काश्मीरनगरपति जयसिंहस्य प्रजापालन समये (खृः द्वादश शताब्द्याम्, शक १११८—४०) वर्त्तमाना चासीत्।

Quoted in Cordier's Vāgbhaṭa et L'Aṣṭāṅgahṛdaya Saṁhitā, 1896.

See Intro. to the Vaidyakśabdasindhu by *Kaviraja* Umeścandra Gupta, 1894.

VĀGBHAṬA II.

The next great authority in Hindu medicine is Vāgbhaṭa II, son of Siṁha Gupta, an inhabitant of Sindh.[1] His work, Aṣṭāṅga Hṛdaya Saṁhitā, the author himself states, is based on the summary of Vāgbhaṭa the elder.[2] In the first chapter of Sūtra Sthāna, he acknowledges the help he received from the works of Agniveśa, Hārīta, Bhela, and others.[3] The fact that Caraka is not referred to here as one of the sources of Vāgbhaṭa II has been taken advantage of by some to prove the posteriority of Caraka.[4] They conclude that Agniveśa and Suśruta wrote their works long before him, and the Agniveśa Tantra was not called by the name of, and in fact was not as yet edited by, Caraka, at the

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1 भिषग्वरो वाग्भट इत्यभूनमे
पितामही नामधरीऽस्मि यस्य
सुतोऽभवत्तस्य च सिंहगुप्तः
तस्याप्यहम् सिन्धुषु जातजन्मा ॥
Aṣṭāṅga.

2 Aṣṭāṅga Hṛdaya Saṁhitā, Uttara Sthāna, Ch. XL, v. 82.
See foot note 2, p. 18.

3 ब्रह्मा स्मृत्वाऽऽयुषो वेदं प्रजापतिमजिग्रहत् ।
सोऽश्विनौ तौ सहस्राक्षं सोऽत्रिपुत्रादिकान्मुनीन् ॥४॥
तेऽग्निवेश्यादिकांस्ते तु पृथक् तन्त्राणि तेनिरे ।
तेभ्योऽतिविप्रकीर्णेभ्यः प्रायः सारतरोदयः ।
क्रियतेऽष्टाङ्गहृदयं नातिसंक्षेपविस्तरम् ॥५॥
Aṣṭāṅga Hṛdaya, Sūtra Sthāna, Ch. I.

4 "It would appear also that at the time Vāgbhaṭa lived, Agnivesha's work was not called by the name of Caraka, and Suśruta had also been written. Hence it follows that Caraka's edition of Agnivesa, that is the work now called Caraka, was probably edited after Suśruta had been written."
Dutt's Materia Medica of the Hindus, Intro., p. IX.

time Vāgbhaṭa II flourished. The argument is however not conclusive; it only shows that the Agniveśa Tantra was available to Vāgbhaṭa II in its original form. No definite results can be expected from this *argumentum ex silentio*. Again it may easily be imagined, and I think it is the right view of the question, that Caraka lived and edited Agniveśa's work long before Vāgbhaṭa, the reason of Caraka being not mentioned in Vāgbhaṭa's book, is the fact that Caraka did not usurp the authorship of Agniveśa Tantra but clearly states at the end of each chapter the real nature of his share in the authorship of his book in the following words:—"Here ends the chapter of Agniveśa Tantra as corrected and edited by Caraka." Many modern text books of medicine have been edited and improved, though the books are still called after the original authors. Moreover to make Caraka flourish after Vāgbhaṭa II would bring him to quite modern times.

We are however arguing on false premises. Though Caraka is not mentioned in the Sūtra Sthāna of Aṣṭāṅga Hṛdaya, his name occurs in the Uttara Sthāna.[1] So there can be no doubt that Caraka's edition of Agniveśa was current in India long before Vāgbhaṭa II wrote his Aṣṭāṅga Hṛdaya Saṁhitā.

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[1] यदि चरकमधीते तदधुवं सुश्रुतादि
प्रथितदितगदानां नाममात्रेऽपि वाच्यः।
अथ चरकविहीनः प्रक्रियायामखिन्नः
किमिह खलु करोतु व्याधितानां वराकः ॥४८॥
* * * *
ऋषिप्रणीते प्रीतिर्येन्मुक्ता चरकसुश्रुतौ।
भेड़ाद्याः किं न पठ्यान्ते तस्माद्गृह्यं सुभाषितम् ॥५३॥

Aṣṭāṅga Hṛdaya Saṁhitā, (Ed. Vijayratna Sen), Uttara Sthāna, Ch. XL.

Editions.—There are various editions of the book but the following are reliable :—

1. By Dr. Anna Moreśvara Kunte, M.D., 2 vols., Bombay, 1880; 2nd Ed., 1891.
2. By Jībānanda Vidyāsāgara, Calcutta, 1882.
3. By Vijayratna Sen Kaviranjana, Calcutta, 1885-90.
4. By Ganeś Sastri Tartevaidya, Bombay, 1888.
5. In Sanskrit and Bengali, with the commentary of Arūṇadatta by Vijayratna Sen Gupta, Calcutta, 1888.
6. In Sanskrit and Guzrathi by Behicharlal Nathuram, Ahmedabad, 1889.
7. In Sanskrit and Bengali by Kāliśa Cundra Sen Gupta, Calcutta, 1890-1892.
8. In Sanskrit and Hindi by Pandit Robi Dutta, Bombay, 1890.
9. In Sanskrit and Marathi by Ganeś Kṛṣṇa Garde, Poona, 1891.
10. In Sanskrit and Bengali by *Kavirāja* Binod Lāl Sen, Calcutta, 1891-1892.

Commentaries.[1]—

1. Sarvāṅga Sundarī[2] by Arūṇadatta, son of Mṛgāṅkadatta, 1220 A.D.

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[1] See Cordier's Vāgbhaṭa et L'Aṣṭāṅgahṛdaya Saṁhitā, P. 6.

[2] इति श्रीमृगाङ्कदत्तसुत श्रीमदरुणदत्तविरचितायां
सर्व्वाङ्गसुन्दराख्यटीकायां * * * * .
Colophon at the end of each Chapter of the Commentary.

2. Āyurvedadarśayana (Dinacharyā Prakarana) by Hemadri or Kamadeva, Raja of Devagiri. It is available in parts only.
3. Aṣṭāṅgahṛdayarddyota by Aśadhara Sallaxana.
4. Padārthacandrikā by Candracandana.
5. Saṅketamañjarī by Dāmodara.
6. Aṣṭānga Hṛdayatīkā by Rāmanāth Vaidya.
7. Vālaprobodhikā (Anonymous).
8. Hṛdayabodhikā "
9. Pāṭhya.
10. Vāgbhaṭartha Kaumudī by Hari Kṛṣṇa Sen Mullick.
11. Pradīpa by Jaśodānandan Sarkār, 1298 B.S.

VĀGBHATA III.

The author of Rasaratna Samuccaya in the Colophons at the end of each chapter identifies himself with Vāgbhaṭa II: "Here ends Book first (or so) of R.R.S. composed by Vāgbhaṭa, son of Siṁha Gupta, prince of physician." The salutation at the beginning of his book is strictly Buddhistic. The probable date of the book is "placed between the thirteenth and fourteenth centuries A.D."[1] "The chemical knowledge, as revealed in Vāgbhaṭa is almost on a par with that in the Suśruta," whereas the R. R. S. indicates an advanced state of that science. He quotes Rasārṇava as a source of his information; he does not mention opium as a medicine, and the Firaṅga roga and its treatment find no place in his book.

[1] P. C. Rāy's History of Hindu Chemistry, Intro., p. li.

MĀDHAVAKARA.

He is the author of the famous work on Pathology or Nidāna. His book was translated into Arabic by the order of Harun-Al-Rasid and so the most recent date that can be assigned to him is the seventh century A.D.[1] Thakore Saheb of Gondal identifies him with Mādhabācāryya, the celebrated author of Sarvadarśana Saṁgraha, the brother of Sāyana, the commentator of the Vedas.[2] I do not find any authority for such an assertion and here is an example of fallacious reasoning based simply on the identity of names. Mādhabācāryya and Sāyana lived in the twelfth century A.D. Mention should also be made of the view expressed by Dr. Hoernle as certain that Mādhavakara, the author of Nidāna and Vṛnda Mādhaba, the author of Siddhayoga are one and the same person. He holds that Vṛnda is the real name, but he was known to the commentators as Mādhava, for his melodious diction. There is no proof given of this opinion, and we have reasons for not accepting it. However as he does not treat of surgical instruments, his work is not important to us.

CAKRAPĀṆIDATTA.

Cakrapāṇidatta or more commonly Cakradatta in a Colophon[3] has given an account of himself in his book called

[1] Jolly's Indian Medicine, ff. 5, 6, pp. 7-9.

[2] History of Aryan Medical Science, Ch. II, p. 35.

[3] गौड़ाधिनाथ रसवत्याधिकारिपाद—
नारायणस्य तनयः सुनयोऽन्तरङ्गात्।
भानीरनु प्रथितलौध्रवलीकुलीनः
श्रीचक्रपाणिरिह कर्तृपदाधिकारी॥

Colophon in Cakradatta.

Cikitsā Sāra Saṁgraha: "The author of this work is Śrī Cakrapāṇi who belongs to the family of Lodhravalī; and who is the youngest brother of Vānu and the son of Nārāyaṇa, the superintendent of the kitchen of Nayapāla,[1] the king of Gour." This book is arranged on the plan of Vṛnda in his Siddhayoga[2] which again follows closely as a companion volume to Mādhava's Nidāna.[3] The age of Cakradatta is about 1060 A.D.; and Vṛnda must have flourished between Mādhava and Cakrapāṇi for he quotes the former while he is himself quoted by the latter. So the probable age of Vṛnda is the ninth century A.D. Besides being a celebrated author, Cakradatta wrote excellent commentaries of Caraka and Suśruta. His extant works are—

1. Cikitsā Sāra Saṁgraha or Cakradatta. A treatise on Medicine.

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[1] For the date of Nayapāla, vide Cunningham's Archæo. Survey of India. III. P. 119; also J. A. S. LX. Pt. I. P. 46. Life of Atisa by S. C. Dās.

[2] यः सिद्धयोगसिसितादिकसिद्धयोगा—
नवैव सिचिनति केवलमुद्धरेद्या।
भट्टचयविपश्चवेदविदा जनेन
दत्तः पतेत् सपदि मूर्द्धनि तस्य शापः॥

Śloka at the end of the Cakradatta.

य इत्यादौ।—सिद्धियोग इति ग्रन्थकृतसंग्रहस्य संज्ञा, तच्चिचितयोगमपेक्ष्याधिका ये च सिद्धियोगा अत्र संग्रहे उक्तास्तानधिकयोगान् तत्रैव सिद्धियोगे सिचिनति, तथा यो वा तानधिकसिद्धयोगानितः संग्रहादुद्धरेत् दूरीकुर्यात्, तस्य मूर्द्धनि दुष्टेन पुंसा दत्तः शापः पतेत्। कीदृशेन पुंसा? भट्टचयविपश्चवेदविदा। कारिका टहटीका चन्द्रटीकेति भट्टचयं, विपश्चवेदः ऋग्यजुःसामरूपः, तद्विदा॥

Śibadāsa Sen's Commentary.

[3] ग्रन्थेन * * * * * * संलिख्यते गदविनिश्चयकर्मनेन॥

Vṛnda's Siddhayoga.

2. Cakradatta or Materia Medica. It treats on drugs applicable to a number of deseases.

3. Muktābali. This treatise on the nature and properties of medicinal drugs is ascribed to Cakrapāṇi.

4. Vānumati—Commentary on Suśruta Saṁhitā.

5. Cakratattwadīpikā—Commentary on Caraka Saṁhitā.

Editions.—

1. Cakradatta or Cikitsā Sāra Saṁgraha edited by *Kavirāja* Pyāri Mohan Sen Gupta, Calcutta, 1295 B.S.

2. Cakradatta with Bengali translation by Candrakumār Dās Kavibhuṣan.

3. Cakradatta with Bengali translation and with commentary of Śiva Dās Sen, by Jaśodā Nandan Sarkār, 1302 B.S.

SĀRAṄGADHARA.

He wrote Sāraṅgadhara Saṁgraha. It is compiled from the works of Caraka, Suśruta, Vāgbhaṭa and others.[1] It is very popular in Western India. It treats on nosology and practice of Medicine. He was the son of Dāmodara and flourished in the fifteenth century A.D.

Edition.—By *Kavirāja* Pyāri Mohan Sen Gupta, Calcutta, 1296 B.S.

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[1] प्रसिद्धयोगा मुनिभिः प्रयुक्ता
चिकित्सके यैं वहवोऽनुभूताः।
विधीयते शार्ङ्गधरेण तेषां
सुसंग्रहः सज्जनरञ्जनाय॥

Sāraṅgadhara Saṁgraha, I. i.

Commentary.—Sāraṅgadharatīkā: It is a commentary on the above work by Adhamulla.

BHĀVA MIŚRA.

About 350 years ago, a compilation was made by Bhāva Miśra, son of Lataka Miśra, an inhabitant of Benares, from the most celebrated medical works and was called Bhāva Prakāśa.[1] He lived about 1550 A.D. and was considered a "Jewel of Physicians and Master of Śāstras." He mentions China root called Tob Chini[2] in the Vernacular as a remedy of Firaṅga roga or Syphilis[3] which he describes for the first time in India. He was the first to make mention of certain drugs of foreign countries as Badhkshani Naspasi,

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[1] श्रायुर्वेदाब्धिमध्यादतिमतिमुनयो यौगरत्नानि यत्ना-
ल्लब्ध्वा स्वे स्वे निवन्धेदधुरखिलजन व्याधिविध्वंसनाय।
तत्तद् यन्नादृष्टदोषैः सुवचनमणिभि र्भावमिश्रैर्विधिज्ञा
शास्त्रे जाद्यान्धकारं प्रशमयितुमिमं सन्विधत्ते प्रकाशम्॥

Bhāva Prakāśa, I. i.

इति श्रीमिश्र लटकतनय श्रीमद्भिश्रभावविरचिते
भावप्रकाशे षष्ठ प्रकरणं सम्पूर्णं॥

Colophon at the end of Section I.

[2] द्वीपान्तरवचा किञ्चित्तिक्तोष्णा वह्निदीपिनी।
विबन्धाध्मानगुल्घ्नी श्रक्तन्मूत्रविशोधिनी॥
वातव्याधीनपस्मारमुन्मादं तनुवेदनाम्।
व्यपोहति विशेषेण फिरङ्गामयनाशिनी॥

Bhāva Prakāśa, I. i.

[3] फिरङ्गसंज्ञके देशे बाहुल्येनैव यद्भवेत्।
तस्मात् फिरङ्ग इत्युक्तो व्याधिर्व्याधिविशारदैः॥

Bhāva Prakāśa, II. iv.

Khorasani and Parasika Vacha (Acorus Calamus), Sulemani Kharjura (date fruit of Suleman),[1] and opium.

Editions.—

1. By Jibānanda Vidyāsāgara, Calcutta, 1875.
2. By Rasik Lāl Gupta.
3. By Kāliśa Candra Vidyāratna.

Besides these books, the number of Sanskrit medical works is simply legion; many of them are daubed with fancy names and are excellent treatises on the different branches of medical science. But they are quite foreign to our purpose. I intend to publish in a separate volume short notices of the medical authors and their works, and so we need not dwell on them here.

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[1] पारसीक यवानी तु यवानी सदृशी गुणैः।
विशेषात् पाचनी रूक्षा वाह्निषी सादिनी गुरुः॥

Bhāva Prakāśa, I.

पारसीकवचा गुरुा प्रोक्ता हैमवतीति सा।
हैमवत्युदिता तद्वदतं इन्ति विशेषतः॥

Ibid.

उक्तं खसफलचीरमाकुकमहिफेणकम्।

Ibid.

चीनाक सन्नः कर्पूरः कफचयकरः स्मृतः।

Ibid.

खर्जुरी गौल्लनाकारा परदीपादिद्वीपता॥

Ibid.

CHAPTER II.

HOSPITALS AND DISPENSARIES.

Before entering into our proper subject, it would not be amiss to notice here two objects—Hospitals and Anæsthetics—which are essentially necessary for the devolopment of surgical knowledge. We know from the Edict II of Aśoka that India during his reign was studded with hospitals not only for the treatment of human beings but also for the brute creations. But even before Aśoka, hospitals flourished in India. In Caraka we can trace the germ of such an institution though it was used for rich men and did not accommodate the public.[1]

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[1] इदं निवातं प्रवातैकदेशं सुखप्रविचारमनुपस्कृतं धूमातपरजसामनभिगमनीयमनिष्टानाञ्च शब्द-स्पर्श-रस-रूप-गन्धानां सोपानीदूमलसुपलवर्चःस्थानस्नानभूमिसङ्गानसंयुक्तं वास्तुविद्या-कुशलः प्रशस्तं स्थपतिरेव तावत् पूर्वमुपकल्पयेत्।

ततः शीलशौचानुरागदाक्ष्यादविस्रब्धोपपन्नानुपचारकुशलान्, सर्वकर्मसु पर्यवदातान् सूपौदनपाचकस्नापकसंवाहकौत्सादकसंवेशकोद्वर्तकांश्च परिचारकान् सर्वकर्मस्वप्रति-कुलान्। तथा गीतवादित्रोद्ग्राहकङ्गीकगाथाख्यायिकेतिहास-पुराणकुशलानाभिप्राय-ज्ञानज्ञ-तांश्च दैशकालविदः परिचर्यांश्च। तथा लावकपिञ्जलप्रभृतिभिर्नकालपुच्छकसगमाहकी-रयान्। गाश्च दीर्घौ शीलवतीमनातुरां जीवद्वत्सां सुप्रतिविहितलक्षणरक्षणपानीयाम्। जल-पात्राचमनीदकीडमथिकपिठरघटकुम्भीकुम्भकुण्डशरावदर्वीकपरीपचनमन्थानचेलसूचकार्पासी-र्यादीनि च शयनासनादीनि चौपस्थस्थङ्गारप्रतिग्रहाणि सुप्रयुक्तान्तरचीनरपच्छदी-पधानानि स्नापार्थयानि संवेशनोपवेशनसंङ्क्षेदाभ्यङ्गप्रदेहे परिषेकानुलेपनवमनविरेचना-स्थापनानुवासन-शिरोविरेचनमूर्धोशारकबस्तीनामुपचारसुखानिसुप्रक्षालितोपधानाश्च शुक्लाम्बर-मध्यमा इमद शस्त्राणि चौपकरणार्थानि।

धूमनेत्रं वस्तिनेत्रोत्तरवस्तिकञ्च। कुशहस्तञ्च तुलाञ्च स्नानभाण्डञ्च घृततैलवसामज्जक्षौद्र-फाणितलवणैलनीदक-मधुसुरासौवीरकतुषोदकमैरेयमेदकदधिमस्तोदश्वित्थाम्लमूलानि च। तथा शालिषष्टिकमुद्गमाषयवतिलकुलत्थबदरसक्तीकाफलकाभयामलकविभीतकानि नाना-विधानि च सेहस्नेदोपकरणानि द्रव्याणि तथैवोद्वर्तनानुलोमिकौभयभाञ्जि संशुद्धनीयदीप-नीयपाचनीयोपशमनीयवातहराणि समाख्यातानि चौषधानि यद्धान्यदपि किञ्चिदापदः परिसंख्यायोपकरणं विद्यते यच्च प्रतिभोगार्थं तत्तदुपकल्पयेत्॥

Caraka Saṁhitā. I., xv.

He advises us as follows:—The engineer is to erect a strong and spacious building, well-ventilated at one part, the other part being free from draughts. The scenery should be pleasing and one should feel happy to walk in it. It must not be behind any high building, nor exposed to the glare of the sun. It should be inaccessible to smoke and dust. There must not be anything injurious to our senses as regards sound, touch, taste, form and smell. There should be stairs, large wooden mortars and pestles; and there must be additional bare ground for the construction of a privy, bath-room and kitchen. The staff should consist of servants and companions. The servants should be good, virtuous, pure, fond, clever, generous, well trained in nursing, skillful in works, able to cook rice and curries well, competent to administer a bath, expert masseur[1], trained in raising and moving a patient, dexterous in making or cleaning beds, practiced in the art of compounding medicines and willing workers not likely to show displeasure to any order. The companions should be good singers and musicians, fluent speakers, well-versed in distichs, ballads, tales, history and mythology, well-acquainted with the design of a patient's nods or signals, agreeable and should have knowledge of the season and the locality. The various kinds of animals

[1] From the accounts of Megasthenes, we learn that four attendants used to massage him (Candragupta) with ebony rollers during the time that he was engaged in disposing of cases. Such an attendant (saṁvāhaka) is a minor character in the Toy Cart or little Clay Cart, drama, transl. by Ryder, in Havard Oriental Series, Vol. IX, 1905—Smith's Early History of India, 2nd Ed., Page 122. Footnote. We also find in the Kāmandikya Nītisāra that the king is cautioned against shampooers who have the opportunity of poisioning him.

मृद्व्यञ्जनकर्त्तारस्तल्पका व्यवकाशया।
प्रसाधका भीजकाश्च गात्रसंवाहका अपि॥

Ch. XII, V. 45.

should always be kept in stock such as Lāva (*Perdix Chinensis*), Kapiñjala (partridge), hares, sheep and the different kinds of deers, Ena (the black antilope) blacktailed deer, and Mṛgamātṛka. There should be a diary attached to the building. The cow should be good natured and healthy, and should yield profuse milk. The calves must be living. There should be stocked for them potable water and hay in a clean fold. In that building must be kept the following necessary articles :—

Water vessels, washing basins, tubs, jars, dishes, ghata, (small jars) kumbhī, kumbha (larger and smaller vessels), kundu (jug or pitcher), soraba (earthen basins), spoons or ladles, cooking utensils, churning rods, cloth, thread, cotton, wool, bedding and āsana (seats). Near them should be placed drinking vessels of gold and spittoons. The bedding should consist of a broad carpet, bed-sheet, pillows, and a bedstead. There should be collected good furnitures for beds and seats ; and also utensils and appliances for application of oleaginous medicines, heat, oil, ointment, bath and perfumeries, and for the acts of emesis, purgation, draining of the brain, injection into the rectum, defaecation and urination (*i.e.* Vasti-yantra, urinal, bed-pan &c.). The blunt and sharp instruments and their accessories, well-washed mullers and whetstones of different degrees of smoothness—polished, plain or rough—should be near at hand ; the tubular instruments for fumigation, inhalation and injection into the rectum, urethra and vagina, should be available there ; and the following articles are also to be stocked :—brushes and brooms, weighing scales and weights, ghee (melted butter), oil, fat, marrow, honey, molasses, salt, wood, water, spirituous liquor formed by steeping husked grains of barley in water, or by boiling together the husks of fried māṣkalāya

(pulse of Phaseolous Rox.), barley and water, spirituous liquor from the blossoms of Lythrum Fruticoscence with sugar, spirit distilled from the different sorts of grains, curdled milk, rice, gruel, whey, sour liquid produced from the aceteus fermentation of powdered paddy, and the various kinds of urines of animals. Different kinds of rice such as Śāli (or that reaped in cold season) and Saṣṭhika (or that grown in hot weather in low lands and reaped within sixty days of its sowing), Mudga (Phaseolus mungo), Māṣa (Phaseolus Rox.), Yava (Hordeum Vulgare), seasame (Seasamum Indicum), Kullatha (Dolichos Biflorus), plums (Zizyphus Jujube), raisins (Vitis Vinifera), Paruṣa (Grewia Asiatica), Abhayā (Chebulic Myrobolan), Āmlakī (Phyllanthus Emblica), Vibhītaka (Terminalia Bellerica) and other classes of medicaments, as oils, diaphoretics, sternutatories, cathartics, emetics, purgatives, astringents, stomachics, digestives, calmatives, carminatives and various other forms of medicines, are required for treatment. Besides these, there must be stored the antidotes to poisons caused by overdoses of medicines and other appliances likely to add to the patient's comfort.

To this may be compared the description of the Greek iatrium, which is mentioned in the Hippocratic treatise, De Medicio. He directs that "it should be so constructed that neither the wind nor sun might prove offensive to the patient, and goes on to enumerate the various articles which it should contain, such as scalpels, lancets, cupping-instruments, trepans, raspatories, with bandages and medicines." [1]

[1] Works of Hippocrates, Syd. Soc. Vol. II, page 470, Footnote.

Suśruta gives us a list of appliances[1] required in surgical operations:—

1. Blunt Instruments. 2. Sharp Instruments. 3. Potential Cautery. 4. Actual Cautery. 5. Śalākā or rods. 6. Horns. 7. Leeches. 8. Hollow bottle gourd. 9. Jāmbav-oushtha [a bougie of blackstone, the extremity of which is shaped like the fruit of the Jambul tree (Urginea Jāmbolana)]. 10. Cotton. 11. Pieces of cloth. 12. Thread. 13. Leaves. 14. Materials of bandaging. 15. Honey. 16. Ghee, or clarified butter. 17. Suet. 18. Milk. 19. Oils. 20. Tarpan.—flour of any perched grain or condensed milk etc. mixed with water to mitigate thirst. 21. Decoctions. 22. Liniments. 23. Plasters. 24. Fan. 25. Cold and hot water. 26. Iron pans, kalasi and other earthen vessels; beddings and seats. 27. Obedient, steady and strong servants.

The Lying-in-room.—Caraka says: "Before the ninth month of pregnancy, the lying-in-room should be constructed. The land should be cleaned of bones, gravels and potsherds. The ground selected should be of auspicious colour, taste and smell. The gate of the house should face towards the east or the north.[2] There must be a store of wood such as Vilva (Ægle

[1] अतोऽनामतं कर्म चिकीर्षता वैद्येन पूर्वमेवोपकल्पयितव्यानि तद्यथा यन्त्रशस्त्रक्षारग्नि-शलाकाग्रजलौकालाबूआम्बीऽपिचुर्द्रोतमूत्रपत्रपट्टमधुघृतवसापयस्तैलतर्पनकषायलेपन कल्क-व्यञ्जनशीतोदक कटाहदीनि पारकर्म्मकरश्च स्निग्धाः स्थिरा बलवन्तः।

Suśruta Saṁhitā. I. v.

[2] "The best sort of ground should abound with milky trees, full of fruits and flowers; its boundary should be of a quadrangular form, level and smooth, with a sloping declivity towards the east producing a hard sound, with a stream running from left to right, of an agreeable doour, fertile, of an uniform

Marmelos), Tinduka (Diospyros Embryopteris), Inguda (Balanites Rox.) Bhallākaka (Semecarpus Anacardium), Vāruṇa (Ocimum Basilicum), Khadira (Acacia Catechu) or wood of other kinds said to be auspicious by a Brāhman versed in the Atharvaveda; and there must be a sufficient provision for clothes, liniments, and covers. For the pregnant woman, be careful to have a fire-place, water, pestles and mortars, a privy, a bathing place, and ovens. These should be constructed according to the science of engineering and should be pleasant with regard to the season. There should be collected clarified butter, oil, honey, different kinds of salts as rock salt, sonchal salt, and black salt, Viḍaṅgas (Embelic Ribes), treacle, Kuṣṭha (Saussurea Lappa), Kilima (Pinus Deodara), Nāgara (dried root of Zinziber Officinale), Pippalī (Piper Longum), its root, Hastipippalī (Scindaspus Officinalis), Mandukparni (Hydroctyle Asiatica), Elā (Elettarium Cardamomum), Lāngolī (Gloriosa Superba), Vāca (Acorus Calamus), Cavya (Piper Cava), Chitraka (Plumbago Zeylanicum), Chiravilva (Pongamia Glabra), Hingu (Ferrula Assafætida), Sarṣapa (Mustard seeds), Laśuna (Allium Sativum), finely or thickly powdered rice, Kadamba (Anthocephalous Kadamba), Ātasi (Linum Usitatissimum), Vallija (Cucurbita Pepo), Bhurya (Betula Bhojpatra), Kulatha Dolichos Uniflorus), Maireya (a spirituous liquor from the blossoms of Lythrum Frutecoscence) and Āshava (Vinous fermented liquor from sugar or molasses, Rum). Also collect two pieces of

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colour containing a great quantity of soil, producing water when dug to the height of a man's arm raised above his head, and situated in a climate of moderate temperature."

Manasara, Ch. I. quoted in Ram Raz's The Architecture of the Hindus, Page 16.

stone (muller and stone slabs), two pestles, two mortars, an ass, a bullock, two sharp needles of gold and silver, two skeins of threads, sharp instruments of steel, two wooden bedsteads (Ægle Marmelos), and wood (Tinduka and Ingudi) for easily igniting fire. The female attendants should be mothers of children, and friends and relatives of the patients. They must be fond of her, skillful in work, intelligent, jolly, laborious full of tender love for the children and a favourite of the mother."[1]

The Child's Room:—He continues—"The engineer is to construct a room, spacious, beautiful, full of light, well-ventilated but free from draughts, strong, and free from beasts of prey, animals with fangs, mice and insects. There should be kept water, mortar and seperate places should be assigned for bathing, cooking, urination and defæcation. It should suit the season of the year. The beddings, seats and covers should be confortable and suitable to the season. Auspicious ceremonies should be performed in that room such as *homa*, expiations and presents to gods, for the proper protection of the child; and there should be present pious old men, doctors, and devoted

[1] प्राक् चैवास्या नवमान्मासात् सूतिकागारं कारयेदप्रवातस्थिग्धशर्कराकपालेदेशे प्रशस्तपरसगन्धायां भूमौ प्राग्द्वारमुदग्द्वारं वा। तत्र वैखानां काष्ठानां तिन्दुकेङ्गुदानां भल्लातकानां वाकुचानां खदिरानां वा यानि चानान्यपि ब्राह्मणाः प्रशंसेयुरग्न्यर्थवेदविदस्तदसनालेपनाच्छादनापिधानसम्पदुपेतं तत्। वास्तु-विद्या-हृदयवेदीगेनाग्निसलिलौषधिखलवर्षः स्थानस्थानभूमिसंस्थानसंस्तुतश्च। तत्र सर्पिस्तैलमधुसैन्धवसौवर्चलकाललवणविड्लशुण्ठकुष्ठकिलिमनागरपिप्पलीमूलहस्तिपिप्पलीमरुकपर्णीलालाङ्गलीवचाचव्यचित्रकचिरबिल्व-हिङ्गुसर्षप लशुनकलिकानीपातसीवल्लिजमूर्व्वाः कुलत्थमैरेयसुरासवाः सन्निहिताः स्युः॥ तथाग्नानी द्वे द्वे चक्रमुषले द्वे उलूखले खरौ द्वयमथ द्वौ च सौक्ष्मौ सूचीपिप्पलकौ सीवर्णराजतौ द्वे शस्त्राणि च तीक्ष्णायसानि द्वौ च विल्वमयौ पर्य्यङ्कौ तैन्दुकेङ्गुदानि काष्ठान्यग्निसन्धुक्षणानि स्त्रियश्च वह्वीर्बहुप्रजाताः सौभाग्ययुक्ताः सततमनुरक्ताः प्रदक्षिणाचाराः प्रतिपत्तिकुशलाः प्रकृतिवत्सलाश्चक्षविषादाः क्लेशसहिष्णवोऽभिमता ब्राह्मणश्चाथर्ववेदविदो यशस्विनश्च तत्र समर्थं मन्येत यत्र ब्राह्मणाः ब्रूयुः स्त्रियश्च उद्वासनकार्य्यम्॥

Caraka Samhita. IV. viii.

attendants constantly. The child's bed, covers and sheets should be soft, light, pure and scented. These should always be free from sweat, dirt, worms or bugs, urine and faeces. If repeated change of new clothes be impossible, the soiled coverings should be well washed and the beddings well purified with steam and thoroughly dried before they are used again. To purify or sterilise the dress, beddings, coverings and sheets by fumigation use the following medicines with clarified butter:—Barley (Hordeum Vulgare), mustard seeds, linseeds, assafœtida, Guggula (Balsamodendron Mukul), Vāca (Acorus Calamus), Coraka (Andropogon Acicularis), Vayasthā (Chebulic Myrobolan), Golomi (Panicum Dactylon), Jaṭilā (Nardostachys Jatamansi), Palankaṣā (a variety of Guggula), Aśoka (Saraca Indica), Rohiṇī (Picrorrhiza Kurroa) and sankes' skin.....A variety of toys to please the child should be at hand and these should be coloured, light, musical, beautiful and must not be sharp pointed. They should be of such a size and shape as cannot be put into the childs' mouth or do not terrify or kill the child."[1]

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[1] अतोऽनन्तरं कुमारागारविधिमनुव्याख्यास्यामः॥ वास्तुविद्याकुशलः प्रशस्तं रम्यमतमस्कं निवातं प्रवातैकदेशं दृढमपगतश्वापदपशुदंष्ट्रिमूषिकपतङ्गं सुसंविभक्तसलिलोदूखलमूत्रवर्चः-स्थानस्नानभूमिसदानसमेतसुखं यत्तु शयनासनास्तरणसम्पन्नं कुर्यात्। तथा सुविहित-रक्षाविधानबलिमङ्गलहोमप्रायश्चित्तं शुचिव्रतवैद्यानुरक्तजनसम्पूर्णमिति। कुमारागारविधिः॥ शयनास्तरणप्रावरणानि कुमारस्य मृदुलघुशुचिसुगन्धीनि स्युः। स्वेदमलजन्तुमल मूत्रपुरीषोपसृष्टानि च वर्ज्यानि स्युः॥ अमति सप्तरात्र्येषां तान्येव च सुप्रक्षालितधौतानानि सुधूपितानि सुशुक्लशुक्लाम्बुपयोगं गच्छेयुः। धूपनानि पुनर्वाससां शयनास्तरणप्रावरणानाञ्च यवसर्षपातसीहिङ्गुगुग्गुलवचावीरकवयःस्थागोलोमीजटिलापलङ्कषाजीकरोहिणीसर्पनिर्मोकानि घृतसम्युक्तानि स्युः॥ मणयश्च धार्याः कुमारस्य खड्गरूपवयस्थभानां जीवतामेव दन्तिगोभ्यो विषाणेभ्योऽपि गृहीतानि स्युः। मलादावौषधयो जीवकर्षभकौ च यान्यन्यानि ब्राह्मणाः प्रशंसेयुः। क्रीडनकानि खलस्य तु विचित्राणि धीमद्भिरा-मानि अगुरुक्षतीक्षाणानि अनास्यप्रवेशीनि अप्राणहराणि अविषासनानि स्युः॥

Caraka Saṁhitā IV. viii.

Suśruta directs that there should be a particular room provided for patients who have undergone surgical operations.[1] "Patients suffering from surgical diseases as inflammatory swelling, wounds &c. should, from the very commencement of their illness, confine themselves inside a clean house, situated in a wholesome locality, free from draughts and not exposed to the glare of the sun. For, in such a building, constitutional, mental and accidental diseases are not likely to occur. In that room, the bed for the patients should be soft, spacious, and well-arranged. The patient should lie down, his

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[1] ब्रणिनः प्रथममेवागारमन्विच्छेत्तच्चागारं प्रशस्तवास्त्वादिकं कार्यं ।

प्रशस्तवास्तुनिष्टैः शुचावातपवर्ज्जिते ।

निवाते न च रोगाः स्युः शारीरागन्तुमानसाः ॥

तस्मिन् शयनमसम्बाधं स्वास्तीर्णं मनोज्ञं प्राक्शिरस्कं सशस्त्रं कुर्व्वीत ।

सुखचेष्टाप्रचारः स्यात् स्वास्तीर्णे शस्त्रे व्रणी ।

प्राच्यां दिशि स्थिता देवास्तत्पूजार्थं नतं शिरः ॥

तस्मिन् सुहृद्भिरनुकूलैः प्रियम्वदैरुपास्यमानो यथेष्टमासीत् ।

सुहृदो विचित्रपल्याश्च कथाभिर्व्रणवेदनाः ।

आश्वासयन्तो बहुशस्तदनुकूलाः प्रियम्वदाः ॥

न च दिवानिद्रावशगः स्यात् ।

दिवास्वप्नाद्भवे कण्डूर्गात्राणां गौरवं तथा ।

श्वयथुर्व्वेदनारागः सावयेव शस्त्रं भवेत् ॥

उत्थानसंवेशनपरिवर्त्तनचंक्रमणौचभोजनादिषु चास्यचेष्टास्वप्रमत्तो व्रणं संरक्षेत् ।

स्थानासनं चंक्रमणं यानयानातिभाषणं ।

व्रणवान् निषेवेत शक्तिमानपि मानवः ॥

उत्थानाद्यासनं स्थानं व्रण्यां चातिनिषेविता ।

प्राप्नुयान्मारुतादींश्च रुजस्तस्मादिवर्ज्जयेत् ॥

मद्यमांसञ्च स्त्रीणां सन्दर्शनमसम्भाषणसंस्पर्शनादिदूरतः परिहरेत् ।

Suśruta Saṁhitā I. xix.

head pointing towards the east, and keep there some weapon for his own protection. On such a bed, the patient can lie comfortably and turn to his sides at pleasure. He should be surrounded by his dear friends, for their sweet words relieve the pain of inflammation. The female friends, however, should be avoided and kept at a distance. He should observe strictly the orders of the surgeon as regards his food, drink and mode of living. He should have his hairs clipped and nails pared short, be pure in his person, put on white clothes and devote himself to religious duties. A light should be kept burning; and garlands of flower, weapons &c., should be provided in the room to ward off the demons. He should be cheered and inspired by pleasant stories; and the physicians and the priests should attend the patient morning and evening. Pastils made of Sinapis Nigra and Azadirachta Indica with clarified butter and salt, should be burnt in the room morning and evening for ten days continually. The inflamed part should be fanned with a *cāmar* or yolk-tail. Sleep during the day, exercise and sexual intercourse must on no account be indulged in."

Suśruta also describes the kitchen of the king thus:— "That is the proper kitchen which is built on good ground, towards an auspicious quarter, full of utensils for cooking, spacious, clean, provided with windows guarded by a network, frequented by friends, cleared well of grass furnished with a canopy, purified by auspicious ceremonies, and managed by men and women of good character. The superintendent of the kitchen should, like the doctor, be noble and virtuous. The cook and servants should be pure, noble, capable, mild, good looking, engaged in their respective duties, high-minded, should have their hairs and nails cut short, steady,

well-bathed, of subdued passion, well-dressed, obedient and have their heads well-covered."

"The doctor in charge of the kitchen should be of noble family, religious, friendly, a clever manager for getting king's food properly prepared, ever careful for his health, non-avaricious, simple, fond, grateful, good-looking, cool-tempered, well-behaved, not proud and envious, laborious, of subdued passion, forgiving, pure, of good character, kind, intelligent, not easily fatigued, always loving, well wisher, capable, bold, clever, skillful, not unreasonably tender, provided with medicines and well proficient in the art of healing."[1]

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[1] कुलीनं धार्मिकं स्निग्धं सुस्नातं सतसौस्थितं।
अलब्धं अशठं भक्तं कृतज्ञं प्रियदर्शनं॥
क्रोधपारुष्यमात्सर्य्य मदालस्य विवर्जितं।
जितेन्द्रियं क्षमावन्तं शुचिं शीलदयान्वितं॥
मेधाविनमसंभ्रान्तमनुरक्तं हितैषिणं।
पटुं प्रगल्भं निपुणं दक्षं मायाविवर्जितं॥
पूर्व्वोक्तैश्च गुणैर्युक्तं नित्यं सन्निहितागदं।
महानसे प्रयुञ्जीत वैद्यं तद्विद्यपूजितं॥
प्रशस्तदिग्देशकृतं शुचिभाण्डं महच्छुचि।
सजालकं गवाक्षाढ्य मान्यवर्गं निषेवितं॥
विकृष्टसंकटं सवितानं कृतार्द्धनं।
परीक्षित स्त्रीपुरुषं भवेद्वापि महानसं॥
तत्राध्यक्षं नियुञ्जीत प्राज्ञं वैद्यगुणान्वितं।
शुचयो दक्षिणा दक्षा: विनीता: प्रियदर्शना:॥
सविभक्ता: सुमनसो नीच केशनखा: स्थिरा:।
स्नाताद्य: संयमिन: कृतीक्षीषा: सुसंयुता:॥
तस्याज्ञा विधेयास्तु विविधा: परिकर्म्मिण:।
आहारस्थित यश्चापि भवन्ति प्राणिनो यत:॥
तस्मान्महानसे वैद्य: प्रमाद रहितो भवेत्।
माहानसिक वीदार: सौपौदनिक पौपिका:॥
भवेयुर्वैद्यवश्गा ये चाध्यक्षे तु कैचन।
इङ्गितज्ञो मनुष्याणां वाक्चेष्टमुखवेक्षते:॥

Susruta Saṁhitā V. I.

In the Kāmandakiya Nītisāra, we find the king advised to take thoroughly examined food, and to be surrounded by physicians well-versed in the science of Toxicology;[1] and again it is said that king should take his medicines, cordials, and edibles after having his medical attendants tasted them.[2] The king is advised to kill his enemy by weaning over his physician or by administering poisonous liquids.[3]

In the Mahāvāgga[4] we find the qualities of a good patient and a good nurse described:—

"6. What are five qualities, O Bhikkhus, which when a sickman has, he is easy to wait upon—

When he does do what is good for him; when he does know the limit (of the quantity of the food) that is good for him; when he does take his medicine, when he does let a nurse who desires his good, know what manner of disease he has, or when he is getting worse that that is so, or when it is getting better that that is so; and when he has become able to bear bodily pains that are severe, sharp, grievous, disagreeable, unpleasant and destructive to life. These are the five qualities, O Bhikkhus, which when a sickman has, he is easy to wait upon.

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1 विषघ्नैरुदकैः स्नातः विषघ्नमनिभूषितः।
परीक्षितं समश्नीयाच्चाहुलाविद्विषण्डतः ॥ १० ॥
Kāmandakya Nitisāra vii. v. 10.

2 औषधानि च सर्वाणि पानं पानीयमेव च।
तत्कल्पकैः समास्वाद्य प्राश्नीयाद्भोजनानि च ॥ २७ ॥
Ibid. vii. v. 27.

3 भिषग्भेदेन वा शत्रुं रसदानेन साध्यदेत् ॥ ७० ॥
Ibid. IX. v. 70.

4 Mahāvāgga viii. 26, 6 & 8 (Sacred Books of the East).

8. There are five qualities, O Bhikkhus, which, when one who waits upon the sick has, he is competent to the task—when he is capable of prescribing medicines; when he does know what (diet) is good and what is not good for the patient, serving what is good and not serving what is not good for him; when he deos wait upon the sick out of love, and not out of greed; when he does not revolt from removing evacuation, saliva or vomit; when he is capable of teaching, inciting, arousing and gladdening the patient with religious discourses. These are the five qualities, O Bhikkhus, which, when one who waits upon the sick has, he is competent to the task."

There is also good deal of evidence to show that medicines were distributed free to the poor and to the pious men. When Visakhā asked for eight boons of the Buddha, she mentioned amongst them the previlege of bestowing her life long "food for the sick, food for those who wait upon the sick and medicines for the sick" and explained her reasons as follows[1]:—

"9. Moreover, Lord, if a sick Bhikkhu does not obtain suitable foods, his sickness may increase upon him, or he may die. But if a Bhikkhu have taken the diet that I shall have provided for the sick neither will his sickness increase upon him, nor will he die. It was this circumstance, Lord, that I had in view in desiring to provide the Samgha my life long with diet for the sick.

Moreover, Lord, a Bhikkhu who is waiting upon the sick if he has to seek out food for himself, may bring in the food (to the invalid) when the sun is already far on his course, and he will lose the opportunity of taking his food. But when

[1] Mahāvāggā VIII, 15-9.

he has partaken of the food I shall have provided for those who wait upon the sick, he will bring in food to the invalid in due time and he will not lose the opportunity of taking his food. It was this circumstances, Lord, that I had in view in desiring to provide the Samgha my life long with food for those who wait upon the sick.

10. Moreover, Lord if a sick Bhikkhu does not obtain suitable medicines his sickness may increase upon him, or he may die. But if a Bhikkhu have taken the medicines which I shall have provided for the sick, neither will his sickness increase upon him, nor will he die. It was this circumstance, Lord, that I had in view in desiring to provide the Samgha, my life long with medicines for the sick."

The Edict No. II of Aśoka clearly shows that charitable institutions were common in India, during his reign. The Edict runs as follows:—

"Everywhere in the kingdom of the king Piyadasi, beloved of the gods, and also of the nations who live in the frontiers such as the Cholas, the Pandyas, the realms of Satyaputra and Keralaputra, as far as Tambapani, (and in the kingdom of) Antiochus, king of the Greeks and of the kings who are his neighbours, everywhere the king Piyadasi, beloved of the gods, has provided medicines of two sorts, medicines for men and medicines for animals. Wherever plants useful either for men or for animals were wanting they have been imported and planted. Wherever roots and fruits were wanting, they have been imported and planted. And along public roads, wells have been dug for the use of animals and men."

We also learn from Houen Tsang's account that Śilāditya II

(610 - 650 A. D.) was inclined towards Budhism and he forbade the slaughter of living animals, built *stupas*, and "in all the highways of the towns and villages throughout India, he erected hospices, provided with food and drink, and stationed there physicians with medicines for travellers and poor persons round about, to be given without any stint."[1]

He also mentions about the father of the Bhikkhu Śrutaviṁśatikoṭi, that "from his house to the snowy mountains, he had established a succession of rest-houses, from which his servants continually went from one to the other. Whatever valuable medicines were wanted, they communicated the same to each other in order, and so procured them without loss of time, so rich was this family."[2]

He also mentions charitable institutions called Puṇyaśālās as common in India. "There were formerly in this country (Tsch-kia-Takka) many houses of ćhârity (goodness or hppiness, Puṇyaśālās) for keeping the poor and the unfortunate. They provided for them medicines and food, clothing and necessaries; so that travellers were never badly off."[3]

Again he says: "Benevolent kings have founded here (Mo-ti-pil-lo or Matipura) a house of "merit" (Puṇyaśālās). This foundation is endowed with funds for providing choice food and medicines to bestow in charity on widows and bereaved persons, on orphans and the destitute."[4] A similar Puṇyāśālā or hospice was in K'ei-P'an-to (Kabandha).[5] In describing

[1] Beal's Record, Vol. I, p. 214.
[2] *Ibid*, Vol. II, p. 188.
[3] *Ibid*, Vol. I, p. 165.
[4] *Ibid*, Vol. I, p. 198.
[5] *Ibid*, Vol. II, p. 303.

Multan he says: "They have founded a house of mercy (happiness), in which they provide food, and drink, and medicines for the poor, and sick, affording succour and sustenance."[1] Of Śilāditya he says: "Every year he assembled the Sramanas from all countries, and on the third and seventh days he bestowed on them in charity four kinds of Alms (*viz.*—food, drink, medicine, clothing)."[2]

Fa Hian (405-11 A.D.), a contemporary of Candragupta Vikramāditya, describes the charitable dispensaries in the town of Pāṭāliputra thus:—"The nobles and householders of this country have founded hospitals within the city to which the poor of all countries, the destitute, cripple and the diseased may repair. They receive every kind of requisite help gratuitously. Physicians inspect their diseases, and according to their cases order them food and drink, medicines or decoctions, every thing in fact that may contribute to their ease. When cured, —they depart at their convenience."[3] Smith remarks: "No such foundation was to be seen elsewhere in the world at this date; and its existence, anticipating the deeds of modern Christian charity, speaks well both for the character of the citizens who endowed it, and for the genius of the great Aśoka whose teaching still bore such wholesome fruit many centuries after his decease. The earliest hospital in Europe the Maison Dieu of Paris, is said to have been opened in the 7th centuries."[4]

"Upatisso, son of Buddha Das, builds Hospitals for cripples,

[1] Beal's Record, Vol. II, p. 274.
[2] *Ibid*, Vol. I, p. 214.
[3] *Ibid*, Vol. I, Intro. lcii.
[4] Smith's Early History of India, 2nd Ed., p. 280.

for pregnant women, and for the blind and diseased.[1] Dhatushena builds Hospitals for cripples and sick[2]. Buddha Das[3] himself ordained a physician for every ten villages on the high road, and built assylums for the crippled, deformed and destitute."[4]

The animal Hospitals or Piñjrāpoles which still exist at Ahmedabad, Surat, and Sodepore in Bengal, and elsewhere may be regarded as the survivals of the institutions founded by the Maurya monarch. The following account of the Surat Hospital in the 18th century is from the pen of Hamilton:—

"The most remarkable institution in Surat is the Banyan Hospital, of which we have no discription more recent than 1780. It then consisted of a large piece of ground enclosed by high walls, and sub-divided into several courts or yards for the accommodation of animals. In sickness they were attended with the greatest care, and here found a peaceful assylum for the infirmities of old age.

"When an animal broke a limb, or was otherwise disabled, his owner brought him to the Hospital, when he was received without regard to the caste or nation of his master. In 1772 this hospital contained horse, mules, oxen, sheep, goats, monkies, poultry, pigeons, and variety of birds; and also an aged tortoise, which was known to have been there seventy-five years. The most extraordinary ward was that appropriated for rats, mice, bugs, and other noxious vermins for whom suitable food was provided."[5]

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[1] Mahāwanśo, p. 249. [2] *Ibid*, p. 245.
[3] *Ibid*, p. 256. [4] Cunningham's Bhilsa Topes, p. 54, foot note.
[5] Hamilton's Description of Hindustan (1820) Vol. I, p. 718, quarto ed., Crooke. Things Indian, Art. Pinjrapole, (Murray 1906).

We quote here from Hemādri the opinions of the sages and the Purāṇas as to the merit of the founder of a hospital[1] :—

Visvāmitra.

There is no gift more precious than the gift of cure; therefore it should be given freely to the sick to augment one's good fortune. He who gives medicines, diet, food, oil for smearing and shelter to the sick, becomes free from all diseases.

Samvartta.

The giver of medicines, oleaginous remedies and food for the cure of the sick, becomes free from all diseases, happy and long-lived.

Agastya.

Those who give rice and medicines freely attain happiness, being free from desease.

Sāura Purāna.

He, who gives medicines to the sick to cure their diseases always remains healthy, long-lived and happy.

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[1] अथ आरोग्यदानं ।

तत्रारोग्यदानस्तुतिरुच्यते ।

आह विश्वामित्रः ।

आरोग्यदानात्परमं न दानं विद्यते क्वचित् ।
अतोदेयं नृजार्त्तानामारोग्यं भाग्यवृद्धये ॥
भेषजं पथ्यमाहारं तैलाभ्यङ्गप्रतिश्रयं ।
यः प्रयच्छति रोगिभ्यः सर्वव्याधिविवर्जितः ॥

संवर्त्तः ।

भेषजं स्नेहमाहारं रोगिणां रोगशान्तये ।
ददानो रोगरहितः सुखी दीर्घायुरेव च ॥

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Nandi Purāna.

The high-souled man who gives the Brahmins collyrium in charity to cure the diseases of the eye, goes to the Sun (after death) and becomes free from eye deseases, fine-looking and fortunate.

Good health is a step to the acquirement of religious merit, wealth, pleasure and final emancipation, and so the man who bestows cure to the sick and also he who erects a hospital equipped with good medicaments, dresses, learned doctors, servants and rooms for students, always gain them. The doctor should be well-versed in the religious treatises, experienced, familiar with the actions of medicines, a discriminator of the colour of the roots of the herbals and well-acquainted with the

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अगस्त्यः ।

अन्नौ-वधप्रदातारः सुखं यान्ति निरामयाः ।

सौर पुराणे ।

रोगिणी रोगशान्त्यर्थमौषधं यः प्रयच्छति ।
रोगहीनः स दीर्घायुः सुखी भवति सर्व्वदा ॥

नन्दि पुराणे ।

अन्नदं यो नरोदद्याद्धेर्य्याधिनिवृत्तये ।
विप्राय स पुमान् याति सूर्य्यलोकं महामतिः ।
चारीम्यनयनो दिव्यः सुभगो जायते नरः ॥

तस्मिन्नेव पुराणे ।

धर्म्मार्थ-काम-मोक्षाणां चारीम्यं साधनैर्युतः ।
अतस्चारीम्यदानेन नरो भवति सर्व्वदा ॥
चारीम्यशालां कुरुते महौषधपरिच्छदां ।
विदग्धवैद्यसंयुक्तां सत्यावसथसंयुतां ॥

proper season of raising them from the ground, well-trained with the qualities of the juices, (their strength and actions), śāli rice, meat and medicaments, trained in compounding medicines, one who knows well of the physique of men by intelligence, one who knows the temparament and the qualities of the diet, a pathologist who is not idle, well acquainted with the remedial agents for the premonitary signs and sequelæ of diseases, proficient in the requirements of time and place, well-read in the medical text-books—the Ayurveda with its eight divisions and an expert in curing diseases by domestic remedies (prepared from handful of common ingredients).

The pious man who erects such a hospital in which the services of good physicians of this nature are retained, becomes celebrated as the virtuous, the successful and the intelligent

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वैद्यस्तु शास्त्रवित् प्राज्ञो दृष्टौषधपराक्रमः ।
औषधीमूलवर्णज्ञः समुद्धरणकालवित् ॥
रसवीर्यविपाकज्ञः शालिमांसौषधीगणे ।
योगविद्देहिनां देशं यो धिया प्रविशेद्बुधः ॥
धातुपथ्यमयज्ञश्च निदानविदतन्द्रितः ।
व्याधीनां पूर्वलिङ्गज्ञस्तदुत्तरविधानवित् ॥
देशकालविधानज्ञश्चिकित्साशास्त्रवित्तथा ।
अष्टाङ्गायुर्वेदवेत्ता सुष्ठियोगविधानवित् ॥

अष्टावङ्गानि आयुर्वेदस्य ।

यथाशास्त्रं शालाक्यं कायचिकित्सा भूतविद्या कौमारभृत्यमगदतन्त्रं रसायनतन्त्रं वाजीकरणतन्त्रमिति सुश्रुतोक्तानि ।

एवं विधः यश्चौ वैद्यो भवेद्यत्राभियोजितः ।
आरोग्यशालामवन्तु कुर्य्याद्दीर्घमसंशयः ॥
स पुमान् धार्मिको लोके स कृतार्थः सबुद्धिमान् ।
सम्यगारोग्यशालायामौषधैः सेषजाचनैः ॥

man in this world. If in such a hospital the kind-hearted man can cure a single patient of his maladies by simple medicines, oleaginous remedies and compounds of medicinal decoctions, goes to the Brahma's residence with his seven generations upwards. The rich and the poor acquire religious merit in proportion to the amount of riches they possess; where would the poor man get a hospital and a young physician to cure his diseases? The man secures the eternal regions mentioned before by rendering the sick healthy by the use of roots to some and by good rubbing (with external applications) to others. He who cures the sick suffering from an increase or decrease of the Air, the Bile and the Phlegm by simple remedies, he too goes to such blessed regions (after death) as are secured by those who perform many religious sacrifices (Yajñas).

व्याधितं विरजी कृत्य चथैकं करुणायुतः।
प्रयाति ब्रह्मसदनं कुलसप्तकसंयुतः॥
आढ्यो वित्तानुसारेण दरिद्रः फलभाग् भवेत्।
दरिद्रस्य कुतः शाला चारीग्याय भिषग्युवा॥
अपिमूलैर्न केनापि महौषधैरथापि वा।
स्वस्थीकृते भवेन्मर्त्यो पूर्व्वोक्तं लोकमव्ययं॥
वात-पित्त-कफाधानां चया-पचयभेदिनां।
यस्तु स्वास्थ्युपायेन मोचयेत् व्याधिपीड़ितान्॥
सोपि याति यमान् लोकान् चवाप्यान् यज्ञयाजिभिः।

स्कन्दपुराणे।

चारीग्य शालां यः कुर्य्यात् सद्भावैश्चपुरस्कृतां।
सर्व्वोपकरणोपेतां तस्य पुण्यफलं शृणु॥
धर्म्मा-र्थ-काम-मोक्षाणामारीग्यं साधनं यतः।
तस्मादारीग्य दानेन तद्दत्तं स्याच्चतुष्टयं॥
चथैकमार्त्तं विप्रांसं स्वस्थीकृत्य प्रयत्नतः।
प्राप्नोति सुमहत्तस्पुण्यमनन्तं चयवर्जितं॥
ज्ञानयोगरतं ज्ञानं रोगार्त्तं शिवयोगिनं।
यः स्वस्थं कुरुते सोपि सर्व्वदानफलं लभेत्॥

Skandapurāna.

Hear, the amount of religious merit secured by a man who erects a hospital containing all the necessary articles (of treatment) and in which are engaged eminent physicians by reward. As good health is the means of attaining religious merit, wealth, pleasure and final emancipation, therefore, he by rendering the sick healthy, gives these four blessings.

By carefully curing a learned man of his sickness great merit is secured, which is eternal and indestructible. He too who cures a sickman who is calm and absorbed in meditation of Siva and knowledge, attains the virtue of all kinds of gifts. Bramhā, Visńu, all the gods, diseases, relatives and kings—they are obstacles to yoga but not to those who perform it (yogi). Whatever merit is obtained by the great, by supporting the sick Brāhmans (priests), Kshatriyas (warriors), and Biṭh (cultivators) and Sudras (servants), can not be obtained by the performance of all the great Yajñas (religious ceremonies). As even the gods can not reach the end of the

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ब्रह्मा विष्णुः सुराः सर्व्वे व्याधयः खलना रुषाः।
योगस्थैते महाविघ्ना व्याधयस्ते न योगिनां * ॥
ब्रह्म-क्षत्रिय-विट्-शूद्रान् रोगार्त्तान् परिपाल्य च।
यत्पुण्यं महदाप्नोति न तत्क्रतुशतैरपि ॥
आकाशस्य यथा नाशः सुरैरप्युपलभ्यते।
तद्दारोग्यदानस्य नाशोवै विद्यते क्वचित् ॥
पुण्येनानेन महता गत्वा शिवपुरं नरः।
मोदते विविधैर्भोगैर्विमानैः सर्व्वकामिकैः।
एकविंशत्कुलोपेतः सभृत्यः परिपालितः।
वसेत् शिवपुरे तावद्यावदाभूतसंप्लवं ॥
ततः स्वधर्म्मशेषेण संप्राप्तः प्रथतः सदा।
ज्ञानमुत्पद्यते तस्य रुद्रेभ्यः परिचारकः ॥

* स्वेन योगिनामिति वा पाठः।

firmament, so there is no end (to the merit) of the gift of cure. By this great merit, the man reaching the region of Siva enjoys himself by soaring in a balloon which can go to the various desired directions. With his twenty-one generations upwards and surrounded by his servants, he stays in the Siva's realm so long till deluge does not occur. There, after the lapse of his merit, the devoted servant acquires knowledge from Siva.

Abandoning this world by knowledge, abiding by the prayers to Siva, and casting away this body as a straw, he reaches beyond the limits of sorrow. Being freed from all sorrows, becoming pure, all-knowing and self-sufficient, and absorbed in his ownself, they are called the Liberated. Therefore to mitigate the diseases, the sick should be well nursed; the great sages should especially be attended to even by the sacrifice of one's body or riches. The wise must not irritate the weak patients, and they like the preceptors should be rescued constantly from sins. He who relieves the sick, by taking them under his care, reaches the other bank of this ocean of world.

ज्ञानादिरक्तः संसाराच्छिवध्यानमुपाश्रितः।
स्वदेहं तृणवत्त्यक्त्वा सर्व्वदुःखान्तमाप्नुयात्॥
समस्तदुःखनिर्म्मुक्तः सर्व्वः स्वात्मव्यवस्थितः।
सर्व्वज्ञः परिपूर्णश्च मुक्त इत्यभिधीयते॥
तस्मादीगापवर्गार्थं रोगार्त्तं समुपाचरेत्।
विशेषेण तु योगीन्द्रं शरीरेण धनेन च॥
रोगिणी नौदिजेत् प्राज्ञो दुर्ब्बलानपि सर्व्वदा।
तान् पापाद्गुरवद्रित्यमेवश्रेयः प्रवर्त्तते॥
योनुरक्षीतमात्मानं सन्मानी दिने दिने।
उपसर्पेत रोगार्त्तस्तीर्णस्तेन भवार्णवः॥

इत्यारोग्यदानं।

Hemādri's Caturvarga, Cintāmoni, Dāna Khandam. Asiatic Soc. Ed. Ch. XIII. P. 891—95.

After these proofs, the statement of Mr. Ameer Ali that "the Arabs invented chemical pharmacy, and were the founders of those institutions which are now called dispensaries"[1] can not be accepted as correct.

DISPENSARIES.

As regards dispensaries, Suśruta advises the physician to construct his dispensary in a clean locality; and the building should face towards some auspicious direction as the east or the north. He says:—"The medicines should be kept in burnt earthen pots arranged on planks supported by stakes or pins".[2] This is still the method of storing medicines used by the *Kavirājas*. Dallvaṇa explains the passage thus:—"The medicines should be kept in pieces of cloth, earthen pots, wooden pots and Śaṅku (kīlaka)."[3] The former explanation is plausible for it is impossible to imagine how a kīlaka or stake can be a container of medicine, unless it is implied as a point of support for hanging the medicine vials from it.

Dr. Heyne (1814) thus describes the ancient dispensaries of the Hindus: "The place in which medicines are kept should

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[1] History of the Saracens p. 262, 1899.

[2] शीतमृद्भाण्डफलकशङ्कुविन्यस्तभेषजं
प्रशस्तायां दिशि शुचौ भेषजागारमिष्यते ॥

Suśruta Saṁhitā. I. xxxvii.

[3] शङ्कौतौषधसंस्थापनोपायं दर्शयन्नाह:,—शीतेति। शीत: कर्पटखण्डं, मृदा भाण्डं, मृत्भाण्डं। फलकं पट्टक इति पुस्तकान्तरे पाठ:, शङ्कु: कीलक:, एतेषु शीतादिषु विन्यस्तं धृतं भेषजं यस्मिन् शङ्कौ तत् भेषजागारं भेषजगृहमिष्यते इति सम्बन्ध:। प्रशस्तायां दिशि पूर्व्वस्यामुत्तरस्यां वा, शुचौ देशे यस्मिन् भूमिप्रविभागोवाप्यादौ, निक्षेपेषु व्यत्ययेन न पाठो दृश्यते। यस्मिन्तु शङ्कुसरीत्येव पाठो लिखित इति सर्व्वावयवसाधेत्यादि यावद्यत्नं द्रव्यं पुराणचेति पाठं केचिदाचार्य्या न पठन्ति ॥

Dallvaṇa's Commentary.

be clean, dry, and not accessible to rats, white ants or dust. The drugs ought to be put in nets, or large pots, the mouth of which must be tied over with a piece of cloth, and suspended in a room. Fire, smoke and water must be kept at a distance.

The house in which medicines are stored, should be neither in too high nor too low a situation, and it should not be far distant from places in which medicines may be collected. Its front should face either the south or the north, with a convenient *viranda* before the door of the same side.

The necessary apparatus for mortars, scales, &c., must be kept in a place in the wall that has been consecrated for that purpose by religious ceremonies."

After describing the different classes, and members composing each class, of medicines, Suśruta continues: "The wise physician should collect and classify these medicines, and with them prepare external applications, infusions, oils, ghee, syrups, &c., as required for derangement of a particular humour. The medicines should be carefully preserved in all seasons, in rooms free from smoke, rain, wind and dust. The medicines should be used singly, or in combinations of several medicines of a class, or of an entire group, or of more than one group, according to the nature of the disease, and the extent of derangement of the humours."[1]

[1] एभिर्लेपान् कषायांश्च तैलं सर्पींषि पानकान्।
प्रविभज्य यथान्यायं कुर्वीत मतिमान् भिषक् ॥
धूमवर्षानिलक्लेदैः सर्व्वर्त्तुष्वनभिद्रुते।
गाढपिहिता गृहे न्यस्तैषिधिनोपधसंग्रहं ॥
समीक्ष्य दोषभेदाश्च गणान् भिन्नान् प्रयोजयेत्।
पृथग्भिश्राण् समस्तान् वा गणं वा व्यस्तसङ्गतं ॥

Suśruta Saṁhitā I. xxxviii.

ANÆSTHETICS.

In the medical text books of the Hindus, there is no mention of a general anæsthetic, from which we can infer that it was unknown in those ancient days. There are, however, many indications to show that the earlier surgeons felt the necessity of such an agent to produce insensibility to pain. Both Caraka and Suśruta mention the use of wine to produce the desired effect. Caraka says: "After extraction of a dead fœtus before the full term of pregnancy, wine should be prescribed to her, for that will improve the condition of her uterus, make her happy and alleviate the pain of the operation."[1] Suśruta, however, distinctly lays down that "wine should be used before operation to produce insensibility to pain." He again remarks: "It is desirable that the patient should be fed before being operated on. Those who are addicted to drink and those who cannot bear pain, should be made to drink some strong beverage. The patient, who has been fed, does not faint, and he who is rendered intoxicated, does not feel the pain of the operation."[2]

The use of certain drugs to produce anæsthetic effects was well known to the ancient Greeks and Romans. Dioscorides

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[1] व्यपगतगर्भशल्यान्तु स्त्रियमाममभीं सुराग्रीष्मनरिष्टमधुमदिरासवानामन्यतममये सात्म्यतः पाययेत गर्भकोष्ठविशुद्ध्यर्थमर्त्तिविकारणाग्रं प्रहर्षणार्थञ्च ॥

Caraka Saṁhitā, IV, viii.

[2] प्राक्शस्त्रकर्म्मणश्चेष्टं भोजयेदातुरं भिषक्।
सयवं पाययेन्मद्यं तीक्ष्णं यो ऽवेदनासहः ॥
न मूर्च्छत्यन्नसंयोगान्मत्तः शस्त्रं न बुध्यते।
तस्मादवश्यं भोक्तव्यं रोगिणूत्तेषु कर्म्मसु ॥
प्राणो ह्यास्थन्तरो नृणां वाह्यप्राणगुणान्वितः।
धारयत्यविरोधेन शरीरं पाञ्चभौतिकं ॥

Suśruta Saṁhitā, I, xvii.

mentions Mandragora (Mandragora Atropa) to have been employed internally as a hypnotic and anæsthetic. Pliny (32-79 A.D.) in his Natural History mentions that this anæsthetic was also used by inhalation; and this fact is corroborated by Galen, Arætæus, Celsus and others. The Arabian physicians also used it. The Chinese surgeons still use some powder (Indian hemp probably) to throw their patients into profound sleep. In the 13th century Theodoric (died 1298) described the "spongio somnifera" the vapours raised from which were capable, when inhaled, of setting patients into an anæsthetic sleep, thus inducing insensibility to the agony and torture of a surgeon's knife. Baptista also mentions his "Pomum somniferum", to be made with mandragora, opium, &c. The Hindus also inhaled the fumes of burning Indian hemp as an anaesthetic at a period of great antiquity. As early as 927, A. D., they also knew drugs which they employed for the same purpose, for Paṇḍit Vallāla, in his Bhoja Prabandha, alludes to a cranial operation performed on the King Bhoja after he was rendered insensible by some drug called Sammohinī (producer of unconsciousness). Another drug is also mentioned, Sañjībanī (restorer to life), by which he soon regained consciousness after the operation had been finished.[1]

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[1] ततस्तावपि राजानं मोहचूर्णेन मोहयित्वा शिरःकपालमादाय तत्करोटिकापुटे क्षिप्तं अक्षरकुलं मट्टीत्वा कस्मिंश्चिद्राजनि निक्षिप्य सन्धानकरणया कपालं यथावदारचय्य सञ्जीवनया च तं जीवयित्वा तस्मै तद्भ्रंशयताम्।

Bhoja Prabandha (Jibānanda's Edn.), P. 98.

CHAPTER III.

MATERIALS OF INSTRUMENTS.

Iron and Steel.

In the Ṛgveda, *ayas*, (Latin aes), next to gold, is the metal most often referred to. *Ayas* often stands as a generic name to mean simply "metal," though in later works it signifies iron as a rule. The mention of dark and red *ayas* in the Atharva-veda indicates a distinction between iron and copper or bronze. The surgical instruments of the Hindus are recommended generally to be made of iron; but Suśruta allows other suitable material when iron of good quality is not available.[1] He says: "A wise surgeon should get the instruments made of pure iron and with sharp edges by an expert blacksmith who is skilful and experienced in his craft."[2] The use of impure iron as a material for surgical instruments, he deprecates as a defect and advises the surgeons not to rely on such instruments.

The Hindus were acquainted with steel and they knew how to turn out steel of fine quality from a pure iron ore. Nāgārjuna, the well known Buddhist chemist, wrote a scientific

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[1] तानि प्रायशो लौहानि भवन्ति तत्प्रतिरूपकाणि वा तदलाभे।

Suśruta Saṁhitā. I. vii.

[2] शस्त्राण्येतानि मतिमान् यत्नमेकायसानि तु।
कारयेत् करणैः प्राप्तं कर्मारं कर्मकोविदं॥

Ibid, I. viii.

treatise on steel and iron.[1] Śibodāsa in his commentary on Chakrapāṇi quotes Patañjali as an authority on the subject.[2] In the Dhanurveda, Vīracintāmaṇi, Śārañgadharapaddhati and Lohārnava, steel as a material of sword has been described and classified.

Dr. Mitra quotes some references[3] about the knowledge of iron possessed by the ancient Hindus from the Ṛgvida. He finds that "swords (II. 156), spears (IV. 25), javelins (II. 292), lances (I. 774), (IV. II. 288) and hatchets (I. 120) are frequently mentioned; and these weapons were bright as "gold" or golden (IV. 19), "shining bright" (I. 175), "blazing" (IV. 93), "sharp" (IV. 113) and "made of iron" (I. 226); they are "whetted on a grind stone (II. 36) to improve their keenness (I. 150), and "polished to enhance their brightness" (II. 326)....."According to Nearchus, King Porus gave 30 lbs of steel to Alexander as the most precious present he could offer."

Royle also remarks[4]: "Working in metals they have long been famous for: their steel acquired so great celebrity at an

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[1] नागार्ज्जुनो मुनीन्द्र श्शास यल्लौहशास्त्रमतिगहनम्।
तस्यार्थस्य श्रुतये वयमेतद्भिषदाचरैर्ल्लूमः॥

Cakradatta, Rasāyanādhikāra.

[2] अर्चयित्वा विधानेन हैरम्बं गुरुभास्करौ।
लोकपालान् यक्षयेव चेषपालानथौषधम्।
आदित्यदैवतायेद्या धन्वन्तरी-पतञ्जली
दद्यादस्त्रिञ्च सर्व्वेभ्यो नानामन्त्रौषधारतः॥

Quoted in Śibodas's commentary on Louhamārana-Vidhi in Cakradatta.

[3] Dr. R. L. Mitra's Indo-Aryans, Vol. I, P. 301. See Wilson's Ṛgveda.

[4] Royle's Antiquity of Hindoo Medicine. Pp. 46-7.

early period, as to have passed into a proverb among the Persians, where *fouladee hind* indicates steel of the best quality; and *juwabee hind*, an Indian answer, means a cut with a sword made of Indian steel."

Copper.

Pure copper was also used as a material of instruments; and vessels and instruments of copper are frequently mentioned in the medical books of the Hindus. A copper probe for applying antimony to the eye has been found in the excavations of Bijnor and another in the Bihat excavations. Cakradatta[1] advises us to use a copper probe for the application of *lekhana* collyrium; and suśruta mentions a copper needle in the operation for reclination of cataract.[2]

Tin.

Tin was also used as a material of blunt instruments. Suśruta mentions plates of tin to surround a tumour and to protect the healthy parts, before the application of actual cautery.[3] Such plates are recommended to be made of tin, or lead, or copper, or iron.

Lead.

Tubes of lead were used for purpose of fumigation. Probes made of lead were used for application of collyrium. The use

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[1] प्रशस्ता लेखने ताम्री रोपने काललोहजा।

Cakradatta, Añjanadhikāra.

[2] तामायसी शातकौम्भी शलाका स्यादनिन्दिता।

Suśruta Saṁhitā, VI. xvii.

[3] अन्त्रावग्रिष्टे क्रमिभिः क्रते च लिखेत्ततोऽग्निं विदधीत पश्चात्।
यदन्त्रमूलं तपुतामसीस पट्टैः समावेष्य तदायसैर्वा।
चाराग्निशस्त्राण्य सकृद्विदध्यात् प्राणाधहिंसनं भिषगप्रमत्तः॥

Suśruta Saṁhitā, IV. xviii.

of lead plates to sorround tumours before application of actual cautery has been noted above.

Bell-metal.

The use of bell-metal—an amalgam of zinc or tin and copper, 25 parts of the former with 75 parts of the latter,—as a material of probes for applying collyrium, is mentioned by Suśruta.[1]

Gold and Silver.

Gold was known to the Hindus from the remote antiquity; and among the metals, it is the one most frequently[2] mentioned in the Ṛgveda. Silver was perhaps unknown during the earlier Vedic age, from its name being not mentioned in the Ṛgveda. But no conclusion can safely be drawn from this argument[3]. We find, however, gold, silver, and other precious

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[1] सौवर्णं राजतं शार्ङ्गलाङ्गं वैदूर्यकाभ्रकं
आयसानि च यौज्यानि शलाकाश्च यथाक्रमं ॥

Suśruta Saṁhitā, VI. xviii.

[2] "निष्क शीव"

Ṛgveda. 5 Mandala. 19 Sūkta.

"निष्केन सुवर्णेन अलङ्कृता शीवा"।

Sāyana.

अश्वः न हिरण्यवान्।

Ibid. 4 Mandala. 2 Sūkta.

"सुवर्णं निर्मितं कल्यावान् अश्वः"।

Sāyana.

"A horse with golden caparisons"—Wilson.

[3] "एनौ रयिं"।

Ṛgveda. 5 Mandala. 33 Sūkta.

एनवर्णौ श्वेतवर्णौ रयिं धनं।

Sāyana.

"Query, if silver money be intended"—Wilson.

stones mentioned as materials of instruments in the medical books. Gold and silver vessels and plates are often described in Sanskrit literature.[1] Suśruta mentions the use of drinking cups made of gold, silver and precious stones.[2]

Caraka, amongst other things necessary for a lying-in-room, mentions two needles of gold and silver.[3] To cut the navel-cord of the new-born child, he recommends a knife made of gold, or silver, or iron.[4] In the Manusaṁhitā[5] we find: "Before the section of the navel string, a ceremony is ordained on the birth of a male; he must be made while sacred texts are pronounced, to taste a little honey and clarified butter from a golden spoon."[6] A golden needle is mentioned by

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[1] सुवर्णकप्यशङ्खाश्म शुक्ति रत्न मयानि च।
कांस्याय स्राव रैत्यानि एणसीस मयानि च।
निर्लेपानि विशुद्धानि कैवलेन जलेन तु॥

इति त्राचे।

[2] सौवर्णे राजते ताम्रे कांसेऽ मथिमये तथा
पुण्यावतंसं भौमे वा सुगन्धि सलिलं पिबेत्॥

Suśruta Saṁhitā, I. xlv.

[3] * * * तीक्ष्णौ सूचीपिप्पलकौ सौवर्णराजतौ द्वे शस्त्राणि च तीक्ष्णायसानि।

Caraka Saṁhitā, IV. viii.

[4] नाभिवर्धनात् प्रभृति छित्वाष्टाङ्गुलमभिधानं कृत्वा च्छेदनावकाशस्य दर्शयित्वाऽर्यी: शस्त्रेणोर्ध्वं हीत्वा तीक्ष्णेन रौक्मराजतायसानां छेदनानामन्यतमेनोर्ध्वधारेण छेदयेत्॥

Ibid.

[5] प्राङ् नाभिवर्धनात्पुंसो जातकर्म विधीयते।
मन्त्रवत्प्राशनं चास्य हिरण्यमधुसर्पिषाम्॥

Manusaṁhitā, II. 29.

[6] Manusaṁhitā (ch. II. V. 29. Jones's trans.)

Suśruta for pricking the bulb of Soma plant to extract its juice.[1] To cure trichiasis, Cackradatta mentions a needle cautery of gold.[2] For destroying the hair follicles, he advises us to pass the hot needle into them as soon as the eyelashes are removed by epilation. In the Yogaratnākara, is mentioned a cautery of gold, to burn the fistuious track round the anus.[3] Śārṅgadhara mentions silver or coral pots for keeping medicated snuffs,[4] and gold and silver tubs for immersing patients in medicated lotions.[5]

Horn.

Horns of animals are mentioned as suction-apparatus. For

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[1] * * * * सोमकन्दं सुवर्णसूच्यादिविदार्य पयोग्रहीयात् सौवर्ण पात्रेऽञ्जलिमात्रं * * * *

Suśruta Saṁhitā, IV. xxix.

[2] प्रज्ञान्तर्मुखं रोम सङ्क्षिप्योरुत्वरच्छनैः ।
सन्दंशेनोद्धरेद्ध्यां पक्ष्मरोमाणि बुद्धिमान् ।
रक्तग्रन्थि दहेत् पक्ष्म तप्तैर्मशलाकया ।
पक्ष्मरोगे पुनर्नैव कदाचिद्रोमसम्भवः ॥

Cakradatta. Netraroga Cikitsā.

[3] अपानमार्गपिटिकां दहेत् स्वर्णशलाकया ।
अग्निप्रतप्तया पश्चात् कुर्यादग्निव्रणक्रियाम् ॥

Yogaratnākara, p. 347.
(Anandāsram Series).

[4] कीचमच्छिन्नधारञ्च हेमतारादिशुक्तिभिः ।
यूक्ष्मा वा पात्रे युक्ष्मा वा ज्ञातैर्व्वा नस्यमाचरेत् ॥

Śārṅgadhara Saṁgraha, III. viii.

[5] सौवर्णं राजतं वापि ताम्रमावसजदारुजं ।
कीटकं तत्र कुर्वीतोक्षादि षटचिंशदङ्गुलं ॥

Ibid, III. ii.

this purpose, the horn of a cow is recommended.[1] A probe made of horn is advised to be used for applying collyrium. Suśruta mentions goat's horn to be used as a container of medicine.[2] He also recommends for this purpose vessels manufactured out of horn.[3] Similarly Caraka advises us to keep medicines in the lamb's horn.[4] Tubes of Vasti-yantra (clysters) are often described to be made of horn.[5]

Bone and Ivory.

Vāgbhaṭa II describes the aṅguli-trāṇaka or finger-guard to be made either of wood or ivory.[6]

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[1] "चुषणे", विष पूषादा चूषण निमित्तं शरीरेषु युज्यते यत्, "शृङ्ग" गवादि शृंगं शरिरं शृङ्ग * * * *

Vāgbhatārtha Kaumudi, I. xxv.

[2] चूर्णाञ्जनं कारयित्वा भाजने मेषशृङ्गजे ॥
संस्थाप्योभयतः कालमञ्जयेत् सततं बुधः ।

Suśruta Saṁhitā, VI. xv.

वंशे वा नाडिपे शृङ्गे स्थापयेत् शोधितं रसम् ।

Rasendra Cintāmaṇi. IX.

[3] एतच्चूर्णाञ्जनं श्रेष्ठं निहितं भाजने शुभे ।
दन्तस्फटिकवैदूर्य शङ्खशैलासनोद्भवे ।
शातकुम्भेऽथ शृङ्गे वा राजते वा सुसंस्कृते ॥

Suśruta Saṁhitā, VI. xix.

[4] सिद्धः शैलासने भाण्डे मेषशृङ्गे च संस्थितः ॥

Caraka Saṁhitā, VI. xxvi.

[5] विमुद्रासं विखण्डाच्च धातुजां काष्ठजां तथा ।
षडङ्गुलीस्यां गोपुच्छां नाडीं युञ्जात् विचक्षणः ॥

Śārṅgadhara Saṁgraha, III. ii.

[6] षडङ्गुलि वाणकं दान्तं वार्क्षं वा चतुराङ्गुलं ।

Aṣṭāṅga Hṛdaya. I. XXV.

Wood.

To apply vapour-bath, Śārṅgadhara mentions tubes made of wood or metal.[1] Wooden Tubes for injections were also used.[2]

Stone.

Śārṅgadhara says: "The collyrium probes should be made either of stone or metal".[3] For compounding medicines, stone *khal* or mortar and pestles are mentioned. A big stone slab with a muller is recommended to be used for grinding dry or fresh vegetable medicines. In extracting the Soma juice, two slabs of stone are mentioned in the Ṛgveda.[4]

Execution.

The execution of the instruments is said to have been all that can be desired. Suśruta says[5]: "They should be made just of the proper size with their ends rough or polished; they should be also strong, well-shaped and capable of a firm grasp." Again he continues: "When an instrument (has been selected) of

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[1] नेत्राणि धातुजान्याहुर्नल वंशादिजान्यपि ॥

Śārṅgadhara Saṅgraha, III. ix.

[2] नेत्रं कार्यं सुवर्णादिधातुभिश्चवेणुभिः।
नलैर्दन्तैर्विषाणाद्यैः मणिभिर्वा विधीयते ॥

Ibid, III. v.

[3] मुखयोः कुण्ठिता श्लक्ष्णा शलाकाश्चाङ्गुलोन्मिता।
अश्मजा धातुजा वा स्यात् कषायपरिमर्ष्टला ॥

Ibid, III. xiii.

[4] Ṛgveda. 10 Mandala, 76, 94 & 175 Sūktas.

[5] समाहितानि यन्त्राणि खरश्लक्ष्णमुखानि च।
सुदृढानि सुरूपाणि सुग्रहाणि च कारयेत् ॥

Suśruta Saṁhitā, I. vii.

a fine make and with an edge keen enough to divide the hairs on the skin, and when it has been firmly grasped at the proper place, only then it should be used in any surgical operation"[1]. And again: "A wise surgeon will get his instruments made of good iron and with sharp edges, by a blacksmith who is skilful and experienced in his craft."[2] Vāgbhaṭa also gives the same directions.[3]

Ornamentation.

In the absence of actual specimen, it is impossible to say whether there was any ornamentation on the surgical instruments of the Hindus. No ornamentation is described in the extant medical treatises. Only one instrument—Mucuṭī—is mentioned by Vāgbhaṭa II as being ornamented with a ring.[4]

Edges of Sharp Instruments.

Suśruta says[5]: "The edges of instruments, used in incising

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[1] यदा सुनिशितं शस्त्रं रोमच्छेदि सुसंस्थितं ।
सुग्रहीतं प्रमाणेन तदा कर्म्मसु योजयेत् ॥
Ibid, I. viii.

[2] See foot-note 2, P. 61.

[3] षड्विंशतिः सुकर्मारैर्घटितानि यथाविधि ।
शस्त्राणि रोमवाहीनि बाहुल्येनाङ्गुलानि षट् ॥
सुरूपाणि सुधाराणि सुग्रहाणि च कारयेत् ।
चक्रालानि सुभातसुतीक्ष्णावार्त्ततेऽर्यसि ॥
समाहितमुखायाणि नीलाभ्रोज्ज्वलानि च ।
नामानुगतरूपाणि सदा सन्निहितानि च ॥
Aṣṭāṅga Hṛdaya, I. xxv.

[4] सुवृत्तौ सूक्ष्म दन्तर्जुमूले रुचकभूषणा ।
Ibid.

[5] तत्रधारा भेदनानां मात्सरी । लेखनानामदंनासूरी ।
व्यधनानां विस्रावणानाञ्च कैञ्चिकी । छेदनानामर्द्धकैञ्चिकीति ॥
Suśruta Saṁhitā, I. viii.

(as of Vṛddhipatra, Nakhaśastra, &c.) should be of the fineness of a masūra (Ervum Lens); of those used in scarifying (as Maṇḍalāgra &c.) of a half a masūra; of those used in puncturing (as Kuṭhārikā) and evacuating (as needles, kuśapatra, &c.) of a hair; and those used in dividing (as Vṛddhipatra), of half a hair". As to the Vaḍiśa or hook and the Dantaśaṅku or tooth-scalers, the former should have a curved end and a fine point, while the latter should have an end shaped like the first leaf of barley."[1]

The Tempering of Sharp Instruments.

Suśruta remarks[2] that "the instruments are tempered in three ways;—by immersing the heated *śastra* in an alkaline solution, or water, or oil. Those tempered in an alkaline solution are used in dividing bones and in excising arrows and other foreign bodies. Those tempered in water are used in incising, dividing or clearing muscles; and those tempered in oil are used in puncturing veins and dividing nerves and tendons."

As the methods of tempering the śastras are the same as those recommended for the arms of war, we quote from Vṛddha Śārṅgadhara (the elder), two methods of tempering arrow-heads and swords. He says[3]: "I shall describe the ways of tempering arrow-heads, by smearing them with a paste of

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[1] वड़िशो दन्तशङ्कुश्चानतायै तीक्ष्णकण्टकप्रथम यवपत्रमुखे।

Suśruta Saṁhitā, I. viii.

[2] तेषां पाचना त्रिविधा क्षारोदकतैलेषु तत्र क्षारपायितं शरशल्यास्थिच्छेदनेषु। उदकपायितम् मांसच्छेदनभेदनपाटनेषु तैलपायितं सिरास्नायुच्छेदनेषु।

Ibid.

[3] फलस्य पायनं वक्ष्ये वनौषधिविलेपनैः।
येन दुर्भेद्यवर्म्माणि भेदयेत् तरुपर्णवत्॥

Vṛddhya Sāraṅgadhara,

vegetable drugs, which would thus acquire the power of piercing a coat-of-mail as easily as the leaf of a tree."

I.

"Make a paste of Pippalī (Piper Longum), rock-salt and Kuṣṭha (Saussurea Lappa) with cow's urine. These are to be well mixed until the paste becomes cold and yellow. The arrow-heads and other sharp cutting instruments are to be well smeared with that paste and then heated to redness. Then they are to be removed from the furnace and allowed to cool down to a state short of redness and dipped in oil. By this means, the iron acquires special power as a cutting instrument[1]".

II.

"Make a paste of the five kinds of salts,[2] mustard and honey. Let the instrument-maker smear it on the śastras which are then to be heated in a furnace. When the colours resembling those of a peacock's feather are displayed on the śastra, the burning is known to be adequate. The instrument is then dipped in water[3]".

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[1] पिप्पली सैन्धवं कुष्ठं गोमूत्रेण तु पेषयेत् ।
अतिशीत मनाविद्धं पीतं नष्टं तथौषधम् ॥
अनेन लेपयेच्छस्त्रं लिप्तं चाग्नौ प्रतापयेत् ।
ततो निर्व्वापितं तैले लौहं तच्च विशिष्यते ॥
Vrddhya Śārṅgadhara.

[2] सौवर्चलं सैन्धवञ्च विड्मौद्भिदमेव च ।
सामुद्रेन सहितानि पञ्चलुलवणानि च ॥
Vaidyaka.

[3] पञ्चभिर्लवणैः पिष्टं मधुसिक्तः ससर्षपैः ।
एभिः प्रलेपयेच्छस्त्रं लिप्तं चाग्नौ प्रतापयेत् ॥
शिखिपीतानुवर्णाभं तप्तपीतं तथौषधं ।
ततस्तु विमलं तोयं पाययेच्छस्त्रमुत्तमम् ॥
Vrddhya Śārṅgadhara.

III.

The sage Uṣanās or Śukrācāryya thus describes[1] the tempering of swords in the Vṛhat Saṁhitā (Kern's trans. Ch. L.):—

23. The fluid to imbrue a sword with, according to the precepts of Uśanās, is: blood, if one wishes for a splendid fortune; ghee, if one is desirous to have a virtuous son; water, if one is longing for inexhaustible wealth.

24. An approved mixture to imbrue the sword with, in case of one desirous to attain his object by wicked means, is: milk from a mare, a camel and an elephant. A mixture of fish bile, deer-milk, horse-milk, and goat-milk, blended with toddy, will make the sword fit to cut an elephant's trunk.

25. A sword first rubbed with oil, and then imbrued with an unguent compounded of the milky juice of the Calotropis, goat's horn, ink, dung from doves and mice, and afterwards whetted, is fit for piercing stone.

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[1] वड़वोष्ट्रकरिक्षदुग्धपानं
यदिपानेन समीहतेऽर्थसिद्धिं ।
अश्वपिष्टसमाश वस्तदुग्धैः
करिहृत्छिदये सताडगर्भैः ॥
चार्कं पयो हृदु विषाणमसीसमेतं
पारवतास्तु शकृता च युतं प्रलेपः ।
शस्त्रस्य तैलमथितस्य ततोऽस्य पानं
पश्चाच्छितस्य न शिलासु भवेद्विघातः ॥
चारैः कदल्या महिषेण युक्तै
दिनौषधैः पाचितमाचयं यत् ।
सम्यक् स्नितं चाश्मनि नैति भङ्गं
न चान्यलौहेष्वपि तस्य कौण्ठ्यम् ॥

Vṛhat Saṁhitā.

26. An instrument imbrued with a stale mixture of potash of plantains with butter milk, and properly whetted, will not get crooked on a stone, nor blunted on other iron instruments.

Good and Bad Qualities of Surgical Instruments.

Suśruta says[1]: "The good points in an instrument are the following: it should have a well-made handle, affording a firm grasp; it should be made of iron of good quality; it should have a fine edge, a pleasant shape and a well-finished point; and it should not be dentated (except the saw)." He gives preference to the Śastras which are of good make and with a fine edge—so fine as to divide the hairs on the skin and whose handles can easily be grasped by the surgeon's hand.

On the other hand, he points out eight defects[2] of sharp instruments: they must not be bent, or blunt, or broken, or jagged, or too thick, or too thin, or too long, or too short. Instruments free from these defects should be used. The Karapatra or saw is the only exception, for being used for sawing bones, it requires a jagged or dentated edge. Vāgbhaṭa also mentions these defects.[3]

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[1] तानि सुवहानि सुतीक्ष्णानि सुधारानि सुरूपाणि सुसमाहितमुखायखकरालानि चेति शस्त्रसम्पत्।

Suśruta Saṁhitā, I. viii.

[2] तत्र वक्रं कुण्ठं खण्डं खरधारमतिस्थूलमत्यल्पमतिदीर्घमतिह्रस्वमित्यष्टौ शस्त्रदोषाः। एते विपरीतगुणमाददीतान्यत्र करपत्रात्। खरधारमस्थिच्छेदनार्थं।

Ibid.

[3] कुण्ठ-खण्ड-तनु-स्थूल-ह्रस्व-दीर्घत्व-वक्रताः।
शस्त्राणां खरधारत्वमष्टौ दोषाः प्रकीर्त्तिताः॥

Aṣṭāṅga Hṛdaya, I. xxvi.

Suśruta enumerates twelve defects[1] of blunt instruments, viz., it may be too thick, or made of impure metal, or too long, or too short, or incapble of being grasped, or capable of being grasped (unevenly) partially, or bent, or made of too soft material, or of elevated ends, or it may have bent, loose, elevated, and weak pins, or be of weak ends, or of thin sides. These faults refer principally to the *Swastika yantras* or the cruciform instruments.

The Uses of Instruments.

Twenty four different kinds of operations[2] are said to be performed by the blunt instruments (Suśruta), viz.:—

1.	Nirghātana	... Extraction by moving to and fro. *e. g.* śalyanirghātanī.
2.	Pūraṇa ...	... Filling the bladder or eyes with oil.
3.	Bandhana ...	... Bandaging and binding by rope.
4.	Vyūhana ...	... 1. Raising up and incising a part for removing a thorn or 2. bringing together the lips of the wound.
5.	Vartana ...	... Contracting or curling up.

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[1] तत्रातिस्थूलमसारमतिदीर्घमतिह्रस्वमत्यङ्गविषमत्यङ्गि वक्रं शिथिलमत्युग्रं खदुकीलं खदुमुखं खदुपाश्र्वमिति दशम यन्त्रदोषाः।

Suśruta Saṁhitā, I. vii.

[2] यन्त्रकर्म्माणितु निर्घातनपूरणस्नेहव्यूहनवर्त्तनचालनविवर्त्तनविवरणपीडनमार्गविशोधनविकर्षणाहरणाचूषणैषणोद्दालनोन्मथनाचूषणैषणदारणसंदरणप्रचालनप्रधमनप्रमार्ज्जनानि चतुर्विंशतिः।

Ibid.

6.	Cālana ...	... 1. transferring, i.e., removing from one part to another; 2. moving a foreign body.
7.	Vivartana	... Turning round.
8.	Vivaraṇa	... Exposing or opening out any part.
9.	Pīḍana ...	... Pressing as by finger to let out pus from an abcess.
10.	Mārga Viśodhana	.. Clearing the canals such as the urethra, rectum &c.
11.	Vikarṣaṇa	... 1. Extraction by pulling; or 2. loosening a foreign body fixed in muscles &c.
12.	Āharaṇa ...	... Pulling out.
13.	Āñcana ...	... Pulling up.
14.	Unnamana	... Elevating or setting upright as the depressed cranial bones or ears.
15.	Vinamana	... Depression as of the elevated ends of the fractured bone.
16.	Bhañjana	... 1. Rubbing the head, ears &c.; 2. contusing a part all round before it is surgically operated on.
17.	Unmathana	... Probing or stirring the track formed by an impacted foreign body.
18.	Ācuṣaṇa	... Suction as of poisoned blood and milk by horns, or gourd, or mouth.

19.	Eṣaṇa ...	... Exploring as by an earth-worm shaped probe, the direction of a sinus or the existence of a foreign body in the wound.
20.	Dāraṇa ...	... Splitting or dividing as the head, ears &c.
21.	Ṛjukaraṇa	... Straightening anything which is bent.
22.	Prakṣālana	... Washing as a wound with water.
23.	Pradhamana	... Blowing as powders into the nose through tubes.
24.	Pramārjana	... Rubbing out as foreign bodies from the eyes &c.

Vāgbhaṭa recognises only fifteen different kinds[1] of operations performed by the blunt instruments:- Nirghātana (moving to and fro), Unmathana (probing), Pūraṇa (filling up), Mārga Śuddhi (clearing passages), Saṁvyūhana (raising up and extracting a thorn by incision), Āharaṇa (pulling out), Bandhana (bandaging), Piḍana (pressing), Ācūṣaṇa (suction), Unnamana (elevation), Nāmana (depression), Cāla (movement), Bhaṅga (breaking), Vyāvartana (turning round); and Ṛjukaraṇa (straightening).

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[1] निर्घातनोन्मथन पूरण मार्गशुद्धि
संव्यूहनाहरण बन्धन पीड़नानि।
आचूषणोन्नमन नामन चाल भङ्ग
व्यावर्तनर्जुकरणानि च यन्त्रकर्म्म॥

Aṣṭāṅga Hṛdaya, I. xxv.

The śastras or cutting instruments, on the other hand, are said to perform eight kinds of surgical operations (Suśruta).[1]

1. Chedana ... ... Excision or removal of a part of the body by operation as of piles.

   Instruments:—Vṛddhipatra, nakhaśastra, mudrikā, utpalapatra, and arddhadhāra.

2. Bhedana ... ... Incision of a part, as of an abscess.

   Instruments:—The same as above.

3. Lekhana ... ... Scarification or dissection of a skin-flap; or scraping, as of Rohini *i.e.*, surgical diseases of the throat.

   Instruments:—Maṇḍalāgra and karapatra.

4. Vedana or Vyādhana ... Puncturing as of veins to bleed patients by instruments having fine points.

   Instruments:—Kuṭhārikā, vrīhimukha, ārā, vetaspatra, and sūcī.

5. Eṣaṇa ... ... Probing, as of sinus and fistula by a probe.

   Instruments:—Eṣaṇī.

6. Āharaṇa. ... ... Extraction, as of stone by the spoon or hook.

   Instruments:—Vaḍiśa, and danta-śaṅku.

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[1] तत्र शास्त्रकर्म्माऽष्टविधं। तद्यथा। छेद्यं भेद्यं लेख्यं वेध्यमेष्यमाहार्य्यं विस्राव्यं सीव्यमिति।

Suśruta Saṁhitā, I. v.

7. Viśrāvaṇa ... To let out pus as from a deep-seated abscess.

Instruments:—Sūcī, kuśapatra, ātimukha, śarārīmukha, antarmukha, trikurccaka, and eṣaṇī.

8. Sīvana ... ... Stitching, as of the lips of a wound by needles.

Instruments:—The different kinds of sūcī or needles.

Caraka mentions, however, six kinds[1] of operations:—

1. Pātana ... ... Incision, as in operation for sinus, abscess, intestinal injury, and deeply impacted foreign bodies.

2. Vyādhana ... Tapping or piercing, as in operations for ascites, suppurating tumour, ovarion tumour, boils &c.

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[1] पाटनं व्यधनञ्चैव च्छेदनं लिपनं तथा।
प्रीच्छनं सीवनञ्चैव षड्विधं शस्त्रकर्म्म तत्॥
नाड़ीव्रणा: पक्वशोथास्तथा चतगुदोदरम्।
अन्त:शल्याश्च ये देशा: पाय्वास्ते तद्विधाश्च ये॥
दकोदराणि संपक्वा गुल्मा: ये ये च रक्तजा:।
व्यङ्गा: शोथितरोगाश्च वीसर्पपिड़कादय:॥
उदृङ्मान् स्थूलपर्व्वनातुत्सन्नान् कठिनान् व्रणान्।
चर्म्म:प्रशस्तधीमांसं छेदनेनोपपादयेत्॥
किलासानि सुकुष्ठानि लिखेल्लेख्यानि बुद्धिमान्॥
वातासृग्ग्रन्थिपिड़का: सकीटा रक्तमण्डला:।
कुष्ठान्यभिहितश्चाङ्गं शोथांश्च प्रच्छयेद्विधक्॥
सीव्यं कुक्ष्युदराद्यन्तु गम्भीरं यदिपाटितं।
इति षड्विधमुद्दिष्टं शस्त्रकर्म्म मनीषिभि:॥

Caraka Saṁhitā, VI. xiii.

3. Chedana ...	...	Excision, as in the operation for tumours, raised and thickened *vraṇa* or corns, and piles.
4. Lekhana ...	...	Scraping, as in operation for some varieties of skin diseases.
5. Pracchana	...	Scarifying, as in the operations for glands, boils, leprous nodules, inflammatory swellings, &c.
6. Sībana ...	...	Sewing, as in the operation of laparotomy for deep seated diseases in the abdomen.

Vāgbhaṭa describes thirteen kinds[1] of operations performed by the sharp instruments :—

1. Utpātana .	...	Raising up by incision, as by the Nakhaśastra.
2. Pātana	...	Incision as by the Vṛddhipatra.
3. Sivana	...	Stitching as by the Sūcī.
4. Eṣaṇa	...	Probing as by the Eṣaṇī.
5. Lekhana	...	Scraping as by the Maṇḍalāgra.
6. Pracchana	...	Scarification as by the Maṇḍalāgra.
7. Kuṭṭana	...	Pricking as by the Sūcī in tattooing.
8. Chedana	...	Excision as by the Vṛddhipatra.

[1] उत्पाट्य पाट्य सीव्यैष्य-लेख्य-प्रच्छन्न कुट्टनम् ।
छेद्यं भेद्यं व्यधी सम्यो यन्त्री दाहश्च तत्क्रियाः ॥
Aṣṭāṅga Hṛdaya, I. xxvi.

9.	Bhedana	... Piercing as by the Sharp Eṣaṇī.
10.	Vyadhana	... Tapping as by the Vetasapatra.
11.	Manthana	... Churning as by the Khaja.
12.	Grahaṇa	... Fixing as by the Sandaṁśa.
13.	Dahana	... Burning as by the rods.

Whetstone.

In the Ṛgveda we find the use of stones mentioned for whetting the edges of the arms of war.[1] The Hindu surgeons used a stone slab for sharpening the śastras or edged instruments.[2] It was of the colour of māṣa (Phaseolus Roxb.). The whetstones used by the Greeks and Romans were either the marble ointment slabs, or made of clay slate or sandy schistaceous shale.

Instrument Cases.

To preserve the edges of the cutting instruments, a case made of the wood of śalmālī (Bombax Malabaricum) was used (Suśruta).[3] Such cases were also manufactured of canvas, or wool, or silk, or leather. These cases—twelve *aṅguli* (*i.e*, fingers' breadth) long and nine *aṅguli* broad—were well sewn and

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[1] See Ṛgveda, Mandala. 2 Sūkta. 39 Verse 7.
„ 9 „ 90 „ 1.
„ 9 „ 112 „ 2.
„ 10 „ 53 „ 9.
„ 19 „ 101 „ 2.

[2] तेषां निशानार्थं शस्त्रशिला माषवर्णा।

Suśruta Saṁhitā, I. viii.

[3] धारसंस्थापनार्थं शाल्मली फलकमिति।

Ibid.

consisted of compartments, lined with wool and seperated by partitions for each instrument. They could be folded, closed with a rod and firmly tied by a knot.[1] The barbers of India still use similar cases for their instruments.

That the razor used to be kept in a case, we know from a passage in the Vṛhadāraṇyaka (800 to 500 B. C.) where the author says "It (the Atman) is here all-pervading down to the tips of the nail. One does not see it any more than a razor hidden in its case or fire in its receptacle".[2]

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[1] स्याद्नवाङ्गुलि विस्तारः सुघनो द्वादशाङ्गुलः।
चौम पट्टीर्णं कौषेय दुकूल सदृ चर्मजः॥
विन्यस्त पात्रः सुस्यूतः सान्तरीर्णास्त्र शस्त्रकः।
शलाका पिहितास्य च शस्त्रकोषः सुसंवृतः॥

Aṣṭāṅga Hṛdaya, I. xxvi.

अथ शस्त्राणां सुरक्षनार्थं शस्त्रकोषं माह स्यादित्यादि। नवाङ्गुलिविस्तारः नवाङ्गुल परिमानविस्तारविशिष्टः शस्त्रकोषः स्यात्। शस्त्रस्य कोषः शस्त्रकोषः। कोष चाप् इति सीके। यथा असिकोष इत्यादि। तथा सुष्ठु, घनो, निविड़ः सुघनः तथा द्वादशाङ्गुलः दैर्घ्येण द्वादशाङ्गुल परिमानः, तथा चौमादिजः। तथा विन्यस्तः यथा क्रमेण क्रतः पात्रो यस्य स विन्यस्तपात्रः। तथा सुष्ठु, स्यूतः क्रत सेवनः, सुस्यूतः तथा सान्तराणि सव्यवधानानि, ऊर्णास्थानि मेषादिलोमसम्भेस्थितानि, शस्त्राणि यस्मिन् स सान्तरीर्णास्त्रशस्त्रकः। तथा शलाकया: पिहितं स्थागितं आस्यं मुखं यस्य स शलाकापिहितास्य तथा सुष्ठु संवृतो, नापित भाण्डिकवद्राशीकरणं यस्य स सुसंवृतः। चौमं चतसीसूतभववस्त्रं केनचिस् ख्यातः। दुकूलशब्दः पट्टादिभिः त्रिभिः सम्बध्यते। तेन पट्टदुकूलं पाट् इति ख्यातेन सूत्रेन निर्म्मितं वस्त्रं ऊर्णा, मेषादिलोम तद्भवं वस्त्रं चौर्णं दुकूलंवनात् इत्याख्य वस्त्रादि। कौषेयदुकूलं कीषकार-कोटभव सूत्रेण रेशम् इति ख्यातेन निर्म्मितं वस्त्रं।

Vāgbhaṭārtha Kaumudi.

[2] Vṛhadāraṇyaka, I. iv.

Macdonell's Sanskrit Literature, p. 22.

To prove that portable cases for medicaments and instruments were in use in ancient India, we quote *in toto* from the Mohāvagga some references to them.[1]

Boxes for Ointments, Ointment Pots, and Portable Cases.

Now at that time, the Bhikkhus used to put pulverised ointments into pots and saucers. They became sprinkled over with herb-powder and dust.

They told this thing to the Blessed One.

"I allow, O Bhikkhus, the use of a box for ointment".

Now at that time the Khabbaggiya Bhikkhus used to carry about various kinds of boxes for ointments—gold ones and silver ones. People were annoyed, murmured and became angry, saying, "Like those who still live in the world."

They told this thing to the Blessed One.

"Various kinds of boxes for ointments, gold ones, and silver ones, are not, O Bhikkhus, to be used. Whosoever does so, is guilty of a dukkata offence. I allow, O Bhikkhus, the use of such boxes made of bone, or ivory, or horn, or of the nala reed, or of bambu, or of wood, or of lac, or of the shells of fruit, or of bronze, or of the centre of the chank-shell (Sankhu-navi)."

2. Now at that time the boxes of ointment had no lid. (The ointment) was sprinkled over with herb-powder and dust.

They told this thing to the Blessed One.

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[1] Mohāvagga vi. 12. (Sacred Books of the East).

"I allow you, O Bhikkhus, the use of a lid."

The lid used to fall off.

"I allow, O Bhikkhus, to fasten the lid with thread and tie it on to the box."

The boxes used to fall.

"I allow you, O Bhikkhus, to sew the boxes on with thread".

3. Now at that time the Bhikkhus used to rub ointment on with their fingers, and the eyes were hurt.

They told this thing to the Blessed One.

"I allow, O Bhikkhus, the use of a stick or holder to put the ointment on with".

Now at that time the *Kh*abbaggiya Bhikkhus used to keep various kinds of ointment-sticks—gold ones, and silver ones. People were annoyed, murmured, and became angry, saying, "Like those who still live in the world".

They told this thing to the Blessed One.

"Various kinds of ointment-holders, O Bhikkhus, are not to be used. Whosoever does so, is guilty of a dukka*ṭa* offence. I allow, O Bhikkhus, the use of ointment-holders of bone, or of ivory, or of horn, or of the na*ḷa* reed, or of bambu, or of wood, or of lac, or of fruit, or of bronze, or of the chank-shell."

4. Now at that time the ointment-sticks used to fall on the ground and become rough.

They told this thing to the Blessed One.

"I allow, O Bhikkhus, the use of a case for the ointment-sticks".

Now at that time the Bhikkhus used to carry the ointment-boxes and ointment-sticks about in their hands.

They told this thing to the Blessed One.

"I allow, O Bhikkhus, the use of a bag to put the ointment-box in."

They had no shoulder strap.

"I allow you, O Bhikkhus, the use of a shoulder strap (by which to carry the ointment-box), or of a thread (by which to sew or tie it on)."

13.

1. Now at that time the venerable Pilindavak*kh*a had head-ache.

"I allow, O Bhikkhus, the use of a little oil on the head".

(The disease) became no better.

"I allow, O Bhikkhus, the practice of taking up (medicine) through the nose". (See commentary on the Dhammapada, pp. 83.)

The nose ran.

"I allow, O Bhikkhus, the use of a nose-spoon" (Natthu-karan*i*).

Now at that time the *Kh*abbaggiya Bhikkhus had various kinds of nose-spoons—made of gold, and of silver. People were annoyed, murmured, and became angry, saying, "Like those who still live in the world."

They told this thing to the Blessed One.

"Various kinds of nose-spoons, O Bhikkhus, are not to be used. Whosoever does so, is guilty of dukkaṭa offence. I allow, O Bhikkhus, the use of such nose-spoons made of bone, (&c., as in chap. 12, 1, down to:) the chank-shell.

2. The nose took up the medicament in unequal proportions.

"I allow, O Bhikkhus, the use of a double nose-spoon (yamaka-natthu-karaṇi)."

They used to spread the drugs on a wick before they sniffed up the aroma: and their throats got burnt.

'I allow, O Bhikkhus, the use of a pipe to conduct the aroma.'

Now at that time the Khabbaggiya Bhikkhus had various kinds of pipes (&c., as in the last clauses of § 1, down to the end).

Now at that time the aroma-pipes came open: and worms got in.

'I allow, O Bhikkhus, the use of a lid to the pipes.'

Now at that time the Bhikkhus carried the pipes about in their hands.

'I allow, O Bhikkhus, the use of a bag to carry the aroma-pipes in'.

The aroma-pipes rubbed against one another.

'I allow, O Bhikkhus, the use of a double bag.'

They had no shoulder strap.

'I allow, O Bhikkhus, the use of a shoulder strap (by which to carry the double bag), or of a thread (by which to sew it on).

Operation Table.

In the examination for piles, Suśruta directs the patient to lie down on his bed or on a board[1]; and in describing the operation, Vāgbhaṭa II mentions a board to be used as an operationtable.[2] A similar bed, as long as the distance from the top of the head to the knees of the patient, is also mentioned in the discription of the lithotomy operation.[3] The use of a board as a fracture bed is also advised.

For passing the tubes of the *vasti-yantra* or clysters into the urethra in the male, the patient is recommended to sit on a stool as high as his knees (*jānumātrāsana*).[4]

In phlebotomy, the patient is advised to sit on a stool, an aratni high[5] (*i.e.* the distance between the tip of the olecranon process of the ulna to the tip of the little finger).

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[1] शुक्लवस्त्रमुपवेश्य सम्यृते शुचौ देशे साधारणे व्यथे काले सुमे फलके शय्यायां वा प्रत्यादित्यमुदमन्यस्रोतःसङ्गे निषण्णपूर्वकायमुत्तानं * * * *

Suśruta Saṁhitā, IV. vi.

[2] शुचिं कृतस्वस्त्ययनं शुक्लविस्रुतमव्यथम्।
शयने फलके वात्यनरोत्सङ्गे व्यापवर्त्तितम्॥

Aṣṭāṅga Hṛdaya, VI. viii.

[3] ततो वस्त्रवत्समविरलमाजानुसमे फलके प्रागुपवेश्य पुरुषं तमुदीचीनसङ्गे निषण्णपूर्वकायमुत्तानमुन्नतकटीकं।

Suśruta Saṁhitā, IV. vii.

[4] स्नातसा भुक्तभक्तसा रसेन पयसापि वा।
सृष्टविण्मूत्रवेगस्य पीठे जानुसमे सदा॥

Caraka Saṁhitā, VIII. ix.

[5] तत्र व्यधसिरं पुरुषं प्रत्यादित्यमुखमरत्निमात्रोच्छ्रिते उपवेश्यासने।

Suśruta Saṁhitā, III. viii.

अग्रितापातपस्थिन्नो जानूच्चासनसंस्थितः।
सदृशानकेशान्तो जानुस्थापितकूर्परः॥

Aṣṭāṅga Hṛdaya, I. xxvii.

KAPĀTA-ŚAYANA OR FRACTURE-BED.

In the treatment of fractures of the lower extremities, mention is made of the *kapāta-śayana* (*lit.* door-bed) or fracture-bed, consisting of a plank of wood resembling the panel of a door.[1] The patient is to lie down on it. The board has five rods fixed to it, to which the fractured limb is tied to prevent any movement: two on each side of the joint and one on the plantar surface of the foot. Dallaṇa explains it thus[2]: In fractures of the bones of the leg, two rods are fixed on each side of the ankle and one supports the foot; in fracture of the thigh bone, two rods are fixed on each side of the knee or hip, and one under the foot. In a double fracture of the thigh bone and bones of the

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[1] अथ जङ्घोरुभग्नानां कपाटशयनं हितं।
कीलका बन्धनार्थञ्च पञ्च कार्य्या विजानता।
यथा न चलनं तस्य भग्नस्य क्रियते तथा।
सन्धेरुभयतो द्वौ द्वौ,तले चैकञ्च कीलकः।
श्रोण्यां वा पृष्ठवंशे वा वक्षस्यूरुकयोस्तथा।
भग्नसन्धिविमोक्षेषु विधिमेनं समाचरेत्॥

Suśruta Saṁhitā, IV. iii.

[2] जङ्घोरुभङ्गेषु पश्चात् कर्म्मविशेषं निर्दिशन्नाह। अथ जङ्घेत्यादि। जङ्घोरुभग्नचिकित्सितमाह। भग्नानाम् काष्ठभग्नानाम्। त्रिविधानामपीत्यपरे। कपाटशयनमवश्यं कार्य्यम्। चलनम् कपाट शयनेनैव सह देशान्तरनयनार्थम्। आधारभूतशयनचालनार्थमित्यन्ये। अधिष्ठितशरीरावयवचलन परिहारार्थं कीलाः। कीलानां पञ्चसङ्ख्यात्वम्। जङ्घोर्व्वोर्द्वयोरेकतरस्य भग्नमवेक्ष्य तत जङ्घाभग्ने तु गुल्फसन्धेरुभयतो द्वौ एकञ्च तले एवं पञ्च। ऊरुभग्ने जानुसन्धेरुभयतो द्वौ द्वौ। बङ्घासन्धेरुभयतस्तले चैक इत्यत्रापि पञ्च। उभयभङ्गापेक्षया तु सप्तभिरेव कीलैर्बन्धनम्। तथाह उभयतो बहिर्द्वौ गुल्फयोर्द्वौ च जानुनोः द्वौ च बङ्घयोः तले चैक एवं सप्त। अत्र जङ्घोर्व्वोः पार्श्वयोर्व्वौ द्वौ तले चैकञ्च कीलक इति केचित् पठन्ति। तन्निबन्धकारैर्न पठितम्। तस्मान्न पठनीयम्। गयदासस्त्वाह पाठान्तरं किमपि पठति। तच्चाभावान्न लिखितम्।

Dallaṇa's Commentary, IV. iii.

leg, seven rods are required,—two on the outer side of the ankle, knee, and groin, respectively, and one under the foot. The fracture-bed is recommended to be similarly availed of in fractures and dislocations of the loin, the spinal column, the chest, and the clavicle. And this mode of treatment, he adds, may advantageously be used for the other kinds of fractures and dislocations. Vāgbhaṭa II also mentions it in the treatment of fractures[1].

Hippocrates used a similar fracture-bed for the proper treatment of fractures and dislocations. It was called Scammum Hippocratic or bench of Hippocrates. As the figures of of this bench would elucidate the structure of the *kapāta-śayana*, we reproduce here three plates with their explanations given at the end of Vol. II, Genuine Works of Hippocrates (Syed. Soc. Ed.), and two plates—Scammum Hippocratis and Plinthium Nilcii from the Collection De chirurgiens Grecs.

Fig. 1. The Scammum Hippocratis *or* Bench of Hippocrates, as represented by Andreas a Cruce (*Officina chirrugica venetiis*, 1596).

Fig. 2. The same as represented by M. Littré.

A. A board, 6 cubits long, 2 broad and 12 inches thick; not 13 as incorrectly stated by M. Littré.

B. The feet of the Axles, which are short.

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[1] कटी जङ्घोरुभग्नानां कपाटशयनं हितम्।
यन्त्रार्थं तत्र कीलाः पञ्च कार्या विवक्षणाः॥
जङ्घोर्वोः पार्श्वयोर्द्वौ तल एकश्च कीलकः।
श्रोण्यां वा वृहतंसे वा वक्षस्याचक्रयोस्तथा॥

Aṣṭāṅga Hṛidya, VI. xxvii.

CC. Axle-trees.

DD. Grooves 3 inches deep, 3 broad, seperated from one another by 4 inches.

E. A small post *or* pillar, fastened in the middle of the machine in a quadrangular hole.

F. Pillars a foot long.

G. A cross-beam laid on the pillars FF, which can be placed at different heights by means of holes in the pillars.

Fig. 3. Representation of the mode of reducing dislocation of the thigh outwards, as given by M. Littré (Œuv. d'Hipp., tom. iv, p. 305).

A mistake in the figure given by M. Littré is here corrected.

A. A lever applied to the nates of the luxated side, and acting from without inwards, in order to bring the head of the bone into its cavity.

B. Another lever, held by an assistant, put into one of the grooves of the machine, and intended to act against lever A.

C. Grove in which the end of the lever A takes its point of support.

D. The luxated member.

EE. Extension and counter-extension.

Fig. 4. Banc d'Hippocrate, d'après Rufus, servant à réduire différentes luxations. (Collection De Chirurgiens Grecs, Bibliothèque Nationale).

Fig. 5. Plinthium, ou cadre de Nileus, d'après Héliodore. (Ibid).

CHAPTER IV.

The Number of Surgical Instruments.

The armamentarium of the Hindu surgeons consisted of a good number of surgical instruments. They are described to be of two kinds, the *yantras* and the *śastras, i.e.*, the blunt and the sharp instruments. Suśruta enumerates no less than one hundred and one varieties of the blunt instruments, and twenty different kinds of sharp instruments. Hārīta, on the other hand, enumerates twelve blunt instruments, twelve sharp instruments, and four prabandhas, as necessary for the operation of extraction of arrows and other foreign bodies.[1] Vāgbhaṭa II mentions one hundred and fifteen kinds of blunt and twenty-six kinds of sharp instruments. Pālakapya (Treatment of Elephants) mentions ten kinds of *śastras* or sharp instruments though he describes the uses of other instruments required for the surgical treatment of diseases.

Instruments and their Classification (Suśruta.)

Of the one hundred and one varieties of the blunt instruments, the surgeon's hand is rightly considered as the principal instrument, for without its help, no instrument can properly be used, and every surgical operation is under its control.[2] They are recommended to be used for the extraction

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[1] द्वादशैव तु यन्त्राणि शस्त्राणि द्वादशैव तु।
चत्वारि च प्रबन्धानां शल्योद्धारे विनिर्दिशेत्॥

[2] यन्त्रशतमेकोत्तरमत एवमेव प्रधानतमं यन्त्राणामवगच्छ। किं कारणं। यस्माद्धस्ताद्ते यन्त्राणामप्रवृत्तिरेव तदधीनत्वाद्यन्त्रकर्म्मणां।
तच्च मनःशरीराबाधकराणि शस्त्राणि तेषामाहरणोपायौ यन्त्राणि।

of *śalya* or foreign bodies, *e.g.*, a dart, an arrow, a javelin, a spear, a peg, a pin, a bamboo rod, a stake &c. which cause pain to the body and mind.

A. Suśruta subdivides the blunt instruments into six classes,[1] viz.:

I.	Svastika or cruciform instruments	...	24 kinds.
II.	Sandaṁśa or pincher-like	...	... 2 „
III.	Tāla or picklock-like	...	... 2 „
IV.	Nāḍī or tubular or hollow	...	... 20 „
V.	Śalākā or rod or pricker-like	...	... 28 „
VI.	Upayantra or accessory	...	... 25 „
			101

These instruments are advised to be made generally of iron, or of other suitable materials, when iron is not available. Their ends often resemble the faces of some ferocious beasts, or of deers, or birds. Hence the instruments should be so constructed as to have the likeness of their faces, following at the same time the directions of scientific treatises, or the instructions of teachers, or in imitation of other instruments, or in adaptation to the exigencies of the time. They should be of reasonable

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[1] तानि षट्प्रकाराणि। तद्यथा। स्वस्तिकयन्त्राणि। सन्दंशयन्त्राणि। तालयन्त्राणि। नाड़ीयन्त्राणि। शलाकायन्त्राणि। उपयन्त्राणिचेति। तत्र चतुर्विंशति स्वस्तिकयन्त्राणि। द्वे सन्दंशयन्त्रे। द्वे एव तालयन्त्रे। विंशतिर्नाड्यः। अष्टविंशतिः शलाकाः। पञ्चविंशति रुपयन्त्राणि।

Suśruta Saṁhitā, I. vii.

Hessler translates the terms as follows: *Uncinata* instrumenta, *forcipum* instrumenta, *palmiformia* instrumenta, *hamata* instrumenta, *secundaria* instrumenta,

Hessler's Suśruta, I. vii.

size, with their ends rough or smooth as required. They should be of strong make, good shape and capable of a firm grasp.[1]

I. The Svastika or Cruciform instruments are—

1. Simhamukha. 2. Vyāghramukha. 3. Vṛkamukha. 4. Tarakṣumukha. 5. Ṛkṣamukha. 6. Dvīpimukha. 7. Mārjāramukha. 8. Śṛgālamukha. 9. Airvvārukamukha 10. Kākamukha. 11. Kaṅkamukha. 12. Kuraramukha. 13. Cāsamukha. 14. Bhāsamukha. 15. Śaśaghātīmukha. 16. Ulūkamukha. 17. Cillimukha. 18. Gṛdhramukha. 19. Śyenamukha. 20. Krauñcamukha. 21. Bhṛṅgarājamukha. 22. Añjalikarṇamukha. 23. Avabhañjanamukha, and 24. Nandimukhamukha.

II. The Sandaṁśa or pincher-like instruments are—

1. Forceps with arms.
2. Forceps without arms.

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[1] तानि श्रायशो लौहानि भवन्ति तत्प्रतिरूपकाणि वा तदलाभे। तच्च नानाप्रकाराणां व्यालानां खगपक्षिणां मुखेसुंखानि यन्त्राणां प्रायशः सदृशानि तस्मात्तत्सादृश्यादागमादुपदेशादन्ययन्त्रदर्शनाद्युक्तितश्च कारयेत्।

समाहितानि यन्त्राणि खरऋजुमुखानि च।
सुदृढ़ानि सुरूपाणि सुग्रहाणि च कारयेत्॥

Suśruta Saṁhitā, I. vii.

अनेकरूपकार्य्याणि यन्त्राणि विविधान्यतः।
विकल्प्य कल्पयेद्बुद्ध्या यथास्थूलन्तु वक्ष्यते॥

* * * * *

अक्षीक्षान्यनुशस्त्राणि तान्येवञ्च विकल्पयेत्।
अपराण्यपि यन्त्राद्यान्यपयोगञ्च यौगिकम्॥

Aṣṭāṅga Hṛdaya, I. xxv.

III. The Tāla or picklock-like instruments are—

1. Ekatāla.
2. Dwitāla.

IV. The Nāḍī or tubular instruments are—

For fistula-in-ano ...	(1) with one slit; (2) with 2 slits ...	2
For piles ...	(1) with one slit; (2) with 2 slits ...	2
For wounds ...	... ...	1
For clysters (Rectal) ...	(Some authors describe 3 only) ...	4
For clysters (vaginal and urethral)...	(male and female) ...	3
For Hydrocele ...	... ...	1
For Ascites ...	... ...	1
For fumigation and inhalation	... ...	3
For Urethral Stricture	... ...	1
For Rectal „	... ...	1
For Cupping—gourd	... ...	1
		20

V. The Śalākā or rod-shaped instruments are—

Gaṇḍūpadamukha or earth-worm like ...	... 2
Śarapuṅkhamukha or arrow-stem like ...	... 2
Sarpafaṇamukha or snake's hood like ...	... 2
Vaḍiśamukha or fish-hook like ...	... 2
Masūradalamukha or masūra pulse like ...	... 2
Promārjana or swabs	... 6
Khallamukha or spoons	... 3
Jāmvavavadana or jambul seed like ...	... 3
Aṅkuśavadana or goad like	... 3
Kolāsthidalamukha or plum seed like ...	... 1
Mukulāgra or bud shaped	... 1
Mālatīpuṣpavṛntāgra or like the stem of mālatī flower	1
	28

VI. The Upayantra or accessory instruments are—

1. Rajju—thread. 2. Veṇikā—twine. 3. Paṭṭa—bandages. 4. Carma—leather. 5. Valkala—bark of trees. 6. Latā—creepers. 7. Vastra—cloth. 8. Aṣṭhīlāśma—stone or pebble. 9. Mudgara—hammer. 10. Pāṇipādatala—palm of the hand and sole of the foot. 11. Aṅguli—finger. 12. Jihvā—tongue. 13. Danta—tooth. 14. Nakha—nail. 15. Mukha—mouth. 16. Vāla—hair. 17. Aśvakaṭaka—the ring of a horse's bridle. 18. Śākhā—branch of a tree. 19. Ṣṭhīvana—spittle. 20. Pravāhaṇa—fluxing the patient. 21. Harṣa—objects exciting happiness. 22. Ayaskānta—a loadstone. 23. Kṣāra—caustic. 24. Agni—fire. 25. Bheṣaja—medicines.

B. The sharp instruments or śastras are—

1. Maṇḍalāgra or round headed knife.
2. Karapatra or saw (*lit.* like the human hand).
3. Vṛddhipatra (*lit.* like the leaf of vṛddhi—an unknown medicinal plant)—a razor.
4. Nakha-śastra or nail-parer.
5. Mudrikā or finger-knife (like the last phalanx of the index finger).
6. Utpalapatra, a knife, *i.e.*, resembling the petal of a blue lotus, (Nymphaea stellata., Willd).
7. Arddhadhāra or a single-edged knife.
8. Sūcī—needles.
9. Kuśapatra—a knife shaped like the kuśa grass (Eragostris Cynosuroides).

10. Ātīmukha—a knife shaped like the beak of the Ātī bird (Turdus Ginginianus).

11. Śararī-mukha—a pair of scissors like the beaks of Śararī bird.

12. Antarmukha (*lit.* having internal sharp edge)—a kind of scissors.

13. Trikurccaka—an instrument consisting of three needles.

14. Kuṭhārikā—a small axe shaped instrument.

15. Vrīhimukha—a trocar shaped like a grain of rice.

16. Arā or awl.

17. Vetasa-patraka—an instrument shaped like the leaf of a rattan (Calamus Rotang).

18. Vaḍiśa—an instrument shaped like the fish-hook.

19. Dantaśaṅku or tooth-pick.

20. Eṣani or sharp probe-like instrument.

According to Hārīta[1] the twelve blunt instruments are—

1. Godhāmukha or iguana-faced. 2. Vajramukha—gṛdhra-mukha? 3. Tribaktra or three faced. 4. Sandaṁśa or pincher.

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[1] गोधामुखं वज्रमुखं त्रिवक्त्रं नाम सन्दंशचक्राकृतिकट्टपादम्।
अथानकं भट्टककुक्खलञ्च श्रीवत्ससौवत्सिक पञ्चवक्त्रं।
द्वादशैतानि यन्त्राणि कथितानि भिषग्वरैः।
अथ शस्त्राणि प्रोक्तानि नामानि च पृथक् पृथक्।
अर्द्धचन्द्रं व्रीहिमुखम् कट्टपत्रं कुठारिका।
करवीरकपत्रञ्च शलाककरपत्रकम्।
वड़िशं शरपादञ्च शूली च सूचिमुद्गरम्।
शस्त्राण्येतानि प्रोक्तानि शल्योद्धारे पृथक् पृथक्॥

Hārīta Saṁhitā, III. lvi.

5. Cakrākṛti or circular shaped. 6. Anaka? 7. Kaṅkapāda? 8. Śṛṅga or horn. 9. Kundala? 10. Śrībatsa? 11. Saubatsika? 12. Pañcabaktram, *i.e.*, five faced—siṁhamukham?

The twelve sharp instruments of Hārīta are—

1. Arddhacandra or half-moon shaped. 2. Vrīhimukha. 3. Kaṅkapatra. 4. Kuṭhārikā. 5. Karavīrakapatraka. 6. Śalākā or sharp probe. 7. Karapatraka or saw. 8. Vaḍiśa or sharp hook. 9. Gṛdhrapāda? 10. Śūlī 11. Sūcī or needle. 12. Mudgara or hammer?

Vāgbhaṭa II classifies the instruments in the following way:-

A. Blunt instruments—

I. Svastika, as heron, lion, bear, crow, deer forceps &c.			24
II. Sandaṁśa: It consists of two iron blades soldered at one end, the other ends being free			2
(*a*) for extraction of eyelashes &c. ...	1		
(*b*) mucuṭī ...	1		
III. Tāla			2
(*a*) Ekatāla	1		
(*b*) Dwītāla	1		
IV. Nāḍī or tubular:			23
(*a*) Kaṇṭhaśalyāvalokinī or throat speculum having three and five holes ...	2		
(*b*) Śalyanirghātanī	1		
(*c*) For piles, different sizes for male and female	6		
For inspection: 2 holes—rectal speculum	2		
For medication: 1 hole	2		
For applying pressure: entire—śāmī ...	2		

(*d*) For fistula-in-ano: with one and two holes		2
(*e*) For nasal polypus &c.		1
(*f*) Aṅguli-trāṇaka or finger-guard ...		1
(*g*) Joni-vraṇekṣaṇa or vaginal speculum ...		1
(*h*) Vrāṇo vasti or wound syringe ...		1
(*i*) For ḍakodara or Paracentesis abdominis		1
(*j*) Vastiyantra or clysters: rectal, vaginal and urethral		3
(*k*) For fumigation...		1
(*l*) Cupping instruments: Alābu, Ghaṭīyantra and Horns		3
		23
V. Śalākā or rod-like instruments ...		34
(*a*) Gaṇḍūṗadamukha or earth-worm shaped		2
(*b*) Masūradalabaktra		2
(*c*) Śaṅku		9
Faṇībaktra or snake's hood ...	2	
Śarapuṅkamukha	2	
Vaḍiśa or blunt hook	2	
Garvaśaṅku or delivery hook ...	1	
Aśmarī or lithotomy hook ...	1	
Śarapuṅkamukha or tooth extractor ...	1	
(*d*) For wiping out discharges ...		6
For rectum	2	
For nose	2	
For ears (karṇaśodhana)	2	
(*e*) For application of actual and potential cauteries		11
Jāmvobouṣṭha, three for each ...	6	

	Arddhendu or half-moon shaped, for hernia			1	
	Kolāsthidala for nasal polypus		...	1	
	Nail-shaped ...	...	...	3	
(*f*)	For cleansing ...	...	...		3
	Rectum ...	...	...	1	
	Vagina ...	...	...	1	
	Urethra ...	...	...	1	
(*g*)	Collyrium probe	...	...		1
					34

VI. Anuyantra or accessory instruments are nineteen in number. To the list of Suśruta he adds the following[1] :—

Goat's gut, silk, time, suppuration, and fear.

B. The sharp instruments of Vāgbhaṭa are twenty-six in number.[2]

1. Mandalāgra. 2. Vṛddhipatra. 3. Utpalapatra. 4. Adhyarddhadhāra. 5. Sarpāsya. 6. Eṣaṇī:—Gaṇḍūpadamukhā and Sūcīmukhā. 7. Vetasa. 8. Śarārī. 9. Trikurccaka. 10. Kuśapatra 11. Ātīvadana. 12. Antarmukha and Arddhacandrānan. 13. Vrīhibaktra. 14. Kuṭhārī. 15. Kuravakasalā. 16. Aṅgulīśastra. 17. Vaḍiśa. 18. Karapatra. 19. Kartarī. 20. Nakhaśastra 21. Dantalekhana. 22. Sūcī. 23. Kurcca. 24. Khaja. 25. Ārā. 26. Karṇavedhanī.

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[1] अनुयन्त्राण्यथक्षान्त रज्जु वस्त्राऽग्नि सुद्वराः।
पट्टान्त जिह्वा वालाश्च शस्त्रा नख मुख छिन्नाः॥
काल: पाक: कर: पादीभयं हर्षश्च तत् क्रियाः।
उपायवित् प्रविभजेदालोच्य निपुणं धिया॥

Aṣṭāṅga Hṛdaya. I. xxv.

[2] षड्विंशति: सुकर्मारैर्घटितानि यथाविधि।
शस्त्राणि रोमवाहीनि वाङ्मल्येनाङ्गुलानि षट्॥
सूचयाणि सुधाराणि सुग्रहाणि च कारयेत्।
चक्रलानि सुघात सुतीक्ष्णावार्मतेऽयसि॥

Ibid. I. xxvi.

Bhāvamiśra mentions the following blunt and sharp instruments: Eṣanī, Jāmvoustha Śalā,[1] Sūcī[2] and knives generally in making incisions which should be shaped like Kharjjūrapatrika, (like the leaf of Kharjjūra tree, Phœnix Sylvestris, Roxb.) Arddhacandra, Candravarga, Sūcīmukha and Abāṅmukha.[3]

Pālakapya[4] mentions ten kinds of śastras :—1. Vṛddhipatra. 2. Kuśapatra. 3. Mandalāgra. 4. Vrīhimukha. 5. Kuṭhārī. 6. Vatsadanta. 7. Utpalapatra. 8. Śalākā. 9. Śūcī or needles. 10. Rampaka. Besides these he refers to Vaḍiśa.

Of the blunt instruments he mentions:—Jāmvobouṣṭha—(four in number, for application of actual cauteries), Siṁhadaṁṣṭrā, Godhāmukha, Kaṅkamukha, Kuliśamukha—(for extraction of foreign bodies), Eṣaṇī or probes (three), wound syringe, Vastiyantra, Śalākā or rods, yaṣṭhiyantra, Karkataka, Dyātūha, Makaraka (crocodile), Śārddūlamuṣṭhika (tiger's claws), Nandimukha (Turdus Gingihianus).

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[1] एषणा गतिमन्विष्य चारसूत्रानुसारिनीम्।
सूचीं निदध्यादत्यन्तं प्रोन्नाम्याग्र विनिर्हरेत्॥
Bhāva Prakāśa. II. iv., Nāḍī Vraṇādhikāra.

[2] आगन्तुजे भिषग्गाढ़ीं शल्येषीत्कृत्य यत्नतः।
जाम्बोष्ठीनाग्निवर्णेन तप्तया वा शलाकया॥
Ibid. Bhagandarādhikāra.

[3] गतिमन्विष्य शल्येष छिन्द्यात् खर्ज्जूरपत्रिकम्।
चन्द्रार्द्धं चन्द्रवर्गञ्च सूचीमुखमवाङ्मुखम्॥
Ibid.

[4] तत्र शस्त्राणि दशनामसंख्यानानि भवन्ति। तद्यथा ऋद्धिपत्रम्, कुशपत्रम्, मण्डलाग्रम्, व्रीहिमुखम्, कुठाराकृति, वत्सदन्तम्, उत्पलपत्रम्, शलाका, सूची, रम्पकमेति। फालजाम्बवतापिकादर्य्याकृतयश्चेति। एतान्याग्निकर्म्मविधाने चत्वारि चान्यानि शल्यहरणानि यथायोगं सिंहद्रंष्ट्रं गोधामुखं कङ्कमुखं कुलिशमुखं चेति। तिस्र एषणयः।
Hastī Āyūrveda, III. xxx.

CHAPTER V.

Description of the Blunt Instruments.

Now we shall describe the instruments in detail. The Yantras or the blunt instruments will be considered first, and next the Śastras or the sharp instruments.

I. The Svastika yantra or Cruciform Instruments.

The word svastika is a technical term signifying one of the twenty-four signs of the Jinas; and it can be represented by two lines crossing each other, the arms of the cross being bent at their extremities towards the same direction. So these instruments may be described as cruciform. They have, as a rule, a length of eighteen aṅguli. Their ends should be shaped like the faces of the following ferocious beasts (1 to 8), dear (9), and birds (10 to 24), and the instruments are to be called after their names.[1] They are divided into two classes; the instruments of class I resemble the mouths of lion (siṁha) and tiger (vyāgra), while class II comprises the instruments which have the likeness of the faces of birds of prey. The fulcrums of these instruments which are at the middle, are of the size of a masūra (Ervum lens). The handles are either rounded off, or bent at an angle at their ends, like an elephant driver's goad—the object being to afford a good grasp of the instrument by the surgeon's hands. The svastika instruments are used for the extraction of

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[1] तत्र स्वस्तिकयन्त्राण्यष्टादशाङ्गुलप्रमाणानि सिंहव्याघ्रदक्षतरक्षुद्वीपिमार्जारशृगालश्वमै
र्व्यादककाककङ्कक्षुररक्षोमुखमुखानि मसूराकृतिभिः कौलेरवद्वानि मूलेऽङ्गुलवदाक्षवारकाण्याविद्धवक्राणि द्वारार्थमुपदिश्यन्ते।

Suśruta Saṁhitā, I. vii.

foreign bodies impacted in the bones.[1] If the foreign body is visible, extract it by the lion forceps or similar forceps of class I. If it is invisible, it should be extracted by the Heron forceps or similar forceps of class II. Of all the varieties of svastika instruments, the Heron forceps (kaṅka-mukha) is the best, for it can be easily introduced and turned in all directions, and also it grasps firmly and extracts a foreign body with ease and can be applied without any harm to all parts of the body.[2]

Class I :—

1. Siṁhamukha svastika or Lion-faced forceps :—this instrument is said to have its mouth shaped like that of a lion (Felis leo). It is the principle instrument of the class I. It is

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[1] तुल्यानि कङ्कसिंहर्क्षकाकादिवदनैर्यथा ।
सुखैर्मुखानि यन्त्राणां कुर्य्यात्तत् संज्ञकानि च ॥
अष्टादशाङ्गुलयामान्यायसानि च भूरिशः ।
मसूराकारपर्यन्तैः कण्ठेवद्धानि कीलकैः ॥
विद्यात् स्वस्तिक यन्त्राणि मूलेऽङ्गुलतानि च ।
ते दृढं रश्मिसंलग्न शल्याहरणमिष्यते ॥

Aṣṭāṅga Hṛdaya. I. xxv.

[2] दृश्यं सिंहमुखाद्यैस्तु गूढं कङ्कमुखादिभिः ।
निर्हरेत्तु शनैः शल्यं शास्त्रयुक्तिव्यपेक्षया ॥
विवर्त्तते साध्वगाहते च शल्यं निगूढोद्धरते च यस्मात् ।
यन्त्रेष्वतः कङ्कमुखम् प्रधानं स्थानेषु सर्व्वेष्वधिकारि चैव ॥

Suśruta Saṁhitā I. vii.

निवर्त्तते साध्वगाहते च
यस्माच्छल्यं गूढमुद्धरते च यस्मात् ।
यन्त्रेष्वतः कङ्कमुखं प्रधानं
स्थानेषु सर्व्वेष्वधिकारि यच्च ॥

Aṣṭāṅga Hṛdaya. I. xxv.

curious that in modern times, the European surgeons use a pair of forceps called the Lion forceps for holding bones firmly during operations. So the Makaramukha of Pālakapya is the Crocodile forceps.

2. Vyāghramukha or Tiger forceps: the mouth of this instrument is like that of a tiger (Tigris regalis).

3. Vṛkamukha or Wolf forceps (Canis lupus).

4. Tarakṣumukha or Hyena forceps (Hyena striata).

5. Ṛkṣamukha or Bear forceps (Ursus Americanas).

6. Dwīpimukha or Panther forceps (Felis pardus).

7. Mārjāramukha or Cat forceps (Felis domestica).

8. Śṛgālamukha or Jackal forceps (Canis aureas).

9. Airbbāruka or Deer forceps (Cervus elephas).

Class II:—The birds, in imitation of whose faces the instruments of this class are made, can be identified from the following discription of their beaks:—

Birds: 1. Raptatories: they have curved beaks hooked at the extremity.

(*a*) Strigidæ...owls...strong hooked beaks bent down from base.

(*b*) Vulturidæ...vultures...long straight beaks bent down at tip.

(*c*) Accipetridæ...falcons, osprey and eagle...short, usually dentated beaks, hooked at the ends.

2. Pessaries...(*a*) Lanidæ...shrike...hooked and strongly serrated beak. (*b*) Cervidæ...crow and blue-jay...beaks strong, thick, somewhat curved anteriorly and slightly notched.

3. Grallatories...Heroidæ or Ardeidæ...herons and krauñca...they have long and powerful beaks with sharp hard

edges, somewhat curved at the point, rarely spoon-shaped, with long neck.

The instruments are—

10. Kākamukha or Crow forceps (Corvus corone).
11. Kaṅkamukha or Heron forceps (Ardea cenerea).
12. Kuraramukha or Osprey forceps (Pandion haliætus).
13. Cāsamukha or Blue-jay forceps (Garrulous or Corvus cristatus).
14. Bhāsamukha or Eagle forceps.
15. Śaśaghātīmukha or Hawk forceps (Nanclerus furcatus).
16. Ulūkamukha or Owl forceps (Strix flammea).
17. Cillimukha or Kite forceps (Milivus ictimus).
18. Śyenamukha or Vulture forceps (Vulture cinereas).
19. Gṛdhramukha or Falcon forceps (Peregine falcon).
20. Krauñcamukha (Ardea jaculator); or Curlew (Numenius Arquatus).
21. Bhṛṅgarājamukha or Fork-tailed or Butcher-bird forceps (Lanius excubitor).
22. Añjalikarṇamukha—birds not identified.
23. Avabhañjanamukha „ „ „
24. Nandimukhamukha (Turdus Ginginianus).

II. The Sandaṁśa or Pincher-like Forceps.

The second class of instruments—the Sandaṁśa[1] or pincher-like forceps—comprises only two instruments: the forceps with and without handles. The first variety is likened

[1] सन्नियद्दीऽनियद्दश्च सन्दंशौ पीड़्याद्दुलौ भवतस्तस्मांसशिरास्नायुगतशल्योद्धारकार्यमुपदिश्यते ।

Suśruta Saṁhitā I. vii.

to forceps with arms, used by the barbers for depilating the nasal cavities, while the second variety is like the armless forceps used by the goldsmiths. The former consists of two arms joined crosswise by a pin fixed at about their middle points, and so really is a cruciform instrument but is classed here for its different use in surgery. The forceps without handles consists of two blades soldered at one end. Some commentators like to subdivide the pinchers into two classes according as their ends are rough or smooth. And so Hessler translates :[1] "Duae forcipes denticulata et non denticulata".

The sandaṁśas are used for the purpose of extracting foreign substances from the soft structures of the human body, such as the skin, muscles, veins, nerves, and tendons[2]. Generally they have a length of sixteen aṅguli.

Vāgbhaṭa II mentions two other instruments as modifications of the type :—

(*a*) One variety has the length of six aṅguli. It is intended for the purpose of extracting minute foreign bodies such as thorn, hair &c. and of removing the superfluous eyelashes.[3]

Cakrapāṇi also advises us to use a sandaṁśa for epilation, which may be called the Epilation forceps.[4]

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[1] Hessler's Suśruta. Caput vii. P. 14.

[2] कोलवद्वद्विमुक्तायौ सन्दंशौ वीडशाहुलौ।
लक्षसिरास्नायुपिशित लग्न शल्यापकर्षणे ॥ ५ ॥

Aṣṭāṅga Hṛdaya, I. xxv.

अतिगूढच शल्यच सन्दंशेन समुद्धरेत्।

Hārita Saṁhitā, III. lvi.

[3] षड्डुलीऽश्रोष्ठरचे सूक्ष्म शल्यो पपक्षयां ॥ ६ ॥

Aṣṭāṅga Hṛdaya, I. xxv.

[4] See foot-note 2, p. 66.

complete the operation for pterygium by removing the remnant, after it has been extirpated by the sharp instruments. Suśruta calls it Mucuṇḍī[1], and uses it to hold the pterygium after it has been raised by vaḍiśa or hook. It must be then a smaller variety of mucuṭī.

A similar pair of forceps, Dr. Erichsen mentions, and says[2] that "for the purpose of extracting needles, thorns, splinters of wood and other foreign bodies of small size and pointed shape lying in narrow wounds, forceps with very fine but strong, well-serrated points will be found useful."

Suśruta mentions baṁsabidala[3] or bamboo forceps. It is made of a piece of bamboo rod, split longitudinally into two halves nearly to its whole extent. This is like the bamboo tongs used by the smokers in Bengal to raise glowing charcoal to the earthen bowl. It should be used to remove worms from the surface of the human body.

The sandaṁśa instrument may be compared with the modern dressing forceps and with the forceps still used by the goldsmiths, known as a sonnā. Those with arms have their counterpart in the sāḍāsī or a pair of pinchers, still used by the blacksmiths.

III. Tāla Yantra or Picklock-like Instruments.

The third class of blunt instruments is called Tāla-

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1 अपाङ्गं प्रेक्षमाणस्य वर्द्धिग्रेण समाहितः।
सुदुष्कार्गृह्य मेधावी सूचीसूत्रेण वा पुनः॥

Suśruta Saṁhitā, vi. xv.

Erichsen's Science and Art of Surgery, Tenth Ed. vol. I. p. 342.

3 तानतुतैलेनाभ्यक्तस्य वंशविदलेनापहरेत्।

Suśruta Saṁhitā, IV. xxvii.

to forceps with arms, used by the barbers for depilating the nasal cavities, while the second variety is like the armless forceps used by the goldsmiths. The former consists of two arms joined crosswise by a pin fixed at about their middle points, and so really is a cruciform instrument but is classed here for its different use in surgery. The forceps without handles consists of two blades soldered at one end. Some commentators like to subdivide the pinchers into two classes according as their ends are rough or smooth. And so Hessler translates :[1] "Duae forcipes denticulata et non denticulata".

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[2] कोलवद्द्विमुखाधौ सन्दंशौ पीडशाहुलौ।
त्वक्सिराखायुपिशित लग्न शल्यापकर्षणे ॥ ५ ॥

Aṣṭāṅga Hṛdaya, I. xxv.

यतिगूढञ्च शल्यञ्च सन्दंशेन समुद्धरेत्।

Hārīta Saṁhitā, III. lvi.

[3] षड्डुलीऽन्योऽरुषि सूक्ष्म शल्यौ पपक्ष्मणां ॥ ६ ॥

Aṣṭāṅga Hṛdaya, I. xxv.

[4] See foot-note 2, p. 66.

Similarly in modern times, we remove superfluous eyelashes by the Epilation forceps. Mr. Berry writes[1]:—"When the trichiasis is only partial, a temporary improvement is obtained by epilation. In some cases where a few eyelashes only have been left altogether, the patient may procure for himself a pair of forceps, and have the eyelashes removed whenever they cause irritation." Surgical epilation was frequently necessary for trichiasis among the Romans and a similar forceps was in use there.[2]

In ancient times in India, the barbers used epilation forceps for pulling out grey hairs. In Makha-deva jātaka, we find the following conversations between the king and his barber[3]:—

"Barber. There is a grey hair to be seen on your head, O King.'

King. Pull it out, then, friend, and put it in my hand.'

So he tore it out with golden pinchers, and placed it in the hand of the King."

(*b*) The second variety is known as the Mucuṭī instrument.[4] It is a pair of straight forceps, having no curve like that o the sandaṁśa. It is serrated finely at the open ends. Th soldered end has a ring attached to it as ornamentation. It recommended to be used for removing painful sloughs and pro granulations from a deep-seated abscess. It is also to be used

[1] Practical Ophthalmology, 1904. By G. A. Berry, M.B. P. 52.

[2] Paulus Ægineta. VI. xiii. (Syd. Soc. Ed.)

[3] Rhys David's Buddhistic jātaka stories, Vol. I, pp. 187.

[4] मुचुटी सूक्ष्म दन्तर्जुमूले रुचकभूषणा।
गम्भीर व्रणमांसार्शो चार्म्मणः शीर्षितस्य च ॥ ७ ॥
Aṣṭāṅga Hṛdaya, I. 2

complete the operation for pterygium by removing the remnant, after it has been extirpated by the sharp instruments. Suśruta calls it Mucuṇḍī[1], and uses it to hold the pterygium after it has been raised by vaḍiśa or hook. It must be then a smaller variety of mucuṭī.

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Suśruta Saṁhitā, vi. xv.

Erichsen's Science and Art of Surgery, Tenth Ed. vol. I. p. 342.

तानतैलेनाभ्यक्तया वंशविदलेनापहरेत्।

Suśruta Saṁhitā, IV. xxvii.

yantra[1]. The word tāla "has been differently intepreted by the commentators. Bhānumatī gives the alternative reading (tālu *i.e.*, palate) for tāla, so the instruments likely had their ends shaped like the palatine process of fish. Dallana,[2] however, maintains that tāla means picklock, the ordinary Indian key which resembles a hook. Two of these are joined at one end, the curved ends being kept free, facing one another. The instrument would then resemble the face of a bhetuli fish. Instruments with one tāla or hook resemble one lip of the fish, and those with two tālas represent its entire face. Both Cakrapāṇi and Dallana however prefer to mean by tāla, the scale of a fish."

They have a length of twelve aṅguli, and are shaped like the jaws of a fish. They may be made either with a single blade (ekatāla) or with double blades (dvitāla) soldered at one end, the hooked ends being free. They are intended for the purpose of extracting foreign bodies from the ear, nose and other outer canals of the body. The ear scoop now used by the barbers of India for extracting wax from the ear is a tālayantra.

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[1] तालयन्त्रे द्वादशाङ्गुले मत्स्यतालुवदेकतालद्वितालके कर्णनासानाड़ीशल्यानामाहरणार्थे।

Suśruta Saṁhitā, I. vii.

द्वे द्वादशाङ्गुले मत्स्यतालुवद्वेधक तालके।
ताल यन्त्रे स्मृते कर्णनाड़ी शल्यापहारिणी॥

Aṣṭāṅga Hṛdaya Saṁhitā, I. xxv.

[2] अत्र ताल-शब्देन प्रदेश उच्यते। एतेन एकं तालं प्रदेशो यस्य तदेकतालं, द्वे तालि प्रदेशौ यस्य तत् द्वितालकम्; एतेन मत्स्यस्य शल्कवत्प्रतनुमुखैकप्रदेशं एकतालं मत्स्यशल्कवत् प्रतनुमुखं द्विप्रदेशं द्वितालमित्युक्तम्। परिवाहस्तु कर्णादिप्रवेशो ज्ञेयः। अन्ये तु मत्स्यातालकवदेकतालकद्वितालके इति पठन्ति। व्याख्यानयन्ति च मत्स्यस्य भेटुनिमत्स्यः, तस्य लौहमयतालकाकारं मुखं भवति अतस्तन्मुखार्द्धाकारं यन्त्रमेकतालकं, सर्वमुखाकारं द्वितालकं, तालकोऽत्रोपचारकादिपाटसन्धिबन्धनं लौहमयमुच्यते।

Dallana's Commentary, I. vii.

For removing substances that have fallen into the meatus auditorius, Paul says:[1] "They must therefore be extracted by an earpick, a hook, or tweezers, or by using powerful shaking of the head, while the ear is placed upon some circular board." Albucasis recommends us to use a slender forceps, which resembles the modern dissecting forceps. He also commends for the purpose a hook slightly bent, which is also mentioned by Celsus.[2]

IV. The Nāḍī Yantra or Tubular Instruments.

The Nāḍī or tubular instruments are described to be of various kinds and to serve many purposes[3]. They are open either at one or both ends. These are used for the extraction of foreign substances from the natural outlets of the body. They are also recommended to be used as a diagonostic apparatus for inspection of diseases in the canals. They are the means of sucking out fluid discharges, as pus *etc.*, from cavities and they facilitate the performances of other operations. They vary in length and diameter in proportion to the different sizes of the outer canals of the body, or according to the varieties of purposes to be served by them.

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[1] Paulus Ægineta, Vol. II. VI. xxiv. (Syd. Soc. Ed.)

[2] Celsus, VI.

[3] नाड़ी यन्त्राण्यनेकप्रकाराण्यनेक प्रयोजनान्येकतोमुखान्युभयतोमुखानि च तानि स्रोतो-गतशल्योद्धारार्थं रोगदर्शनार्थमास्रावणार्थं क्रियासौकार्यार्थाय चेति तानि स्रोतोद्वारपरिणाहानि यथायोग परिणाहदीर्घाणि च।

Suśruta Saṁhitā, I. vii.

नाड़ीयन्त्राणि यथिरार्थं कानेक मुखानि तु।
स्रोतोगतानां शल्यानामासयानाञ्च दर्शने।
क्रियार्थं सुकरत्वाय कृत्यादाचूषणाय च।
तद्विस्तार परिणाह दैर्घ्यं स्रोतोऽनुरोधतः॥ ९॥

Aṣṭāṅga Hṛdaya Saṁhitā, I. xxv.

The tubular instruments are used for fistula-in-ano, haemorrhoids, tumours, abscesses, injections into the rectum, vagina and urethra, hydrocele, ascites, inhalations, stricture of urethra and rectum and cupping as by gourd and horns.[1]

As examples of the tubular instruments, Vāgbhaṭa II. mentions:—

1. KAṆṬHASALYĀVALOKINĪ[2] OR THROAT SPECULUM.

To examine foreign substances such as a fish-bone in the throat, the instrument should have a length of ten aṅguli and a circumference of five aṅguli.

Suśruta describes the extraction of a foreign body, made of lac from the throat of a patient by the following device. A heated iron probe or sound should be introduced into the throat of a patient through a tube of copper and made to touch the bit of shellac. The foreign substance would begin to dissolve or soften and so will adhere to the probe. The rod is then to be cooled by sprinkling water through the tube and the foreign body then should be drawn out steadily with it.[3] But other kinds of foreign bodies are to be extracted from the throat by means of a rod-like instrument, one end of which is smeared with melted wax or shellac.

The use of some adhesive substance for extraction of foreign bodies accidentally introduced into the outer passages of the

[1] भगन्दरार्शोऽर्बुदव्रणवस्त्यन्तरबस्तिमूत्रवृद्धिदकोदरधूमनिरूहप्रकाशसविरूढगुदवल्मीक-लावूपडयन्त्राणि चोपरिष्टाद्व्याख्यास्यामः।

Suśruta Saṁhitā, I. vii.

[2] दशाङ्गुलाऽऽयताऽऽस्य. कण्ठशल्यावलोकिनी।

Aṣṭāṅga Hṛdaya, I. xxv.

[3] जातुषे कण्ठासक्ते कण्ठे नाड़ीं प्रवेश्याग्नितप्ताच्च शलाकां तयावगृह्य शीताभिरद्भिः परिषिच्य स्थिरीभूतमुद्धरेत्। अजातुषे जतुमधूच्छिष्टलिप्तया शलाकया पूर्ववत्कर्मेत्येके।

Suśruta Saṁhitā, I. xxvii.

human body was well known to the Greeks and Romans. Paul says:[1] "Stones and such like bodies we extract by wrapping wool round an earpick, and smearing it with turpentine-rosin, or some glutinous substance, and introducing it gently into the meatus auditorius."

2. Pañcamukha and Trimukha.

To take a good hold of a four-eared arrow, a speculum having five holes (Pañcamukha) should be had recourse to; and for a two-eared arrow, a speculum having three holes (Trimukha) would be necessary. The central hole is for the arrow, while the side holes are meant for the ears of the arrow.[2]

Celsus[3] says that when a weapon buried in the flesh has barbs too strong to be broken with forceps, they may be shielded with split writing-reeds (Calamus scriptorium), and the weapon thus withdrawn.

Paul says: "Some apply a tube round about the barbs[4] so that when they draw out the weapon, the flesh may not be torn by the barbs."

In modern times a snare is used instead of a tube. Dr. Erichsen[5] writes: "The extraction of an arrow is usually attended with little difficulty. But if barbed, special precautions have to be taken. With the view of safely effecting its removal, the snares.....have been devised."

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[1] Paulus Ægineta. Vol. II. VI. xxiv. (Syd. Soc. Ed.)

[2] नाड़ीपञ्चमुखच्छिद्रा चतुष्कर्णस्य संग्रहे।
वारङ्गस्य द्विकर्णस्य च्छिद्रा तत् प्रमाणतः।

Aṣṭāṅga Hṛdaya, I. xxv.

[3] Celsus, vii. v.

[4] The Works of Paulus Ægineta. vi. lxxxvii.

[5] The Science and Art of Surgery. Vol. I. pp. 343.

3. TUBULAR INSTRUMENTS FOR INSPECTION OF ARROWS.

Again for the inspection of the arrows, various kinds of tubular instruments would be necessary, which will vary according to the shape, length, and circumference of the arrows and their ears.[1]

4. ŚALYANIRGHĀTANĪ.

The top of this tubular instrument is shaped like the disc of a lotus and is closed. The other end is open and leads to a hollow extending to a fourth part of the tube. It has a length of twelve aṅguli. It is useful for removing an arrow fixed deeply into the body, in different directions and thus helpling its easy extraction.[2] For this purpose Suśruta directs us to use a stone hammer.

The Śalyanirghātanī had its counterpart in the female part of the Impellent, mentioned by Paul, for forcing an arrowhead forwards through a part so as to extract it at the side opposite to that of its entrance. It would thus be seen that the function of the Impellent was similar to that of the Śalyanirghātanī; the former moved it forwards, while the latter moved the śalya side to side, the object of both being to extract the foreign substance. The Impellent would seem to have been a plain rod of metal pointed at one end (the male part) and hollowed at the other (the female part); the pointed end used to be introduced into the socket of an arrow when it possessed one, and the hollow

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[1] वारङ्ग कर्षसंस्थान नाह देर्ष्यानुरोधतः।
नाडीरिवं विधाश्चान्या द्रष्टुं शल्यानि कारयेत्॥ १०॥
Aṣṭāṅga Hṛdaya, I. xxv.

[2] पद्मकर्णिकया मूर्ध्नि संवृतो वादशाङ्गुला।
चतुर्थं शुषिरानाड़ी शल्यनिर्घातनी मता॥
Ibid.

end was meant to fit over the tail in case where the arrow was tanged.[1] The Greeks and Romans recognised the necessity of an arrow being moved about until loosened, if it remained fixed in the bone; and Celsus[2] directs us to strike it with some iron instrument until it be shaken from the place where it is lodged.

5. Tubular instruments for piles.

According to Suśruta[3] these should be made either of iron, or ivory, or horn or wood. They are hollow instruments tapering at the end which should be shaped like the teat of a cow. For males, the length is four aṅguli, while the circumference is five aṅguli. In the case of females, however, the tube should be made wider, the circumference being six aṅguli, and longer, the length being equal to the space covered by the palm of the hand. There are two slits on the sides—one for inspection of diseases and the other to allow application of caustic and cautery to the diseased part. The slit measures three aṅguli in length and the pulp of the thumb in breadth. At a distance of a half aṅguli from the margin of the slit, is raised a circular projection, also a half aṅguli high.

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[1] Paulus Ægineta, VI. lxxxviii.

[2] Celsus, VII. 5.

[3] तच्च यन्त्रं लौहं दान्तं शार्ङ्गं वार्कं वा गोस्तनाकारं चतुराङ्गुलायतं षडङ्गुलपरिणाहं पुंसां षडङ्गुलपरिणाहं नारीणां तलायतं तदर्धच्छिद्रं दर्शनार्थमेकं छिद्रमेकं छिद्रन्तु कर्म्मणि। एकदारि हि शस्त्रचाराङ्गीनामतिक्रमो न भवति। छिद्रप्रमाणन्तु त्र्याङ्गुलायतमङ्गुष्ठोदरपरिणाहं यदङ्गुलमवशिष्टं तस्यार्धाङ्गुलमधस्तादर्धाङ्गुलोच्छितोपरिवृत्तकर्णिकमेषयस्नाकृतिसमासः।

Suśruta Saṁhitā, IV. vi.

Vāgbhaṭa[1] describes two different instruments, one for inspection and the other for medication. They both have the same length and circumference. The former has two slits on the side, while the latter has only one slit, three aṅguli long and the pulp of the thumb in width. The annular projection is turned upwards : the object being the prevention of sudden introduction of the instrument too far inwards.

A similar instrument without any slit on the side is called Śamī[2]. It is advised to be used for exerting pressure over the piles by its introduction into the rectum (Vāgbhaṭa.)

Rectal speculum is mentioned by Hippocrates in his treatise on fistula[3] and by Paul in the treatment of piles.[4] It is called Calopter in contradistinction to the vaginal speculum which is called Diopter. The rectal speculum in the Naples museum is a two bladed instrument working with a hinge in the middle. In modern times, both the varieties of the speculum, tubular and valved, are in use.

For inspection and medication of piles, a tubular speculum is recommended to be used by the veterinary surgeons. In the

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[1] चर्मसी गोस्तनाकारं यन्त्रकं चतुरङ्गुलम् ।
नाड्यै पञ्चाङ्गुलम् पुंसां प्रमदानां षडङ्गुलं ।
द्विच्छिद्रं दर्शने व्याधेरेकच्छिद्रन्तु कर्म्मणि ।
मध्येऽस्य चाङ्गुलच्छिद्रमङ्गुष्ठोदर विस्तृतम् ।
ऊर्द्धाङ्गुलीच्छितीदृग्वा कर्णिकञ्च तदूर्द्धतः ॥

Aṣṭāṅga Hṛdaya Saṁhitā, I. xxv.

[2] श्रम्याख्यां तादृगच्छिद्रं यन्त्रमर्शः प्रपीड़नं ॥ १२ ॥

Ibid.

[3] The Genuine Works of Hippocrates. (Syd. Soc. Ed.) Vol. II. P. 817.

[4] Paulus Ægineta, VI. lxxix.

Aśvavaidyaka, Jayadatta sūri[1] describes the instrument thus: "The surgeon should know the instrument to have the length of six aṅguli. On the two sides, the wise surgeon should make two slits, three aṅguli long and a half aṅguli broad. Through an instrument with two slits, the piles of the horses should be examined. Through a speculum with one slit, the surgical operations, such as incisions &c., should be performed, after having tied the horse and making him lie down".

6. Tubular Instruments for Fistula-in-ano.

These are similar to the instruments used for the inspection and medication of piles, the only difference being the omission of the circular rings in their construction, for otherwise, the projection may rub over the sore if the speculum be introduced deeply.[2]

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[1] यन्त्रं षडङ्गुलं विद्यान् च्छिद्रं पञ्चाङ्गुलं भिषक्।
अधोऽर्धाङ्गुलविस्तीर्णं दैर्घ्येणाप्यङ्गुलत्रयम्॥
उभयोः पार्श्वयोस्तस्य कुर्य्याच्छिद्रद्वयं बुधः।
अर्शसेन तु वाहस्य द्विच्छिद्रेण विलोकयेत्॥
एकच्छिद्रेण वै कर्म्म कुर्य्याच्छेदादि पूर्वकम्।
पातितस्य सुबद्धस्य तुरङ्गस्य विचक्षणः॥

Aśvavaidyaka (Bibliotheca Indica). Liii. vs. 4, 5 and 6.

[2] छिद्रादूर्द्धं हरेदीषदर्शोयन्त्रस्य यन्त्रवित्।
ततो भगन्दरे दद्यादेतदर्द्धेन्दु सन्निभं॥

Suśruta Saṁhitā, IV. viii.

सर्व्वेष्वप्येवमेवेदं छिद्रादूर्द्धं भगन्दरे।

Aṣṭāṅga Hṛdaya, I. xxv.

7. Tubular Instruments for the Nose.

Nasal-Speculum.

Similar tubular instrument without ring is to be used for examination of nasal diseases as tumours and polypus. It is however shorter and thinner than the rectal speculum. Vāgbhaṭa says: "It is two aṅguli long and admits the index finger in its lumen. The tube has a single slit on the side."[1]

He describes nasal tubes for introducing medicated powders into the nose as snuff.[2] After partially filling the tube with powders, one should blow through the empty end, the other end being put well inside the nasal cavity. Suśruta also uses a tube to blow powder into the nose.[3] Caraka[4] mentions nasal insufflation to cure diseases. Śārṅgadhara[5] and Cakradatta[6] describe the nasal tube for insufflation to be six aṅguli long and open at both ends.

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[1] घ्राणाम्बुदार्शसामेकच्छिद्रा नाड्यङ्गुलद्वया।
प्रदेशिनी परिक्षाढ्या स्याद्वृन्दर यन्त्रवत् ॥ १५ ॥
Aṣṭāṅga Hṛdaya, I. xxv.

[2] भ्रानं विरेचनचूर्णो युञ्जात् तं मुखवायुना।
षड़ङ्गुलद्विमुखया नाड्या भेषजगर्भया।
Ibid. I. xx.

[3] नासास्रावे घ्राणतचूर्णमुक्तं नाड्यादेयं यीऽवयीड़क्षतौक्ष्यः।
Suśruta Saṁhitā, VI. xxiii.

[4] सिद्धिं स्याद्भावनं चूर्णैश्चषां प्रधमने हितं।
Caraka Saṁhitā, VI. xxvi.

[5] षड़ङ्गुला द्विवक्त्रा या नाड़ी चूर्णान्तयो धमेत्।
तीक्ष्णं कीलमितस्यक्त्र वातः प्रधमनं हितं ॥
Śārṅgadhara Saṁgraha, III viii.

[6] भ्रापनं रेचनचूर्णो युञ्जात् तत् मुखवायुना।
षड़ङ्गुल द्विमुखया नाड्या भेषजगर्भया ॥
Cakradatta, Nasyādhikāra.

Aretaeus says that a quill or reed or a wide long tube may be used for blowing powders into the pharynx. Alexander Trallianus[2] says that a calamus scriptorium, the joints of which have been removed, may be used as an insufflator. Oribasius[3] however gives the fullest description of the tube used as a nasal insufflator. "A reed slender and with a straight bore, 6 inches in length, and of such a size that it can be passed in the nares, is taken and its cavity entirely filled with medicament. The reed may be either natural or of bronze. This being placed in the nares, we propel the medicament by blowing into the other end."

In modern times, we advise our patients to do the same thing when powders are prescribed to be thrown into the nose or ears. The cylindrical shaft of the ordinary quill so cut as to be open at both ends will serve the purpose admirably. The nasal insufflator is used now for identical object.

Aretaeus[4] mentions a nasal syringe with a double tube. It consists of two pipes united together by an outlet so that liquid medicine may be injected into both the nasal cavities simultaneously, for injection into each nostril separately, he points out, can not be borne.

It is remarkable that in Mahāvāgga[5] mention is made of single and double nose-spoons. Nāthu-karaṇi (*i.e.*, an instrument to hold up the nose, so that the medicated oil

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[1] Aretaeus, Vol. II., P. 408.

[2] Alexander Trallianus, IV. viii.

[3] Oribasius Collect, xii.

[4] Aretaeus, Ed. Adams, Vol. II., P. 459.

[5] Mahāvāgga, VI. 13. 1 & 2. Sacred Books of the East.

does not run out...Ed.) and Yamaka-nāthu-karaṇi (*i.e.*, one that would go up both nostrils...Ed.). They are recommended to be made of gold, or silver, or bone, or ivory, or horn, or of the *nala* reed, or of bambu, or of wood, or of lac, or of the shells of fruit, or of chank-shell". (Sacred Books of the East).

To apply oily medicines inside the nasal cavity a cotton wick is first soaked in the oil and then it is pushed well inside the nose. It is recommended also to pour oil into the cavity through a tube, while the other cavity is pressed by a finger (Vāgbhaṭa[1]).

To treat a case of fracture of the nasal bones, Suśruta recommends[2] two straight tubes open at both ends to be introduced into the nasal cavities, after putting the fractured ends in position, either lowering or elevating the raised or depressed end by a rod as required. Then bandages are to be applied. The tubes serve as splints to support the broken ends in position, while through their orifices the patient may breathe without inconvenience.

Similarly Celsus, after replacing the fractured ends in position uses oblong tents sewed round with a thin soft skin as splints into the nostrils; or a large quill smeared with gum, or artificer's glue may be applied in the same way. Paul also

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[1] नासापुटं पिधायैकं पर्य्यायेण निषेचयेत्।
ऊर्ध्वास्तु भेषजं प्रज्ञाद्या पिचुनाऽथवा॥

Aṣṭāṅga Hṛdaya, I. xx.

[2] नासां सन्नां विडग्नां वा ऋजुौ कृत्वा शलाकया।
पृथग् नासिकयोर्नाड्यौ विमुखौ संप्रवेशयेत्॥
ततः पट्टेन संवेष्ट्य घृतसेकं प्रदापयेत्॥

Suśruta Saṁhitā, VI. iii.

says: "And some sew the quills of the feathers of a goose into the rags, and thus introduce them into the nose, in order that they may preserve the parts in position without obstructing the respiration; but this is unnecessary as respiration is carried on by the mouth."[1]

Suśruta also advises us to introduce these tubes into the nasal cavities during the performance of the Rhinoplastic operations.[2]

8. The Aṅguli-trāṇaka or Finger-guard.

Vāgbhaṭa says:[3] "It is generally made either of ivory or wood. The instrument is shaped like the teat of a cow, and is four aṅguli long. Two slits occur on the sides like those in the speculum for piles."

It protects the finger of the surgeon from being injured by the teeth of the patient and so helps the surgeon in opening the mouth of the patient with ease.[4]

In modern times, finger-guards are used for the same purposes.

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[1] Paulus Ægineta, Vol. II. vi, xci. Syd. Soc. Ed.

[2] सुसंहितं सम्यगथो यथावन्नाड़ीद्वयेनाभिसमीक्ष्य वह्नां।
प्रीत्यै च तेनाभवचूर्णयेच्च पत्राङ्गयष्टीमधुकाञ्जनैश्च ॥
Suśruta Saṁhitā, I. xvi.

[3] अङ्गुलित्राणकं दान्तं दारवं वा चतुरङ्गुलम्।
छिद्रितं गोस्तनाकारं तदङ्गविदतौमुखं ॥
Aṣṭāṅga Hṛdaya, I. xxv.

[4] तच्च वङ्गं विदतौ, सम्भृत मुखस्यातुरस्य मुखव्यादान निमित्तं सुखं सुखकरं स्यात्। यत इदं दन्तघातात् रक्षति यत उक्तं सुखमिति।
Vāgbhaṭārtha Kaumudī, I. xxv.

अङ्गुलिर्दन्तौष्ठी रक्षणार्थत्वादङ्गुलित्राणमिति नाम।
Sarvāṅga Sundarī, I. xxv.

9. JONI-VRAṆEKṢAṆA OR VAGINAL SPECULUM.

Vāgbhaṭa[1] describes it to be a tubular instrument, sixteen aṅguli long, and six aṅguli in circumference. It consists of four blades, attached at their bases to a ring. The tube tapers gradually, the end is free and looks like the bud of a lotus. To the four blades are soldered four rods in such a way that on pressing their free ends, which pass out of the ring, by the surgeon's hands, the tapering end of the tube would gape widely. The surgeon by regulating the pressure of his hand, may open or close the speculum to any desired extent.

Another kind of vaginal speculum used to be manufactured out of the two horns of a buffalo by dividing each into two longitudinal halves. They should be so paired that their concave surfaces would look towards one another, their ends diverging outwards. So we get a pair of bivalve speculum out of a pair of horns.

The bivalve speculum of horn mentioned above, has its modern counterpart in the pair of speculum known as Barne's or Neugebauer's speculum.

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1 योनिव्रणेक्षणं मध्ये शुषिरं षोडशाङ्गुलम्।
मुद्रावद्धं चतुर्भिस्तमर्धाज्ञ मुकुलाननं।
चतुःशलाकसाक्रान्तं मूले तदिकसेन्मुखे ॥ १७।

Aṣṭāṅga Hṛdaya, I. xxv.

यन्त्रस्य यन्त्रस्य कल्पनायां चतारिखण्डानि तथा कार्याणि यथा मुद्रिकया बद्धानि मिलितानि च पद्मसुकुलाकार मुखा, अन्तर शुषिरा षड़ङ्गुल परिणाहवती नाड़ी स्यात्। ततस्तन्मध्ये प्रत्येकं खण्डसंलग्नं चतस्रः शलाकाः पाशमुखात् सन्निवेश्य शलाकानामध्यभागे तथा बधीयात् यथा शलाकामूल पीड़नेन यन्त्रस्य मुखं विकसेत्।

Vágbhaṭārtha Kaumudi, I. xxv.

The vaginal speculum or Diopter is mentioned by Soranus, Paul[1] and other Greek surgeons. Paul describes its method of working as follows:— "The person using the speculum should measure with a probe the depth of the woman's vagina, lest the stalk (fistula) of the speculum being too long, it should happen that the uterus should be pressed upon. If it be ascertained that the stalk is larger than the vagina, folded compresses are to be laid on the alæ pudendi, in order that the speculum may be placed upon them. The stalk is to be introduced, having a screw at the upper part, and the speculum is to be held by the operator, but the screw is to be turned by the assistant, so that the laminæ of the stalk being separated, the vagina may be distended." The accounts given by Albucasis[2] and Haly Abbas[3] are similar. These instruments are described to be bivalve, trivalve or quadrivalve. A quadrivalve speculum of the Greeks is identical with the Joni-vraṇekṣaṇa of the Hindus; the only difference being that the former is acted by screw mechanism, while the latter is worked on the principle of the lever. Drawings of several shorts of the Greek instruments are given in the surgery of Albucasis and by Schultet.[4] There are three specimens of vaginal, speculum in the Naples museum, drawings of which are given by Milne. In modern times, we use similar valvular speculum for identical purposes.

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[1] Paulus Ægineta, Vol. II. vi. lxxiii. Syd. Soc. Ed.

[2] Albucasis, Chirrug. II. 71.

[3] Haly Abbas, Pract. ix. 57.

[4] Arsenal de chirrug. tab. 18.

10. Tubular Instruments for wounds.

Vraṇa-vasti or Wound-syringe.

If the wound be caused by deranged air and be very tender, especially if it forms on the lower half of the body, the vasti should be used. In diseases of the urinary organs, such as, obstruction of urine, faulty conditions of urine, impure semen, stone in the bladder and disorders of menstruation, uttara-vasti is necessary.[1]

There are two instruments mentioned—one for application of oleaginous medicines to a sore and the other for washing a sinus with medicated lotions. Each consists of a tube and a leather bag. The tube is smooth and rounded and is shaped like a cow's tail.[2] It is six aṅguli long. The base is broad and admits a thumb, while the end is narrow and admits a pea. There is a circular projection or ring at a short distance from the end. The base is fitted tightly into a bag of thin leather.[3]

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[1] वातदुष्टो व्रणोयस्तु रूक्षाश्चत्यर्थवेदनः।
अधःकाये विशेषेण तत्र बस्तिर्विधीयते।
मूत्राघाते मूत्रदोषे शुक्रदोषेऽश्मरीषु च।
तथैवार्त्तवदोषे च बस्तिरुत्तरो हितः॥

Suśruta Saṁhitā, IV. i.

[2] नाड़ी व्रणानां स्नेहप्रयोगार्थं प्रक्षालनार्थञ्च ते यन्त्रे आह यन्त्रे इत्यादि नाड़ीव्रणाभ्यङ्ग क्षालनाय नाड़ीव्रणानामभ्यङ्गार्थं प्रक्षालनार्थञ्च षड़ङ्गुले षड़ङ्गुल दीर्घे, बस्तियन्त्राकृति बस्तिनेत्राकारे इत्ते गोपुच्छाकारि * * * *

Vāgbhaṭārtha Kaumudī, I. xxv.

[3] यन्त्रे नाड़ी व्रणाभ्यङ्ग क्षालनाय षड़ङ्गुले।
बस्तियन्त्राकृती मूलेऽङ्गुष्ठ कलायखे।
अयतः कर्णिके मूले निबद्धस्तट्चर्म्मणी॥ १८।

Aṣṭāṅga Hṛdaya Saṁhitā, I. xxv

To prevent the tube slipping out of the bag, an additional precaution is taken by tying a knot of thread over the leather covering the tube. For description of the bag, *vide infra*.

Śārṅgadhara[1] however says that the tube should have the thickness of the shaft of a vulture's feather and should admit a moong (Phaseolus Moong). It is eight aṅguli long.

Pālakāpya describes the tube for washing wounds of elephants to be made of copper, and shaped like the karontaka flower. It is sixteen aṅguli long.

In modern times, wound syringes are similarly used to wash the sore with medicated lotions.

For description of the tubes for vraṇa-dhupana or wound-fumigation, *vide infra*.

11. Tubular Instruments for Ascites.

Dākodara yantra or Canula.

It may be either metallic or manufactured from the cylindrical hollow calamus of a peacock's feather.[2] The tube is open at both ends and is of the same calibre throughout. Suśruta advises us to use a pipe of tin, or lead or a feather to drain the fluid, after the abdomen has been tapped.[3]

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[1] व्रणवस्त्रेस्तु नेत्रं स्यात् त्र्यङ्गमष्टाङ्गुलोच्छ्रितम्।
सुद्वच्छिद्रग्रन्थिपक्षनलिकापरिणाहि च।

Śārṅgadhara Saṅgraha, III. vi.

[2] द्विधारा नलिका पिच्छनलिका वा दाकोदरे। १९।

Aṣṭāṅga Hṛdaya Saṁhitā, I. xxv.

[3] तत्र वङ्क्षादीनामन्यतमस्य नाड़ीद्विधारां पक्षनाड़ीं वा संयोज्या दोषोदक-मवसिञ्चेत्तती नाड़ीमपहृत्य तैललवणेनाभ्यज्य व्रणवस्त्रेणोपचरेत्।

Suśruta Saṁhitā, IV. xiv

Celsus describes a lead or copper canula for draining ascites.[1] Paul writes that the tip used to be bevelled off like a writing pen.[2] It was also employed in empyema.[3] Albucasis[4] mentions a tube of silver or copper or brass having a small hole at the bottom and three on its sides.

In modern times we use a metallic canula of similar shape for draining fluid in ascites.

12. Tubular Instruments for Hydrocele.

This is practically the same instrument described above. Suśruta[5] mentions a tube or canula to drain the fluid after tapping the hydrocele with the vrīhimukha śastra or trocar. The Greek surgeons did not describe the operation. They preferred the open incision to puncture.[6] Rhases, however, describes the operation of puncturing the scrotum for hydrocele.[7]

13. Tubular Instruments for Urethral Stricture.

Suśruta recommends gradual mechanical dilatation of the urethra by means of tubes made of iron, or wood, or lac, well-smeared

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[1] Celsus, vii. 15 &. ii. 10.

[2] Paulus Ægineta, Vol. II. VI. L. Syd. Soc. Ed.

[3] Hippocrates, ii. 259.

[4] Albucasis, Chirrug, ii. 54.

[5] मूत्रजां स्वेदयित्वात्तु वस्त्रपट्टेन वेष्टयेत् ॥
सेवन्याः पार्श्वतोऽधस्ता द्विध्येद्वीहिमुखेन च ।
यथात द्विमुखां नाडीं दत्वा विस्रावयेद् भिषक् ॥

Suśruta Saṁhitā, IV. xix.

[6] Paulus Ægineta, VI. lxii.

[7] Rhases, Cont. xxiv.

with ghee.[1] He advises us to use the same tube for three consecutive days, then another of larger calibre for three days more, and so on, till the canal be fully dilated. He reserves External Urethrotomy as a last resource.[2]

14. Tubular Instruments for Rectal Stricture.

Suśruta similarly describes gradual dilatation of stricture of the rectum, using a higher number of diliators after the lapse of three days until the desired effect is attained.[3]

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[1] (a) निरुद्धप्रकाशे नाड़ीं स्नीहीमुभयतोमुखीं ॥
दारवीं वा जतुकृतां घृताभ्यक्तां प्रवेशयेत् ।
परिषेकं वसायाञ्च शिग्रुसारवराश्वयोः ॥
चक्रतैलं तथायोज्यं वातघ्नप्रत्यसंयुतं ।
त्र्याहात्त्र्याहात् स्थूलतरां सम्यङ्नाड़ीं प्रवेशयेत् ॥
स्नीहीविवर्द्धयेदेवं स्निग्धमन्नञ्च भोजयेत् ।
भित्त्वावा सेवनीं मुक्त्वा सद्यःक्षतवदाचरेत् ॥

Suśruta Saṁhitā, IV. xx.

(b) निरुद्ध प्रकाशे नाड़ीं द्विमुखीम् कनकादिजम् ।
घिवाभक्तां चुङ्गकादिस्नेहेन परिषेचयेत् ।
तैलेन वा वचदारुकल्कैः सिद्धेन च त्र्याहात् ॥
पुनः स्थूलतरा नाड़ीदेया स्नीहीविवृद्धये ।
... ...
... ... रुद्धगुदेऽप्येष क्रियाक्रमः ॥

Cakradatta, Kṣudraroga Cikitsā.
See also Yogaratnākara, P. 368, where these verses are quoted.

[2] See 1 (a). चंस्यार्थं :—सेवनीं त्यक्त्वा शस्त्रेण वा मूत्रस्रोतः संकोचकारणं चर्म विदारयेत् । तस्यापि द्वारस्याविपाटे मणिबन्धमात्रं दारयेदिति ।

Commentary of Śrī Kaṇṭha in Vyākhyā Kusumāvalī (Anandāśram Series), P. 406.

[3] सन्निरुद्ध गुदे योज्या निरुद्धप्रकाशक्रिया ॥

Suśruta Saṁhitā, IV. xx.

There is no mention of solid bladder sounds in the Sanskrit medical books. But from the above descriptions, it seems beyond doubt that they had a set of dilators for stricture of the urethra and another set of dilators for stricture of the rectum. These dilators were tubes—either metallic or wooden—and had a regular gradation in the increse of their diameters. Cakrapāṇī mentions stricture dilators of gold.[1]

In modern times we have also two sets of these instruments —urethral and rectal dilators, numbered in an ascending series according to the increased diameters of these instruments.

15. Tubular Instruments for Injections into the Rectum.

Vasti yantra or Rectal Clyster.

Injections into the rectum are to be thrown by means of a tube with a membranous bag tied to its end. The tube is advised to be made either of gold, or silver, or lead, or copper, or brass, or bell-metal, or ivory, or horns, or glass, or precious stones, or wood or bamboo. It should be clean, smooth, strong, and tapering like a cow's tail, and should terminate in a smooth rounded bulb. The tube varies in length and circumference according to the age of the patient as follows :—

I. Caraka.[2]

Age.	Length of tube.	Opening at the end admits.
6 years ...	6 anguli ...	A moong
12 „ ...	8 „ ...	A pea
20 „ and over ...	12 „ ...	A small plum seed

[1] See foot note I (b), Page 124.

[2] सुवर्णरूप्यत्रपुतास्त्रसीसै-
कांस्यायसास्थिद्रुमवेणुदन्तैः ।
नलैर्विषाणैर्मणिभिश्च तेषैः
कार्याणि नेत्राणि मुखानि कानि ॥

II. Suśruta.[1]

Age.	Length of tube.	Part of tube in bag.	Circumference of tube.	Circumference at end.	Measure of injection.
1 year	6 aṅguli	1½ anguli	Little finger	Shaft of heron's feather.	2 añjali
8 „	8 „	2 „	4th „	Shaft of falcon's feather.	4 „
16 „	16 „	3½ „	3rd „	Shaft of peacock's feather.	8 „
50 „	12 „	3 „	Pulp of thumb	Admits a plum stone.	12 „
70 „	Same as that of the 16th year.				

षड्द्वादशाष्टाङ्गुल सम्मितानि षड्विंशतिद्वादशवर्षजानाम्।
स्युर्मुद्गकर्कन्धु सतीनवाह्निच्छिद्राणि वर्त्मापिहितानि चापि॥
यथावयोऽङ्गुष्ठ कनिष्ठकाभ्यां मूलाग्रयोः स्युः परिणाहवन्ति।
ऋजूनि गोपुच्छसमाकृतीनि श्लक्ष्णानि च स्यूगृहिकामुखानि॥
स्यात् कर्णिकैकाग्र चतुर्थभागे मूलाग्रिते वस्ति निवन्धने द्वे।
जारद्गवोमाहिषवाजिनो वा स्याच्छीकरो वस्तिरजस्र वापि॥
दृढ़ानतुर्नष्टशिरो विगन्धः कषायरक्तः सुसदृः सुगन्धः।
दृष्टां वयोवीर्य्य यथानुरूपं नेत्रेषु योज्यस्तु सवङ्गसूत्रः॥

Carāka Saṁhitā, VIII. iii.

Also quoted in Cakradatta, Anuvāsanādhikāra.

[1] तत्र सांवत्सरिकाष्टहिरण्ड वर्षाणां षड्दशद्वादशाङ्गुल प्रमाणानि कनिष्ठिकानामिका मध्यमाङ्गुलि परिणाहान्यरेऽभ्यर्द्धाङ्गुलार्द्ध तृतीयाङ्गुल सन्निविष्ट कर्णिकानि कङ्कगृध्रेन वर्हिणच नाडीतुल्य प्रवेशानि मुद्गमाषकलायमात्र स्रोतांसि विदध्यान्नेत्राणि तेषु त्वाच्छादनाद्रव्य प्रमाणमातुर श्लक्ष्णसम्मितेन प्रसृतेन सम्मितौ प्रसृतौ द्वौचत्वारोऽष्टौ विधेयाः।

भवति चात्र।

वर्षोत्तरेषु नेत्राणां वस्तिमानस्य चैव हि।
वयोबलशरीराणि समीक्ष्य वर्द्धयेद्विधिं॥

षड्विंशतेरूर्द्ध द्वादशाङ्गुलं मूले ह्यष्टोदर परिणाहमग्रे कनिष्ठिकोदर परिणाहमग्रे त्वाङ्गुलसन्निविष्ट कर्णिकं गृध्रपक्षनाडीतुल्य प्रवेशं कोलास्थिमात्रं च्छिद्रं छिन्नकलायमात्रं छिद्रमित्येके। सर्व्वासुमूले वस्तिनिबन्धनार्थं द्विकर्णिकानि। आच्छादन द्रव्य प्रमाणं तु विद्धि द्वादश प्रसृताः। सप्तत्रिंशद्धं नेत्र प्रमाणमेतदेवद्रव्य प्रमाणन्तु द्विरहवर्षवत्।

तत्र नेत्राणि सुवर्णरजतताम्रयोरीति दन्तगजमथितकसारमयानि श्लक्ष्णानि दृढ़ानि गोपुच्छाकृतीन्यजूनि गुटिका मुखानि। वस्त्याच्छादनानां मदवो नाति बहला दृढ़ाः प्रमाणवन्तो गोमहिषवराहाजोरभ्राणां।

III. Vāgbhaṭa II.[1]

Age. (years).	Length of tube.	Opening at base admits.	Opening at end admits.
Under 1	5 aṅguli	1 finger	A moong (phaseolus moong).
1 to 6	6 „	1½ „	A masha (phaseolous Rox).
7 to 11	8 „	2 „	A kalāya (pea) (pinus sativum).
12 to 15	9 „	2½ „	Boiled pea.
16 to 20	12 „	3 „	A śṛṅgalakoli (zizyphis cenoplia).
over 20	varies according to the age, strength and size of the patient; but the orifice at the base of the tube need not be wider.		

नेत्रलाभे हितनाड़ी नलवंशास्थि सम्भवा।
वस्त्रलाभे हितं चर्म्म सूक्ष्मं वा ताम्रवं घनम्॥
वस्तिं निरुपदिग्धन्तु गुदं सुपरिमार्जितं।
सहनुहत हीनञ्च मुहुःखे हविमर्हितं।
नेत्रमूले प्रतिष्ठाप्य न्युब्जन्तु विततानतम्॥

Suśruta Saṁhitā, IV. xxxv.

[1] तयोस्तु नेत्रं वैमादि धातु दार्व्यस्थि वेनुजं।
गोपुच्छाकारमच्छिद्रं ऋजुं गुडिका मुखं॥
ऊनेऽब्दे पञ्चपूर्णेऽस्मिन्नासप्तभ्योऽङ्गुलानि षट्।
सप्तमे सप्त तान्यष्टौ द्वादशे षोड़शे नव।
द्वादशैव परं विंशाद् वीक्ष्य वर्षान्तरेषु च।
वयो बल शरीराणि प्रमाणमभिवर्द्धयेत्॥
साङ्गुष्टेन समंमूले स्त्रीक्षेत्रेनाथ कनिष्ठया॥
पूर्णेऽब्दे ऽङ्गुल मादाय तदर्द्धार्द्ध प्रवर्द्धितं।
चाङ्गुलं परमं छिद्रं मूलेऽग्रे वहते तु यत्।
मुद्गं माषं कलायन्तु स्विन्नं कर्कन्धुकं क्रमात्॥
मूल च्छिद्र प्रमाणेन प्रान्ते घटित कर्णिकं।
वर्त्मार्थ पिहितं मूले यथास्वं चाङ्गुलान्तरं।
कर्णिका हितयं नेत्रे कुर्य्यात् तच्च योजयेत्॥
अजावि महिषादीनां वस्तिं सुसदितं दृढं।
कषाय रक्तं निच्छिद्र यत्नि गन्ध शिरं तनुं।
ग्रथितं साधुसूत्रेण मुखं संस्थाप्य भेषजं।
वस्त्राद्भावेऽङ्गपादं वा न्यसेद्वासोऽथवा घनं॥

Aṣṭāṅga Hṛdaya Saṁhitā, I. xix.

Cakradatta[1], Śārṅgadhara and Bhāva Miśra[2] follow Caraka as regards measurement. Kharanāda[3] also gives a similar description.

[1] See foot note 2, Page 125.

[2] नेत्रं कार्य्यं सुवर्णादिधातुभिश्चर्वणक्षमैः ।
नलैर्दलैर्विषाणाद्यैर्मणिभिर्वा विधीयते ॥
एकवर्षात्तु षड्वर्षं यावन्मानं षडङ्गुलम् ।
ततो द्वादशकं यावन्मानं स्यादष्टसंमितम् ॥
ततः परं द्वादशभिरङ्गुलैर्नेत्रदीर्घता ।
मुद्राछिद्रं कलायाभं छिद्रं कोलास्थिसन्निभम् ॥
गोपुच्छसन्निभं मूले स्थूलं तस्मात् क्रमात् कृशं ।
यथासंख्यं भवेन्नेत्रं शुक्लं गोपुच्छसन्निभम् ॥
धातुराङ्गुष्ठमानेन मूले स्थूलं विधीयते ।
कनीनिकापरीणाहसमे च गुटिका मुखे ॥
तन्मूले कर्णिके द्वे च कार्य्ये भागाच्चतुर्थकात् ।
योजयेत् तत्र वस्तिञ्च वस्त्रद्रव्यविधानतः ॥
मृगाजगोकरगवां महिषस्यापि वा भवेत् ।
मूत्रकोशसमा वस्तिस्तदलाभे च चर्मणः ॥
कषायरक्तः सुश्लक्ष्णवस्तिः स्निग्धो दृढोन्नतः ।
व्रणवस्तिस्तु नेत्रं स्यात् शुक्लमष्टाङ्गुलोन्नतम् ॥
मुद्रच्छिद्रद्रव्यपचनलिकापरिणाहि च ।

Śārṅgadhara Saṅgraha, III. v.
Bhāva Prakāśa, I. ii.

[3] वस्तिनेत्रसमं शुक्लं मृदुनाङ्गुलिकामुखम् ।
भवेद्गोपुच्छसंस्थानं सुप्रवाहं विकर्णिकम् ।
या विभागप्रणयने मर्यादा कर्णिका भवेत् ।
द्वे कर्णिके चोपरिष्टात्तस्याधारेऽथवान्तरे ।
साङ्गुष्टकपरीणाहं मूलं नेत्रस्य शस्यते ।
मध्यं त्वनामिकातुल्यमग्रं तुल्यकनिष्ठिकं ।
खे नाङ्गुलि प्रमाणेन दैर्घ्ये स्याद् द्वादशाङ्गुलम् ।
कर्कन्धुप्रवरच्छिद्रं श्लेष्मनाशयथाबलः ।

Hārīta[1] advises us to use a bamboo tube four aṅguli long, which is to be introduced into the rectum up to two aṅguli.

As a general rule, Caraka writes that the broad and the narrow ends of the tube are to be equal to the patient's thumb and little finger respectively, in circumference. The orifice at the end of the tube is to be kept closed by a wick, so that no foreign body may enter the lumen of the tube to occlude it. The plug may be easily removed when the tube is required for use, and then replaced.

Towards the narrow end of the tube is a projection or ring at a distance of about two aṅguli from the extremity. The height of the projection varies with the size of the tube at the base. It acts as a bar to the further introduction of the tube inside the rectum than required. Towards the base are two similar projections, two aṅguli apart from each other. To the one near the base is firmly tied the leather bag, so that the tube may not slip away suddenly during forcible compression of the bag. The other is meant to afford a firm grasp by the surgeon, so that the tube may not move during its introduction into the rectum. These projections are to be made of thread or a piece of cloth and are to be so shaped as to resemble the end of the proboscis of an elephant.

As regards the leather bags, they are recommended to be

विंशदादशषड्वर्षं द्वादशाष्टषडङ्गुलम्।
कर्कन्धूक सतीनाभसुखं विद्ववहम्॥

Kharaṇāda quoted in Sarvāṅga Sundarī, I. xix.

[1] चतुरङ्गुलां वेणुमयीं नाड़ीं प्रतिलक्षणां कृत्वा त्वचा वस्तिप्रतिकर्म्म कुर्य्यात्। * * * गुदाभ्यन्तरे द्व्याङ्गुलमात्रं नाड़ीं सञ्चारयेत् सुधीः।

Hārīta Saṁhitā, V. iii.

made of the bladder of cows, or buffaloes, or hogs, or goats, or lambs. The bladder is to be well cleaned first with lime and water, so that no unpleasant smell may be emitted by the decomposition of its muscular tissue, then dyed red with Mañjiṣṭhā (Rubia Cordifoliatum) or with Harītakī (Terminalia Chebula, Retz.) and thoroughly dried. The bags are recommended to be soft, durable, entire and capacious. If the bladders of these animals are not available, the bags are to be manufactured from a frog's skin, or the peritoneum (one-fourth part would suffice) of any beast, or a piece of leather or a piece of very thick cloth. The size of the bag varies according to the age of the patient. It is to be firmly tied over the first projection at the base of the tube.

In the Siddhisthāna Chapter XI of the Caraka Saṁhitā,[1] there is a passage showing that veterniary medicine was well-known to the ancient Hindus at a very early period. This portion was edited by Dṛḍhavala and it is impossible to decide whether the passage refers to Agniveśatantra or not. It runs as follows:— "Then the disciples asked: 'How are clysters to be made in cases of animals such as elephants, camels, cows, horses, lambs and goats?' To this, the sage Ātreya explained the clysters for

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[1] अपृच्छदेनं सचवस्तिमब्रवीत् विधिश्चतस्त्राह पुनः प्रचोदितः।
अजाविकेभ्यो गजोष्ट्रयोर्वा गवाश्वयोर्वस्तिमुशन्तिमाद्यम्॥
अजाविकादन्तमुवस्तिमुत्तरं वदन्ति वस्तिं विपरीतरूपम्।
सुवस्तिमष्टादशशोऽश्माङ्कुलं तथैवनेवञ्च दशाङ्कुलं क्रमात्॥
गजोष्ट्रगोऽश्वाव्यजवस्ति सप्तौ चतुर्थभागं च सकर्णिकं वदेत्।
प्रध्वस्तवज्राण्योर्हि निरूहमात्रा गवादिषु द्विगुणो यथा बलम्।
निरूह उक्तः स तथाऽनुवासयं गजस्य इक्षिप्तनुवासनेऽष्टमः॥

Caraka Saṁhitā, VIII. xi.

animals in the following manner. The leather bag of the vasti-yantra should be made of a buffalo's bladder for goats, lambs, elephants, cows, camels and horses. The vasti for these animals is known as suvasti and uttara-vasti as uttara-suvasti. The tube of the suvasti should be eighteen aṅguli long for elephants and camels, sixteen aṅguli for cows and horses, and ten aṅguli for goats and lambs. Like the vasti yantra used for men, it should have a projection at the junction (of the tube with the bladder) and another at the fourth division of the tube from the end."

In the Aśvavaidyaka[1] the tube for the horse is thus described: "The tube should be made either of wood, or metals, or horn, or bamboo, or reeds. Its length should be twelve aṅguli and circumference six aṅguli. The wise surgeon should make the tube of such a calibre as to allow a plum seed to pass through it easily. It should be straight, polished and tapering from the base. At a distance of four aṅguli from the end of the tube, a projection should be raised, while for tying the leather bag firmly to the tube, two projections ought to be constructed at the base".

Pālakāpya[2] describes the rectal clysters for elephants. He advises that these are to be made either of wood or bamboo. The end is bulbous and the surface smooth. The length

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[1] काष्टैर्धातुभिश्च शृङ्गवंशनलादिभिः।
द्वादशाङ्गुलदीर्घन्तु परिणाहे षडङ्गुलम्॥
कोलास्थिमात्रच्छिद्रन्तु कुर्यान्नेत्रं विचक्षणः।
मूलादनुक्रमं ऋजुमसृणन्तु विशेषतः॥
त्यक्ताङ्गुलानि चत्वारि कर्णिकान्तस्य कारयेत्।
पुटकस्यप्रवक्ष्याम्य मूले द्वे चापि कर्णिके॥

Aśvavaidyaka, XVI. vs. 2—4.

[2] Pālakāpya's Hasti-Āyurveda, Sec. IV. Ch. V.

length of the tube varies, the most convenient being sixteen aṅguli for men and sixty-eight aṅguli for elephants. The projections at the base of the tube should be twelve aṅguli high. He describes in detail the method of introduction, position of the elephant, etc.

Dṛḍhavala advises us to reject the following eight kinds of tubes and eight kinds of bags[1] :—

I. Tubes—

1. Hrasva or too short: For the injection does not reach the proper place.
2. Dīrgha or too long: For the injection passes beyond the proper place.
3. Tanu or too thin: The injection can not pass through the tube easily and so the bag may burst.
4. Sthūla or too thick: The tube pulls the mucous membrane of the rectum and anus backwards and forwards during its entrance and exit.
5. Jīrṇa or old, weak and delicate: The tube may break inside the rectum during its introduction and so cause injury to the gut or anus.

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[1] ह्रस्वं दीर्घं तनुस्थूलं जीर्णं शिथिलवन्धनम्।
पार्श्वच्छिद्रं तथा वक्रमष्टौ नेत्राणि वर्जयेत्॥
अप्राप्तातिगतिचोभकर्षणच्यवनस्रवाः।
गुदपीड़ा गतिर्जिह्मा तेषां दोषा यथाक्रमम्॥
सांसलच्छिद्रविषमस्थूलजालकवातलाः।
छिन्नः क्लिन्नश्च तानष्टौ वस्तीन् कर्म्मसु वर्जयेत्॥
गतिर्वैषम्यविस्रंसस्राव्यदीर्याच्छनिस्रवाः।
फेनिलश्चुतधार्थैत्यं वस्तेः स्याद् वस्तिदोषतः॥

Caraka Saṁhitā, VIII. v.

6. Śithilabandhana: The tubes do not fit the bags well, so during compression of the bags, the injected fluid runs out by the side of the tube.
7. Pārśvacchidra or leaky: Having slit on the side, the tube may injure the soft parts by rubbing against them.
8. Bakra or curved: The motion of the injected fluid would be curvilinear. It will strike a side of the rectum and so would not go inside the gut.

II. Bags—

1. Maṁsala or fleshy: The bag emits bad smell.
2. Chidra or leaky: The injection escapes outside.
3. Viṣama or uneven: Parts are unequally compressed and so the injection does not issue in a forcible jet.
4. Sthūla or thick: It is dfficult to grasp the bag and so it can not be forcribly compressed.
5. Jālaka or having a network: The injection comes out.
6. Vātala or hollow, airy and incompressible: If air can not be expelled out, froth forms in the injection; and so air is pumped into the rectum.
7. Chinna or torn: The injection flows down.
8. Klinna or moist: The injection can not be forced out.

Suśruta mentions eleven defects of tubes and five defects of bags of the Vasti yantra.[1]

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[1] अतिस्थूलं कर्कशमवनतमणभिन्नं सन्निकृष्ट विप्रकृष्ट कर्णिकं सूक्ष्मातिच्छिद्रमतिदीर्घमतिह्रस्वमिलेकादश नेत्रदोषाः। बहलताल्पता सच्छिद्रता प्रक्लीर्णता दुर्ब्बिद्धतेति पञ्चवस्ति दोषाः।

Suśruta Saṁhitā, IV. xxxv.

सजुनेत्रं विधेयं स्यात्तत्र सम्यग्विजानता।
अतिस्थूले कर्कशे च नेत्रे चावनते तथा॥

I. Tubes—

1. Atisthūla: Too thick.
2. Karkaśa: Rough.
3. Avanata: Curved.

} Such tubes injure the rectum and so cause pain.

4. Anu: Too thin.
5. Bhinna: Broken.
6. Sannikṛṣṭa Karṇika: Projection near?

} It becomes useless to inject fluids into the rectum.

7. Viprakṛṣṭa Karṇika: Projection distant?

} Injure the rectum which bleeds.

8. Sūkṣma: Small orifice.
9. Atihrasva: Too short.

} It becomes difficult to inject as the fluid comes out.

10. Atichidra: Large orifice.
11. Atidīrgha: Too long.

} Too much fluid passes into the rectum and so pain is complained of.

II. Bags—

1. Vahalatā: Fleshy.
2. Prastīrṇatā: Large.

} It is difficult to tie the bags over the tubes properly.

3. Sacchidratā: Perforated.
4. Durvviddhatā: Difficult to tie.

} No fluid can be forced into the rectum and so the instrument is useless.

5. Alpatā: Small. Small quantity of fluid passes into the rectum.

गुदे भवेत् चतं रुक् च साधनं पूर्ववत् श्रुतं।
आसन्न कर्णिके नेत्रे भिन्नेऽणौ वाप्यपार्थके॥
अवसीको भवेद्लेसस्मादोषान्विवर्जयेत्।
प्रकृष्ट कर्णिके रक्तं गुदमर्म्म प्रपीड़नात्॥
चरत्यतापि पित्तघ्नी विधिर्वस्तिष पिच्छिलः।
ह्रस्वेत्वसरोतसि च क्षेपो वस्तिष पूर्ववत्॥
प्रत्यागच्छंस्ततः कुर्य्याद्दोषान्वस्ति विघातजान्।
दीर्घे महासोतसि च नेयमत्यवपीड़वत्॥
प्रस्तीर्णे बहले चापि वस्तौ दुर्व्वह दोषवत्।
वस्तावल्पेऽल्पता वापि द्रव्यस्याल्पगुना मताः॥
दुर्व्वहे चाग्र भिन्ने च विज्ञेयः भिन्न नेत्रवत्।

Suśruta Saṁhitā, IV. xxxvi.

16. Uttara-vasti.

Urethral, Vaginal and Uterine Tubes.

Injections into the urethra and vagina are also recommended to be thrown in by similar contrivances: the tubes being adopted in length and circumference to the length and breadth of the passages for which they are intended.

1. Tubular Instruments for the Urethra.

The tubes intended for applying medicines into the male urethra is recommended to be twelve aṅguli long. Suśruta[1] advises us to use tubes fourteen aṅguli long. It is to be made of gold and is called Puṣpanetra. Its circumference is equal to that of a stalk of flower of Jātī (Jasmimum Grandiflorum) or Mālatī (Echites Crayophyllata, Rox.), and the lumen of the tube allows a mustard seed to pass through it. It is provided with an annular projection just at the central part. Caraka[2] says that

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[1] वस्तेरुत्तरसञ्ज्ञस्यविधिं वक्ष्याम्यतःपरं ॥
चतुर्दशाङ्गुलं नेत्रमातुराङ्गुल सम्मितम् ।
मालतीपुष्पवृन्तार्यं छिद्रं सर्षप निर्गमम् ॥
मेढ्रायामसमं केचिदिच्छन्ति खलु तद्विदः ।
स्त्रेह प्रमाणं परमं कुक्षयात प्रकीर्त्तितः ॥
पञ्चविंशादधोमात्रां विदध्याद् वृद्धिकल्पिताम् ।
निविष्टकर्णिकं मध्ये नारीणां चतुरङ्गुलं ॥
मूतस्रोतः परीणाहं सुद्ग वा हि दशाङ्गुलं ।
तासामपत्यमार्गे तु निदध्याच्चतुरङ्गुलम् ॥
द्वाङ्गुलं सूतमार्गेतु कन्यानान्त्वेकमङ्गुलम् ।
विधेयं चाङ्गुलं तासां विधिवद्वचार्ते यथा ॥

Suśruta Saṁhitā, IV. xxxvii.

[2] पुष्पनेत्रञ्च हैमं स्यात् सूक्ष्मौत्तरबस्तिकम् ।

it has two projections while Vāgbhaṭa[1] describes three. The bag is to be made of goat's bladder. A probe is first passed into the urethra to examine its condition and then the tube is introduced up to the length of six aṅguli. The bladder which contains the injection and which is tied tightly round the tube, is then compressed to force the fluid into the urethra. The tube of course, varies in size according to the dimensions of the organs of generation.

For the female, the puṣpanetra is described to have the length of ten aṅguli. The projection is at a distance of four aṅguli from the base. The circumference of the tube varies according to the width of the urethral canal. The calibre of the tube allows a moong to pass through it.[2]

जातीपुष्पस्य वृन्तेन समं गोपुच्छसंस्थितम्।
रौप्यं वा सर्षपच्छिद्रं द्विकर्णं द्वादशाङ्गुलम् ॥ ४८ ॥
Caraka Saṁhitā, VIII. ix.

[1] चातुराङ्गुलमानेन तन्त्रे वं द्वादशाङ्गुलं।
हृतं गोपुच्छवत् मूल मध्ययोः कृत कर्णिकं।
सिद्धार्थक प्रवेशाय त्रयं हेमादि सम्भवं।
कुन्दाग्रमार सुमनः पुष्पवन्नोपमं हृदं।
तस्य वस्तिर्दृलघुर्मावा यन्त्रिर्विकल्प्या वा ॥
* * * *
नेत्रं दशाङ्गुलं मुद्गप्रवेशचतुरङ्गुलं।
अपत्यमार्गे योज्यं स्याद्द्वादशाङ्गुलं मूत्रवर्त्मनि ॥
मूत्रकृच्छ्रविकारेषु बालानां सैकमङ्गुलम्।
Aṣṭāṅga Hṛdaya Saṁhitā, I. xix.

[2] पुष्पनेत्रं प्रमाणन्तु प्रमदानां दशाङ्गुलम्।
मूत्रस्रोतः परीणाहं मूत्रस्रोतोऽनुवाहि च ॥
गर्भमार्गे तु नारीणां विधेयं चतुरङ्गुलम्।
द्वाङ्गुलं मूत्रमार्गे तु बालाया स्त्वेकमङ्गुलम् ॥
Caraka Saṁhitā, VIII, ix

Catheters.

It is curious to find no description of so important an instrument as the catheter. Injections were thrown into the urethra but the tube used was always a straight one, having the length of six aṅguli; so it could not possibly have reached the bladder in the male, and nowhere has the claim been put forward for it to have done so. The tube might have served well for the females. The female catheter of the Greeks, as preserved in the Naples museum, is 0·98 mm. long and is straight throughout (Milne).

In the Atharvaveda Saṁhitā,[1] however, we find a hymn, unmistakably alluding to the use of catheter in ancient times.

Against obstruction of urine with a rod.

"This hymn is intended to be 'used in a rite for regulating the flow of urine'. The reed implies some primitive form of a fistual urinaria, the vastiyantra (one of the nāḍīyantrāni) of the late physicians—who however do not appear to have made frequent uses of it".

* * * * * *

6. What in thine entrails, thy (two) groins, what in thy bladder has flowed together—so be thy urine released, out of thee with a splash! all of it. (In the groin are two vessels located in the two sides affording access to the receptacle of urine).

7. I split up thy urinator, like the weir of a tank—so be thy urine released, out of thee, with a splash! all of it.

8. Unfastened (be) thy bladder orific, like that of a water-

[1] Book 1. 3. Whitney's translations and annotations.

holding sea—so be thy urine released, out of thee, with a splash! all of it.

9. As the arrow flew forth, let loose from the bow,—so be thy urine released, out of thee with a splash! all of it".

2. Tubular Instruments for the Vagina.

Similarly injections were thrown into the vagina. The vaginal tube should be thicker than the urethral tube and in circumference should be equal to that of the little finger. It should be introduced into the vaginal canal up to a distance of four aṅguli, whereas into the urethra, the tube was allowed to enter up to a distance of two aṅguli only in the adults and of one aṅguli only in the girls.[1]

3. The Uterine Tubes.

The uttara-vasti comprises the urethral syringe—male and female—and the vaginal and uterine clysters. No distinct uterine tube is described in the text books. But Suśruta[2] says

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[1] द्वादशाङ्गुलकं नेत्रं मध्ये च कृतकर्णिकम्।
मालतिपुष्पदलाभाग्रं सर्षपनिर्गमम्॥
* * * *
स्त्रीणां कनिष्ठिकास्थूलं नेत्रं कुर्याद्दशाङ्गुलम्।
मुद्गप्रवेश्यं योज्यञ्च योन्यलक्षतरङ्गुलम्॥
द्व्यङ्गुलं मूत्रमार्गे च सूक्ष्मं नेत्रं नियोजयेत्।
मूत्रक्रुच्छविकारेषु बालानामेकमङ्गुलम्॥

Śārṅgadhara Saṁhitā, III. vii.
Bhāva Prakāśa, I. ii.

[2] उष्ट्रजान्वै स्त्रियै दद्यादुत्तानायै विचक्षणः।
कन्यतरस्य कक्ष्यायै दद्यात् सुखदृ पौड़ितं।
विकर्णिकेन नेत्रेण दद्याद्योनिसुखं प्रति।
गर्भाशय विशुद्ध्यर्थं स्नेहेन त्रिगुणेन तु।
अप्रत्यागच्छति भिषक् वस्त्रावृत्तरसंस्थिते।

that to apply uttara-vasti to a female, she is advised to lie supine, keeping her knees flexed and well raised. For a girl the quantity of injection is one prasṛta.

To purify the uterine cavity, apply a clyster of twice the quantity of oleaginous medicines, inside the vagina by means of a tube having three rings. If after the application, the oily medicine does not flow out, then apply a second clyster containing medicines of the group called śodhana or purifiers, into the rectum; or let the clever surgeon introduce a probe into the space of the clyster; or press under her navel deeply by his closed fist. As the object of the injection is to clean the cavity of the uterus, there can be no doubt that a uterine tube is referred to in the passage. Again the precautions recommended if the injections do not come back easily, point to a uterine tube to have been used, for injections into the vagina can not be delayed in coming out. The Hindu writers often confounded the intra-uterine and urethral injections with the vaginal clyster. Caraka[1] says: "The uttra-vasti is to be used for the females during the period of menstruation, for then the uterus, being in a condition fit for impregnation, has its mouth open and so can easily be reached by the injection." This shows that uterine medication to be the object aimed at by the clyster.

भूयो वस्तिं विदध्यात् संयुक्तं शोधनैर्नरः।
गुदे वर्तिं निदध्याद्वा शोधनद्रव्य संयुतां।
प्रवेशाद्वा मतिमान्वस्तिदारमथैषणीम्।
पीड्येदाप्यधोनाभेर्बलिनोत्तरसुष्टिना।

Suśruta Saṁhitā, IV. xxxvii

[1] स्त्रीणाञ्चार्तवकाले तु प्रतिकर्म्म तदाचरेत्।
गर्भासना सुखं खेटं तदादत्ते ऋपाडता॥
गर्भं योनिस्तदा शीघ्रं क्लिन्ने यद्गाति मारुते॥

Caraka Saṁhitā, VIII. ix.

The Greeks were no better, for Milne also complains: "It is dificult to separate ancient descriptions of injections into the vagina from those into the uterus, for the terms for the two parts are frequently interchangeable". Again he says: "It is probable that at other times under the heading of 'injections of the bladder', only irrigation of the urethra is meant".[1]

18. Tubular Instruments for Inhalations and Fumigations.

The tubes for smoking were made, like the vasti tubes, of various metals, or glass or wood. Caraka[2] describes it as a straight tube having three pouches. The end of the tube is equal in diameter to that of a plum seed. Śārṅgadhara[3] adds that a reed or bamboo pipe will also serve the purpose. It is described as a straight tube, the broad base of which admits the patient's thumb while the narrow end, a plum seed. Suśruta[4] describes the base

[1] Graeco-Roman Surgical Instruments, P. 107-8.

[2] चतुर्विंशतिकं नेत्रं स्वङ्गुलीभिर्विरेचने।
द्वात्रिंशदङ्गुलं खेहे प्रयोगे चाष्टमिष्यते॥
ऋजुविकोषफलितं कोलास्थ्यग्रप्रमाणितम्।
वस्तिनेत्र समद्रव्यं धूमनेत्रं प्रशस्यते॥१६

Caraka Saṁhitā, I. v.

[3] धूमनाड़ी भवेत्तत्र तिसस्रश्च तिपर्विका॥१०
कनीष्ठिका परीणाह्या राजमाषागमान्तरा।
धूमनाड़ी भवेद्दीर्घा शमने रोगिणोऽङ्गुलैः॥११
चत्वारिंशन्मितैस्तद्वद्वात्रिंशद्भिस्तु दीप्तये।
तीक्ष्णे चतुर्विंशतिभिः कासघ्ने षोड़शोन्मिते॥१२
दशाङ्गुलिर्वामनीये तथासाद्रव्यनाड़िका।
कलायमध्यलम्बूला कुलत्थागमरन्ध्रका॥१३

Śārṅgadhara Saṁhitā, III. ix.

[4] तत्र वस्तिनेत्रद्रव्यैर्धूमनेत्रद्रव्याणि व्याख्यातानि भवन्ति। धूमनेत्रस्तु कनिष्ठिका परिणाहमयो कलायमात्रं स्रोतोमूलेऽङ्गुष्ठपरिणाहं धूमवर्त्तिं प्रवेश स्रोतोऽङ्गुलान्यष्ट चत्वारिंशत् प्रायोगिके। द्वात्रिंशत् स्नेहने। चतुर्विंशतिर्विरेचने। षोड़शाङ्गुलं कासघ्ने वामनीये च।

and end of the tube to be equal in circumference to that of the thumb and little finger respectively. The orifice should allow a common pea to pass easily through the tube. Vāgbhaṭa[1] says that there are three pouches or dilatations of the tube, shaped like the half-open buds at equal distances from each other. The tube is supposed to consist of four equal parts. The first pouch is located at the end of the first part, the second and third pouches at the ends of the second and third parts respectively. Cakradatta[2] also describes it similarly.

Dṛḍhabala[3] mentions another method of inhalation. He makes a paste of the medicines prescribed and smears it on a piece of silk cloth. This is then to be rolled round like a wick. This wick is to be dipped in ghee before use, and fire lit at one end, while the patient is to smoke it through the other end.

एते अपि कोलास्थिमात्र च्छिद्रे भवतः। ब्रणनेत्रमष्टाङ्गुलं ब्रणधूपनार्थं कलायपरिमण्डलं कुलत्थवाहि स्रोत इति।

Suśruta Saṁhitā, IV. xl.

[1] वस्ति नेत्र समं द्रव्यं त्रिकोशं कारयेद्भृशं।
मूलाग्रयोर्दृष्टं कोलास्थि प्रवेशं धूमनेत्रकं।
तौक्ष्ण्य स्नेहन मध्येषु त्रीणि चत्वारि पञ्च च।
अङ्गुलीनां क्रमात् पातः प्रमाणे नाटकानि तत् ॥६॥

Aṣṭāṅga Hṛdaya Saṁhitā, I. xxi.

[2] ऋजुत्रिकोशफलितं कोलास्थ्यप्रमाणितम्।
वस्तिनेत्रसमद्रव्यं धूमनेत्रं प्रशस्यते।
सार्द्धस्त्र्यंशयुतः पूर्णोच्छ्रय प्रायोगिकादिषु।
नेत्रे कासहरे त्र्यंशहीनः शेषे दशाङ्गुलः॥

Cakradatta, Dhūmapānādhikāra.

[3] प्रपुन्डरीकं मधुकं शार्ङ्गष्टां समनःशिलाम्।
सरिचं पिप्पलीं द्राक्षामेलां सुरसमञ्जरीम्॥
कृत्वा वर्त्तिं पिबेत्तस्मं क्षौमक्षेलानुवर्त्तिताम्।
घृताक्तामनु च क्षीरं गुडोदकमथापिबा॥

Caraka Saṁhitā, VI. xxii,

Both Caraka[1] and Śārṅgadhara[2] advise us to make tubes of medicines, the fumes of which are advised to be smoked in the following manner:—Powder the medicaments and make a paste; measure one karsa; take a smooth reed (Saccharum sara, Rox.) twelve aṅguli long. Apply the paste round the reed, for a length of eight aṅguli. Dry it in shade. Remove the reed, leaving a dried tube of the paste. When required for smoking, light one end of the tube with a burning wick and smoke through the other end.

Caraka[3] describes another inhaler, which consists of two earthen basins (soraba) placed upon each other, their edges being pasted with flour. The upper one is perforated at the centre for the reception of one end of the tube, the patient puts the other

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[1] पिष्ट्वा लिप्येच्छरेर्यीकां तां वर्त्तिं यवसन्निभां।
अङ्गुलमात्रितां कुर्य्यादष्टाङ्गुलसमां भिषक्॥
शुष्कां निर्गर्भां तां वर्त्तिं धूमनेत्रार्पितां नरः।
सेहाक्तमग्निसंदृष्टां पिबेत् प्रायोगिकीं सुखाम्॥ ६॥

Caraka Saṁhitā, I. v.

[2] वर्त्तिकां प्रक्षिपेच्च सूक्ष्मां द्वादशाङ्गुलाम्।
धूमदत्तस्य कल्केन लेपयेद्बाह्यतः क्षमः॥
कल्कं कर्षमितं लिप्त्वा छायायां शुष्कमाचरेत्।
इयत्तामपनीयाथ सेहाक्तां वर्त्तिमादरात्॥
अङ्गारैर्दीपितां कृत्वा धृत्वा नेत्रस्य रन्ध्रके।
वदनेन पिबेद्धूमं वदनेनैव संत्यजेत्॥
नासिकाभ्यां ततः पीत्वा मुखेनैव वमेत् सुधीः।

Śārṅgadhara Saṅgraha, III. ix.

[3] मधूच्छिष्टं सर्ज्जरसं घृतं सप्तकसंपुटे।
कृत्वा धूमं पिबेच्छुष्कं वाम्लं वा स्नायु वा गवाम्॥
श्वेताकवर्द्धमानानां नाडीं शुष्कां कृशस्य वा।

Caraka Saṁhitā, VI. xxi.

end into his mouth for inhalation. The lower pot contains glowing charcoal of catechu (Accacia catechu. Linn.) wood, over which are put pills of necessary medicines. The tube is from eight to ten aṅguli long.[1] This inhaler is intended for phthisical subjects. It is useful for allaying cough and exciting emesis. This instrument is called *mallaka saṃpuṭa* or *sorāba saṃpuṭa* or a pair of earthen basins. In such an apparatus Caraka recommends us to put powders of cow's horn, hairs, nerves and ligaments, besides other medicines. Susruta[2], Vāgbhaṭa[3] and Cakradatta[4] also describe it. Śārṅgadhara[5] however reserves this instrument for fumigating wounds only.

The length of the pipe will vary according to the different kinds of smoking prescribed by the physician. There are five kinds of smoking narrated :—

1. Śamana, madhya, proyogika — medium.
2. Briṁhana, snehana, mṛdu — mild.

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[1] दशाङ्गुलोन्मितां नाड़ीं अथवाष्टाङ्गुलोन्मिताम् ।
शरावसंपुटच्छिद्रे कृत्वा जिह्वां विचक्षणः ॥
वैरेचनं सुखैर्नैव कासवान् धूममापिबेत् ।

Caraka Saṁhitā, VI. xxii.

[2] इतरयोर्न्यपेत धूमोद्वार स्थिरे समाहिते शरावे प्रक्षिप्य वर्त्तिं मूलच्छिद्रेणान्येन शरावेण पिधाय तस्मिन्छिद्रे नेत्रमूलं संयोज्य धूमसासेवेत ।

Suśruta Saṁhitā, IV. xl.

[3] शराव सम्पुटच्छिद्रे नाड़ी न्यस्य दशाङ्गुलां ।
अष्टाङ्गुलां वा वक्त्रेण कासवान् धूममापिबेत् ॥

Astāṅga Hṛdaya Saṁhitā I. xxi.

[4] अथवा सघृतान् शक्तून् कृत्वा मल्लिकासम्पुटे ।
नवप्रतिश्यायवतां धूमं वैद्यः प्रयोजयेत् ॥

Cakradatta, Nāsāroga Cikitsā.

[5] See foot-note 2. P. 145.

3. Recana, śodhana, tīkṣṇa — strong.
4. Kāsaghna — anti-cough.
5. Vāmana — emetic.

So the length of the tube would vary thus—

1. Caraka[1]

	Aṅguli.
In strong smoking	24
„ medium „	32
„ mild „	96

2. Suśruta.[2]

In medium smoking	48
„ oleaginous „	32
„ brain-sedative „	24
„ anti-cough or emetic „	16

3. Vāgbhaṭa.[3]

In strong smoking	24
„ medium „	32
„ mild „	40

4. Śārṅgadhara.[4]

In medium smoking	40
„ mild „	32
„ strong „	24
„ anti-cough „	16
„ emetic or wound-fumigation	10

FUMIGATION.

Similarly wounds are said to be purified by suitable medicinal fumigation. In the purification of wounds by fumigation, we get a glimpse of the antiseptic method of treatment in its

[1] See foot-note 2. P. 140.
[2] See foot-note 4. P. 140.
[3] See foot-note 1. P. 141.
[4] See foot-note 3. P. 140

embroyonic form. Suśruta[1] recommeds the tube to be eight aṅguli long and to have the circumference of a common pea; and its orifie should be of the size of a kulattha (Dolichos biflorus, Linn.). The fumes of medicated substances from the inside of any closed pot containing fire, pass out through the tube and are allowed to play on any sore to purify it. For this purpose two earthen pots—sorāba samputa—may conveniently be used as before. Śārṅgadhara[2] uses a tube ten anguli long and recommends us to use Nimba leaves (Azadirachta Indica) for wound-fumigation. As another instance of the application of the principles of antiseptic methods to practical therapeutics, we may mention the use of medicinal injections into the cavity of the uterus to rectify its morbid conditions.[3]

A similar instrument was used to fumigate the uterus and vagina in various diseases of these parts. "Fumigation", says Suśruta,[4] "is to be applied to the vagina by burning the

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[1] व्रणनेतमष्टाङ्गुलं व्रणधूपनार्थमकलायपरिमण्डलं कुलत्थवाह्निस्रोतश्चेति।

Suśruta Saṁhitā, IV. xl.

स चौषधवसर्पिर्भिर्धूपनाङ्गैश्च धूपयेत्।

Ibid. IV. i.

[2] दशाङ्गुलिर्वानलीयै तथासाद्य व्रणनाडिका।
कलाय मण्डलस्थूला कुलत्थागसरन्ध्रका ॥१२

* * *

शरावसम्पुटे छिद्रा कल्कमङ्गारदीपितम् ॥१७
छिद्रे नेत्रं निवेश्याथ व्रणस्तेनैव धूपयेत्।

* * *

व्रणे निम्बवचाद्यैश्च धूपनं सं प्रशस्यते।

Śārṅgadhara Saṅgraha, III. ix.

[3] See foot note 2, P. 1318.

[4] सर्वसङ्गे तु योनिं धूपयेत् व्रणसर्पनिर्मोकेण पिष्टीतकेनवा।

Suśruta Saṁhitā, III. x.

slough of a snake (Bungarus) or pinditaka (?) wood, in cases of obstructed delivery of the fætus. Caraka[1] mentions fumigation of the vagina by burning Bhurjapatra (Betula Bhojpatra), glass, precious stones and the slough of a snake as one of the means for removing the placenta. To remove the after pains and difficulty in micturition and defæcation, Suśruta[2] advises us to fumigate the vagina. He recommends fumigation of the uterus with purifying medicines. In fumigating these parts, the Hindu surgeons desired a local action, and did not share in the belief, held by some of the Greek gynæcologists[3] that "the uterus was an animal within the body which could wander about, being attracted by pleasant smells and repelled by disagreeable smells".[4] The Arabs also did not believe uterus to be an animal.[5] This method of treatment was well known to the Greeks; for Hippocrates[5] writes that "fumigation with aromatics promotes menstruation and would be useful in many other cases, if it did not occasion heaviness of the head". He "directs us to take a vessel which holds about four gallons and fit a lid to it so that no vapour can escape from it. Pierce a hole in the lid, and into this aperture force a reed about a cubit in length so that the vapour connot escape along the outside of

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[1] मूर्ज्जपत्रकाचमणि सर्पनिर्म्मोकैर्योन्या योनिं धूपयेत्।

Caraka Saṁhitā, IV. viii.

[2] कटुकालाबुकृतवेधन सर्षप सर्पनिर्म्मोकैर्व्वा कटुतैलविमिश्रैर्योनिमुखं धूपयेत्।

Suśruta Saṁhitā, III. x.

[3] Aretæus. Morb. Acut. ii. 11.
Plato's Timæus.

[4] Græco-Roman Surgical Instruments. P. 158.
Adan's Commentary on Paulus Ægineta, Vol. I. Bk. iii. P. 636-37.

[5] See also in the Hippocratic treatises, as Nat. Mul. vii, 9; I Morb. Mul. xvii. 1; II Morb. Mul. xl. 20, 21; Steril. vi. 3; Superfœt. ix. 3, x. 9, 11.

the reed. The cover is then fixed on the vessel with clay."[1] Oribasius[2] and Soranus[3] used similar instruments for the purpose.

Disinfection of Rooms, Clothes, etc.

Caraka[4] says that if peacock's feather, bones of vaka bird, white mustard and red sandal wood, well powdered and mixed with ghee, be used in fumigation, the poison of a room, beddings, seats and clothes, is got rid of. Śārṅgadhara[5] advises us to disinfect a sick room by the fumes caused by burning the following substances with ghee : peacock's feather, Nim leaves (Melia Azadirachta), Vrihati, pepper, asafœtida, Jotāmāṁsī (Nardostachys jotamansi), seeds of Sālmalī (Bombax malabaricum), goat's hair, slough of a serpent, cat's fæces and ivory. Suśruta[6] advises fumigation of a sick room for a surgical patient for

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[1] Græco-Roman Surgical Instruments P. 159.

[2] Coll. x.xix.

[3] Soranus. xxiii.

[4] मिखिवर्हबलाकास्थीनि सर्षपाश्चन्दने च घृतयुक्तः।
धूमो गृहशयनासनवस्त्रादिषु शस्यते विषनुत् ॥५८॥

Caraka Saṁhitā, VI. xxv.

[5] मयूरपिच्छं निम्बस्य पत्राणि उहतीफलम्।
मरिचं हिङ्गु मांसी च बीजं कार्पाससम्भवम् ॥
छागरोमाहिनिर्म्मोकं विष्ठा वैडालिकी तथा।
गजदन्तस्य तद्भूर्णं किञ्चिद् घृत विमिश्रितम्।
गेहेषु धूपनं दत्तं सर्व्वन्वालग्रहान्नयेत्।
पिशाचान् राक्षासञ्चित्वा सर्व्वज्वरहरो भवेत् ॥

Śārṅgadhara Saṁgraha, III. ix.

[6] सर्षपारिष्टपत्राभ्यां सर्पिषा लवणेन च।
विरम्य कारयेद्धूपं दशरात्रमतन्द्रितः ॥

Suśruta Saṁhitā, I. xix.

ten days, morning and evening, after the operation has been performed.

15. Tubular Instrument for Cupping.

Generally cow's horn is recommended for the purpose. It is eighteen aṅguli long, its base, forming the mouth of the instrument, is three aṅguli wide (Vāgbhaṭa).[1] It is conical in shape and the cone is said to be either curved or straight. The other end is pointed and perforated to the extent of allowing a mustard seed to pass through it. The narrow end, however, is made to assume the shape of a woman's nipple by winding thread round it. This facilitates the operation of suction by the mouth of a surgeon when the broad end is placed against any diseased area of the patient's body. Suśruta[2] mentions its use in blood-extraction. For extracting bood, the part must be scarified before its application; and to facilitate the operation, the part should be fomented (Yogaratnākara).[3] After suction, the horn is to be covered by a piece of cloth or a small bladder of animals. Vāllūki[4] describes the śṛṅga thus:—"It is the horn of a white cow, half-moon shaped and seven aṅguli broad. The orifice

[1] वाङ्गुलमं भवेच्छृङ्गं चूषणेऽष्टादशाङ्गुलं।
अग्रेसिद्धार्थकच्छिद्रं मुनस्त्वपुटकाकृति॥

Aṣṭāṅga Hṛdaya Saṁhita, I. xxv.

[2] तत्रप्रच्छिते तनुवस्त्रपटलावनद्धेन शृङ्गेण शोणितमवसेचयेदास्यपवणात्।

Suśruta Saṁhitā, I. xiii.

[3] स्त्रेदं विदध्यात्कुशलस्य नाड्या शृङ्गेण रक्तं बहुशः हरेच्च।

Yogaratnākara Arbuda cikitsā.

[4] विषाणः श्वेतगोरिन्दूचक्रं सप्ताङ्गुलायतम्।
चिप्तान्तः पिप्पलेशिकं योज्य वातयुतेऽजि।
अङ्गुष्टे मूलवन्मूले छिद्रमस्येऽस्य सुद्भवत्।

Vāllūki quoted in Nibandha Saṁgraha, I. xiii.

at the base is equal in circumference to that of the base of the thumb, while the end which is perforated admits a moong. This orifice at the end is closed by a wick of cotton". Cakrapāṇidatta says that the horn should be three aṅguli long, and its orifice should be of the size of the stalk of an oleander flower.

Suśruta mentions a peculiar use of the horn[1]: the extraction of an insect, cerumen, etc. from the middle ear by means of a horn or a probe. The horn was evidently used as an apparatus for suction, and Suśruta describes suction as one of the methods of extracting śalya from the body[2]. Caraka[3] uses horns and leeches to extract venom from a snake-bite; and Suśruta also refers to it. Besides the horns and cupping glasses, suction used to be accomplished by the surgeon's mouth.

Similarly Paul[4] says that foreign bodies may be sucked out from the ears with a reed.

On the method of suction as a mode of treatment, Erichsen[5] says:— "In former days, when duels with the small swords were of frequent occurrence, persons called "suckers" who were often the drummers of a regiment, were employed to attend the wounded combatants. This treatment which was conducted with a certain degree of mystery, consisted in sucking the wound till all blood ceased be flow, and then applying a pellet of chewed

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[1] कर्णच्छिद्रे वर्त्तमानं कीटं छेदनलादि वा।
ग्रहेणापहरेद्वौनाग्रथवापि शलाकया।
Suśruta Saṁhitā, VI. xxi.

[2] See foot-note 3. P. 108.

[3] दंशं वा चुषेन्मुखेन यवचूर्णं पांशुपूर्णेन।
प्रच्छन् वेधजलौकः ग्रहैः स्राव्यं ततो रक्तम्॥
Caraka Saṁhitā, VI. xxv.

[4] Paul. VI. xxiv. and III. xxiii.

[5] Erichsen's Surgery, Vol. I. p. 341.

paper or a piece of wet linen to the orifice; in this way it would appear that many sword thursts traversing the limbs were healed in a few days. The process of suction cleared the wound thoroughly of all blood, and drawing the sides into close apposition, placed the parts in the most favourable condition possible for union by primary adhesion. This practice might, perhaps, in many cases advantageously imitated in the present day by means of a cupping glass and syringe".

We also find Suśruta[1] describing a vasti yantra in the treatment of snake-bite. The tube is open at both ends, one end is applied to the part bitten by the snake, while to the other end the surgeon puts his mouth to suck out the poison. So this vasti yantra may be compared to the modern aspiration syringe.

Cupping instrumunts of metal or horn are still used by the Arabs in Kordofan and Sir R. Pasha[2] suggests that cupping is possibly borrowed by the west from the "most perfect physicians" the Arab. But now we are confident that the credit is due to the Hindus.

ALĀBU YANTRA.

Alābu or gourd is described to be made of the bark of the succulent fruit called alābu (Lagenarea Vulgaris). The pulp is scraped away and the bark is allowed to dry. Such a bark should be selected which is twelve and eighteen aṅguli in length and circumference respectively. Its mouth should be circular and should have a diameter of three or four aṅguli. A fire is to be lit inside it by burning a strip of dry cloth to produce a vacuum, and the

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[1] प्रतिपूर्यं मुखं वस्तेर्हितमाचूषणं भवेत्।

Suśruta Saṁhitā, V. v.

[2] *Vide* Third Report, Wellcome research laboratory at Gordon. P. 316.

instrument to be applied instantly to the intended part of the patient's body. It should be thus used to drain blood and phlegm from the body (Vāgbhaṭa[1]). In modern times cupping glasses are used for like purposes in a similar manner.

Vāllūki[2] describes the alābu yantra thus:—"The mouth of the instrument is well formed and has the diameter of four aṅguli. The body has the circumference of eight aṅguli and is well smeared with a paste of black mud. It is used for drawing out blood". In yogaratnākara[3], śṛṅga and alābu are directed to be used for extraction of blood from accidental wounds. Caraka mentions the use of alābu for blood-extraction[4].

Another instrument known as the ghaṭī yantra was used exactly in the same way[5]. It is said to consist of a brass pot

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[1] साङ्गादशाङ्गुलोऽलाबुर्नाड्या त्वष्टा दशाङ्गुलः।
चतुर्व्याङ्गुल उत्सेधो दीर्घोऽन्तः श्रेष्ठरक्तहृत्॥

Aṣṭāṅga Hṛdaya Saṁhitā, I. xxv.

[2] चटाङ्गुलपरीणाहा चतुरङ्गुलनालसम्मिता सुमुखी कृष्णमृदालिप्ता तनुः श्रेष्ठा रक्तावसेचनेऽलाबुरिति।

Vāllūki quoted in Nibandha Saṁgraha I. xiii.

सान्तर्दीपयाऽलाब्वा।

Suśruta Saṁhitā, I. xiii.

[3] छिन्ने भिन्ने तथा विद्धे क्षते सद्यो भिषग्वरः।
पटमुत्क्षेप संस्वेदं व्रणं व्रणविशारदः॥
सुदुर्मुहूर्यथा दुःखं ना प्राप्नोति व्रणी नरः।
अथवा दीप्यलवणपोटल्या स्वेदयेत्मुहुः॥
सन्ततया तप्तलोहपात्रसंयोगतः क्रमात्।
दुष्टं रक्तं स्रितं चापि शृङ्गालाब्वादिभिर्हरेत्॥

Quoted in Yogaratnākara.

[4] रुधिरागमार्थमथवा शृङ्गालाबुभिराहरेत् रक्तम्—

Caraka Saṁhitā, VI. vii.

[5] तद्वदघटीछिद्रा गुडबिलयोन्नमने च सा।

Aṣṭāṅga Hṛdaya Saṁhitā, I. xxv.

which is still used commonly in India by all classes of people for drinking purposes. A fire should be lit inside as before and the ghaṭī applied to the surface of the body covered by a piece of cloth. It soon becomes firmly fixed and is thus used to raise abdominal tumours by means of it for purposes of correct diagonosis and also to effect its cure by subsidence. It is still used by the common people for the same ends.

Caraka[1] says:—"After the abdominal tumour has been relaxed or softened a little by fomentation and oleaginous application, it is to be covered by a piece of cloth. Then inside a small ghaṭī, a fire is to be lit by burning kuśa and other forms of grasses; the pot is then to be inverted and pressed over the part covered by the cloth. By this way, the tumour would be drawn upwards *i,e.* be made prominent. The ghaṭī is then to be taken away and after removing the cloth, and examining the extent of the tumour, it is to be incised. The different shapes of the incisions are called vimārga, ajapada and ādarśa. After incision, the tumour is to be pressed and rubbed with fingers. But the intestines and the heart must not be touched."

The extraction of blood by means of cups, has been practised from remote antiquity. It is interesting to note that both the Latin and Greek terms—*cucurbitula* and σικυα signify a gourd;

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[1] स्निग्धस्विन्नशरीराय गुल्मं शैथिल्यमागतं ॥
परिवेष्य प्रदीप्तांस्तु वल्वजानथवा कुशान्।
भिषक् कुम्भे समावाप्य गुल्मं घटमुखं क्षिपेत् ॥
स गृहीतो यदा गुल्मस्तदा घटमधोहरेत्।
वस्त्रान्तरं ततः कृत्वा भिन्यादगुल्मप्रमाणवित् ॥

Caraka Saṁhitā, VI, v.

and we know that Alābu also means a gourd. It is curious that the instrument should have been known to the ancient Hindus and Greeks by the same name.

Prosper Alpinus[1] (16th century) who wrote a book on the state of medicine in Egypt in his time, gives drawings of cupping horns he saw there. The horns were those of young bulls, highly polished, with a small hole at the top, by which the air was extracted by suction. To close the orifice a small tab of parchment was taken into the mouth and affixed by the tongue. The Egyptians also used cupping glasses, by suction and not by fire, a method evidently unknown to them.

Hero of Alexandria (B. C. 285—222) describes an interesting form of cup. Milne summarises his account thus:[2]—"The figure shows a cup of ordinary flattened form, divided into two by a diaphragm. Two tubes pass through the fundus, one passing through the diaphragm, the other not. Each of the tube is fitted with another which is open at its inner end but closed at its outer end and provided with a small cross bar to rotate it. Each of these sets of tubes is perforated by small openings. In the case of the short tubes, these are outside the cup, in the case of the long tube they are inside the cup, in the chamber shut off by the diaphragm. By rotating the piston these openings can be placed in apposition or not at will, thus forming valves. Open valve A by placing the hole in apposition. Close valve B by turning the holes away from each other. The inner chamber of the cup is now shut off except for the small hole A. Apply the mouth to the valve A, and suck the air out of the chamber. Close valve A. Apply the cup to the affected part. The advantage

[1] De Med. Aegyptiorum. Ed. 1541 lib. ii. ch. xii. p. 139.

[2] Greco-Roman Surgical Instruments. P. 104.

of this arrangement is that the affected part is not directly sucked upon by the mouth; and the instrument is therefore more pleasant for the operator to use".

Celsus[1] thus describes the different kinds of cups:—"There are two kinds of cups, bronze and horn. The bronze is open at one end and closed at the other; the horn, open at one end, as in the previous case, has at the other end, a small foramen. Into the bronze kind, burning lint is placed, and then the mouth is fitted on and pressed until it sticks. The horn is placed empty on the body, and then by that part where the small foramen is, the air is exhausted by the mouth, and the cavity is closed off above with wax and it adheres in the same way as before. Either may advantageously be constructed, not only of these varieties of materials but of another substance. If other things are not to be had, a small cup or a narrow mouthed jar will answer the purpose. When it has fastened on, if the skin has previously been cut with a scalpel, it extracts blood; but if it be entire, air".

Paul[2] remarks that "those which are made with longer necks and broader bellies are possessed of a strong power of attraction." Both Oribasius[3] and Aretaeus[4] allude to them. Antyllus says that there are three materials of which cups are made—glass, horns, and bronze. A good number of such cups occur in the Naples, British and Scottish National Museums.

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[1] Celsus. II. xi.
[2] Paulus Ægineta. VI. xii.
[3] Med. Coll. VII. xvi.
[4] De Morb. Acut. I. 10.

Albucasis[1] gives a full account of dry cupping. In applying the instrument he advises us either to create a flame in it, or to fill it with hot water. He gives drawings of various instruments of cupping. Rhases speaks of applying a glass or a cupping instrument to draw off blood after leeching. The other Arabians give little additional information.

In modern times, cupping glasses are used in the same way as before.

V. Śalākā or Rods.

The rods, or pricker-like instruments, or probes are described to be of various kinds and are recommended to be used for various purposes[2]; so their length and circumference would vary according to some special uses required of them. Suśruta[3] says: "There are two kinds of śalākā with their ends shaped like the head of the earthworm. They are used for probing abscesses and sinuses.

Two śalākā have their ends shaped like the wing of an arrow. These are to be used for raising any part for the purpose,

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[1] Albucasis, Chirrug. ii. 98.

[2] नाड़ीव्रणान् शल्यगर्भानुष्माणं तत्सङ्गिनः शनैः।
करीरवालाङ्गुलिभिरेषणा वैषयेद्भिषक्।

Suśruta Saṁhitā, IV. i.

[3] शलाकाश्चनाश्चापि नाना प्रकाराणि नाना प्रयोजनानि यथायोगपरिणाहदीर्घाणि च तेषां शस्त्रपदशरपुङ्खसर्पफण वड़ीशमुखे द्वे द्वे एषण व्यूहनचालनाहरणार्थमुपदिश्येते। मसूरदल-मात्रमुखे द्वे किञ्चिदानताग्रे स्रोतोगतशल्योद्धरणार्थे। षट्कार्पासकृतौषधानि प्रमार्जने क्रियासु। चीणि दर्व्याकृतीनि स्नेहमुखानि भारौषधप्रणिधानार्थं। वीह्यास्यानि आस्यवदनानि वीह्यङ्गुलवदनानि षड़ङ्गुलाग्रिकर्णास्त्रभिन्नेतानि। नासार्बुदहरणार्थमेकं कोलास्थिदलसाचमुखं स्नेहतीक्ष्णाग्रं। अन्त्रनार्थमेकं कलायपरिमण्डलमुभयतो मुकुलाग्रं। मूत्रमार्गविशोधनार्थ-मेकं मालतीपुष्पकलायप्रमाणपरिमण्डलनिभं।

Suśruta Saṁhitā, I. vii.

after incision, of extracting any foreign body from it. Others assign to them the function of bringing together the lips of the wound caused by an abscess being opened and emptied.

Two śalākā have their ends shaped like the hood of a snake. They are useful for transferring any material from one part to another. Some of the simple probes used by the ancient Greek and Roman surgeons carried a single or double snake of Æsculapius at one end. But evidently it was meant as an ornamentation and served no useful purpose.

Two śalākā have their ends shaped like a fish-hook but are blunt. They are used for extracting any extraneous material from the muscles or bones".

The last six kinds of Suśruta are practically the same as the six śaṅku of Vāgbhaṭa,[1] which are the following :—

The śaṅku are six in number. Amongst these, two are twelve and sixteen aṅguli long respectively. They are used for the purpose of raising a foreign body upwards from the wound.

Two varieties have their ends shaped like the hood of a snake. They are ten and twelve aṅguli long ; and they are used for the purpose of moving a foreign body in the wound in all directions.

Two varieties have the shape of a fish-hook—the ends resembling the stem of an arrow. These are used for the extraction of foreign bodies from the wound.

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[1] शङ्कवः षड्भी तेषां षोड़शद्वादशाङ्गुली ।
व्यूहने।ऽपि फणावक्त्रौ दौ द्वादश दशाङ्गुली ॥
चालने शरपुङ्खा सा वाहार्थे वड़िशाकृतिः ॥२५

Aṣṭāṅga Hṛdaya Saṁhitā. I. xxv.

Suśruta[1] mentions another pair of śalākā which have their ends shaped like a masūra pulse, and slightly curved; these are used for the purpose of extracting a foreign body from the external outlets of the body such as mouth, nose, etc. They are eight and nine aṅguli long respectively.

Swab Probes.

Six śalākā are used for the purpose of wiping out the principal excretory canals of the body *viz.*, rectum, nose and ears.[2] Their ends are covered with cotton like a head-dress (pāgḍī). The two śalākā intended for the rectum, have the lengths of ten and twelve aṅguli respectively for short and long distances. So the two varieties of probes for the ears are eight and nine aṅguli long, while the other two kinds of probes for the nose are six and seven aṅguli long respectively. Some commentators are of opinion that these six śalākā are meant for clearing abscesses.

For similar purposes the Greek and Roman surgeons used the spathomele or spatula probe. Priscianus[3] writes: "First of all we must frequently wipe away the clots of blood from the nose

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[1] See foot note 2, P. 155.

उभेनखपदमुखे स्रोतश्च: शल्यहारिणी।
मसूरदलवक्त्रे दे सृजाता सप्तनवाङ्गुले ॥२४

Aṣṭāṅga Hṛdaya Saṁhitā, I. xxv.

[2] कार्पास विहितोषीषा: शलाका: षट्प्रमार्जने।
पायावासन्न दूरार्थे दे दश द्वादशाङ्गुले।
दे षट् सप्ताङ्गुले घ्राणे दे कर्णेऽष्टनवाङ्गुले ॥२८॥

Ibid.

[3] Priscianus, xiv.

with the end of a spathomele wrapped on the 'berry' with soft wool, and then occlude it by plugging with wool in the same way."

The use of probes, having the ends wrapped with wool, for wiping out discharge of pus from the ears of horse, is mentioned by Jayadatta Suri[1] in his Treatment of Horses.

Spoon-shaped Probes.

Three probes are described to have their ends shaped like a khala or mortar with a conical cavity, and so they resemble a spoon. They are to be used for the purpose of applying caustic solutions, etc.[2]

Similarly cyathiscomele, which is a variety of spathomele in which the spatula is replaced by a spoon, is said to have been used by the Greek surgeons to mix, measure and apply medicaments. The specimens of these instruments occur in the Naples Museum. Sometimes the edge of the spoon is sharp and is recommended to be used as a curette. Scrivonius Largus directs us to use the spoon of an ear specillum for the application of caustics to hæmorrhoids.

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[1] पूयस्रावेण जानीयात् शोधमभ्यन्तरोद्भवम् ।
पिचुना वेष्टयित्वा तु शलाकाग्रं समाहितः ॥
तेन कर्णान्तरे पूयं कर्षयित्वा विचक्षणः ।
पातितस्य सुबद्धस्य पूरयेन्मधुसर्पिषा ॥

Aśvavaidyaka, Ch. 34, v. 2. and 3.

[2] See foot-note 2, P. 155.

Nail-shaped Probes.

Vāgbhaṭa[1] describes three other probes for the same purpose. They are eight aṅguli long; their ends are bent and resemble in size and shape the nails of the third, fourth, and fifth fingers respectively.

Paul[2] mentions a nail-shaped probe in the treatment of bubonocele. But this was applied as a cautery and not for the application of medicaments. Nail-shaped cauteries are also referred to by Hippocrates[3] in the treatment of recurrent dislocation of the shoulder-joint.

Jāmvovauṣṭha Probes.

Three probes are called Jāmvovouṣṭha for their ends are shaped like the fruit of Jambul tree (Eugenia jambolanum).[4] Three other śalākā have their ends shaped like aṅkuśa or elephant driver's goad.[5] They may be made of any length required

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[1] चतुरङ्गुला निम्नमुखा स्निग्धाः चारीषच्च क्रमे।
कनीनी-मध्यमा-नामी-नखमान-समैर्मुखैः॥

Aṣṭāṅga Hṛdaya Saṁhitā, I. xxv.

[2] Paulus Ægineta, VI. lxv.

[3] Hippocrates iii. 15.

[4] See foot-note 2, P. 155.

शलाका जाम्बवौष्ठानां चारिःग्री च पृथक् त्रयं।
युञ्जात् स्थूलानु द्रीर्घांनां,

[Aṣṭāṅga Hṛdaya Saṁhitā, I. xxv.

[5] See foot-note 2, P. 155.

For the diagram of the aṅkuśa see Fergusson's Tree and Serpent Worship; Plate xxxiii. Sanchi. xxxvii. fig. I. and xxxviii. fig. 1 & 2.

by the surgeon. These six varieties are recommended for the purpose of applying caustic medicaments and the actual cautery.

Paul[1] mentions a gamma-shaped cautery in the radical cure of hernia. This cautery is shaped like the Greek letter Γ; so it resembles the aṅkuśa cautery of the Hindus. The aṅkuśa is similar in appearance to the Greek letter.

One variety, which is used for the purpose of removing a tumour from the interior of the nasal cavity, has its end shaped like a khala or mortar, with sharp edges, and of the size of half the stone of the fruit of the jujube tree (Ziziphus jujuba)[2]. Vāgbhaṭa[3] mentions a similar probe for the purpose of applying actual cautery to a nasal tumour. Its end resembles in shape and size, a half of the stone of the fruit of the jujube tree.

This spoon-shaped probe of the Hindus is comparable to the curette like sharp cyathiscomele of the Greeks, noted before.

Collyrium Probes.

For the purpose of applying collyria to the eyes, a rod is mentioned having the length of eight aṅguli and the thickness of a pea. Its both ends are shaped like buds[4].

The probes for applying collyria to the eyelids, should be six aṅguli long, with a rounded bulbous end. They may be made of gold, or silver, or copper, or iron, or stone. For the habitual use of collyria, a lead probe is prescribed. When medicines are directed

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[1] Paul, VI. lxii.

[2] See foot-note 2, P. 155.

[3] कोलास्थि दल तुल्या स्था नासार्शोऽर्बुद दाहकृत् ॥

Aṣṭāṅga Hṛdaya Saṁhitā, I. xxv.

[4] See foot-note 2, P. 155.

to be applied not only to the lids but also to the conjunctiva, the finger is recommended as it is a softer and safer instrument. Again the probes would vary according to the nature of the collyria to be used. As for the application of lekhana collyrium, the probe should be made of copper and should be ten aṅguli long. The probe is advised to be made thinner at its middle to afford a firm grasp by the surgeon. The ends are shaped like buds. For applying ropaṇa collyrium, a similar probe is to be used, but it should be made of steel; while for the application of a collyrium for the improvement of the visual strength, a probe made of gold or silver, and having the size and shape of a finger is recommended by Cakradatta.[1]

Suśruta[2] likes a probe of steel, or bell-metal, or copper for lekhana collyrium; and of gold, or silver, or horn, for ropaṇa and snehana collyria. The probe should be eight aṅguli long, and the eye is to be kept open and fixed by the left hand, while the right hand is to hold the probe, and so the collyrium is to be applied to the eye.

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[1] दशाङ्गुला तनुर्मध्ये शलाका सुकुलानना ॥
प्रशस्ता लेखने तासौ रोपणे काललोहजा।
षडङ्गुलीव सुवर्णौत्था रूप्यजा च प्रसादने ॥

Cakradatta. Āschyotana Cikitsā.

[2] तेषां तुल्यगुणानेव विदध्याद् भाजनान्यपि।
सौवर्णं राजतं शाङ्खं नाभं वैदूर्यकांस्यजं ॥
आयसानि च योज्यानि शलाकाश्च यथाक्रमं।
वङ्गयोर्मुकुलाकारा कलाय परिमण्डला ॥
षडङ्गुला तनुर्मध्ये सुकृता साधुनिग्रहा।
द्वौ चास्यौ यत्नजातानि शारीरी वा हिता भवेत् ॥

Suśruta Saṁhitā. VI. xviii.

Śārṅgadhara[1] says: "The collyrium probe should be made of stone or metal. It should be eight aṅguli long and its ends must be made smooth and rounded like a common pea. For lekhana collyrium, a copper, or iron, or stone probe is to be used, while for ropaṇa collyrium the tip of the finger is recommended for its softness."

Of the probes used by the Hindus for applying collyrium to the eyes, fortunately we possess a few specimens. Among the objects of interest found in the excavations at Bijnor, we find, "fourthly, one copper salai or instrument for applying antimony to the eye, similar to those found in the Bihat excavations."[2]

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[1] मुखयोः कुण्ठिता ग्रन्था शलाकाप्राङ्गुलोन्मिता।
अश्मजा धातुजा वा स्यात् कलायपरिमण्डला॥
ताम्रलोहाश्मसंजाता शलाका लेखने मता।
सुवर्णरजतोद्भूता शलाका रोहणे मता।
अङ्गुलीच सदृक्षेन कथिता रोपणे बुधैः॥

Śārṅgadhara Saṅgraha. III. xiii.
Yogaratnākara. Eye Diseases. P. 823.

चिक्कण सलिलयोनि सङ्गराजद्रवं च
ह्रविधि च विषकल्के चीर चाज्ञे मधूच्छि।
प्रतिदिनमथ तत्र सप्तधा सोगमेकं
प्रविहितमथ पश्चात् कारयेत् तच्छलाकाम्॥
सवितुरुदयकाले साञ्जना व्यञ्जना वा
करकरिकसमेतानभ्रपैत्तिक्यरोगान्।
असितसित समुत्थान सन्धिवर्त्मोभिजातान्
हरति नयनरोगान् सेव्यमाना शलाका।

Cakradatta, Netraroga Cikitsā.

[2] "Vide Princep's (Thomas') Indian Antiquities, fig. 18. pl. iv" J.A.S.B. IX. 1. 7.

Specillum with two olivary ends formed a variety of probe of the Greek and Roman surgeons. It was used as an ordinary probe in dealing with crooked fistulæ, and as a cautery to destroy the roots of hairs after epilation. Sometimes it carried an eye in one of its olives and was used in the treatment of nasal polypus. The eye was threaded with a cord having many knots along it. The other end of the probe was pushed through the nose and withdrawn by the mouth, and then by a sawing movement of the cord with both hands of the surgeon, the polypus was removed.[1] A single probe for the application of semi-solid medicaments, occurs in the outfit of the oculist of Rheims, in the museum at St. Germain-en-Laye and is figured by Milne.[2]

Karṇa-śodhana or Ear-cleaner.

This śalākā is said to have its end shaped like the end of a leaf of Aśvattha (Ficus religiosa). The instrument looked like a sruva—one of the famous spoons used in sacrificial ceremony.[3] It was used for the purpose of extracting wax from the ears.

The different kinds of spoons used in the ancient Hindu ceremonies were as follows: "Three different sruk or offering-spoons are used *viz.*, the guhu, upabhrit and drubha. They are made each of a different kind of wood, of an arm's length (or according to others, a cubit long) with a bowl of the shape and size of the hand, and a hole cut through the bark and front

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[1] Paul VI. lxxxvii, VI. xiv, VI. xxv.

[2] Greco-Roman Surgical Instruments, pl. xi. fig. 5.

[3] कर्णशोधन मश्वत्थ पत्र प्राग्रं सुवाननं ॥

Aṭṭāṅga Hṛdaya Saṁhitā, I. xxv.

side of the bowl and fitted with a spout, some eight or nine inches long and shaped like a goose's bill. The sruva or dipping-spoon, on the other hand, chiefly used for ladling the clarified butter (or milk) from the butter vessel into the offering-spoons, is of the khadira wood (Accacia catechu), a cubit long, with a round bowl measuring a thumb's joint across and without a spout".[1]

So we see that the bowl of the karṇa-śodhana was round in shape.

Suśruta also mentions a śalākā for the extraction of cerumen or minute insects from the ears.[2] Cakrapāṇi[3] alludes to it. In modern times, the ear-cleaner, as used commonly in India, is a tāla yantra. Ear specillum is frequently mentioned by the Greeks and Romans. It consisted of a small narrow scoop at one end and a simple probe at the other. The use of the scoop is thus described by Archigenes[4]: "If a bean, stone, etc. fall into the ear, remove it with the small narrow scoop of the ear specillum". Celsus[5] directs us to extract a scab or cerumen by means of the ear specillum.

The ear scoop used by the modern surgeons is a narrow scoop, more like the Hindu pujā vessel known as kuśi. The ear scoop is often made in combination with a director.

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[1] Śatapatha Brâhmaṇa, Sacred Books of the East. 1. 3. 1. 1. foot-note.

[2] See foot note 1, P. 149

[3] क्लेदयित्वा तु तैलेन स्वेदेन प्रविलाप्य च।
शोधयेत् कर्णगूथस्य भिषक् सम्यक् शलाकया॥
Cakradatta, Karṇaroga.

[4] Galen. XII, 652.

[5] Celsus. VI. viii.

GARBHA-ŚAṄKU. FŒTUS OR TRACTION HOOK.

The end of this instrument is said to have been bent like aṅkuśa or elephant driver's goad. It is described to have the same length as the other śaṅku have *i. e.* ten to sixteen aṅguli, and it is eight aṅguli in width.[1] It is recommended for extracting a dead fœtus from the mother's womb, after perforating its head by the maṇḍalāgra or mudrikā knife. Suśruta recommends us to perforate the head and then to extract the bones by the śaṅku or hook, and lastly to apply traction by fixing it about the chest or axilla. If the head can not be perforated, it is to be applied to the eyes or cheeks.[2]

Traction hook for extraction of a dead fœtus was well known to the ancients. Hippocrates[3] bids us break up the head of the fœtus with a cephalotribe and remove the bones with bone forceps, or deliver it by a traction hook inserted near the clavicle. Celsus[4] advises us to insert a smooth hook with a short point and to fix it in the eye, or the ear, or the mouth, or the forehead, and so the fœtus is to be dragged down. Soranus points out the best places for the insertion of the hook to be the eyes, the occiput, the mouth, the clavicles, and the

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[1] नतोऽग्रे शङ्कुना तुल्यो गर्भे शङ्कुरितिस्मृतः।
षडाङ्गुला यतस्नेन मृढ़गर्भं हरेत् स्त्रियाः॥ १६।

Aṣṭāṅga Hṛdaya Saṁhitā I. xxv.

[2] ज्ञात स्त्रियमाश्वास्य मद्यलांगेषाङ्गुलीशस्त्रेण वा शिरोविदार्य शिरःकपालान्याहृत्य शङ्कुना गृहीत्वोरसि कक्षायां वापहरेदभिन्ने शिरसि चाक्षिकूटे गण्डे वा।

Suśruta Saṁhitā. IV. xv.

[3] Hippocrates. II. 70.

[4] Celsus. VII. xxix.

ribs in head presentations; and the pubes, ribs, and clavicles in footling cases.[1] Soranus, Aetius[2] and Paul[3] direct us to extract the fœtus in the same way but they recommend us to use two hooks instead of one, in order that the pulling may be straight down and not to one side.

Albucasis,[4] Rhases,[5] Haly Abbas,[6] and Avicenna[7] give similar directions for opening the child's head and for delivering the fœtus with hooks.

This purpose in modern times is served by the blunt hook and crotchet.

Yuj̃a-śaṅku or Midwifery Forceps.

An instrument is thus named and figured by modern writers on Hindu surgery, bearing some resemblance to the modern forceps, for extracting the child alive. We have, however, no mention of any such instrument in the works of Caraka, Suśruta Vāgbhaṭa and other ancient authorities. The Greeks and Romans were also ignorant of it; and the Arabians fared no better, though Adams, in his commentary on Paul[8] asserts that Avicenna refers to forceps for the delivery of living childern. Mulder, in his valuable work,[9] gives an extract from a translation from the works of Avicenna supporting

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[1] Soranus. II. xix.
[2] Aetius. IV. iv. 23.
[3] Paul. VI. lxxix.
[4] Albucasis. Chirrug. II. 76 and 77.
[5] Rhases. Cont. xxii.
[6] Haly Abbas. Pract. ix. 57.
[7] Avicenna. iii. 21, i, 24.
[8] Paulus. Æginita. III. lxxvi.
[9] Historiâ Forcipum et Vecticum. p, 6.

the same conclusion. Smellie[1] says: "With regard to the fillets and forceps, they have been alleged to be late inventions; yet we find Avicenna recommending the use of both. The forceps recommended by Avicenna is plainly intended to save the fœtus". "He recommends all the old methods for assisting in natural labours; and if the woman can not be delivered by these, he orders a fillet to be fixed over the head: if that can not be done, to extract with the *forceps*; and should these fail, to open the skull; by which means the contents will be evacuated, the head diminished, and the fœtus easily delivered."[2] Playfair[3] also holds the same view. The point is however by no means settled. For Milne[4] says: "A full consideration of Avicenna's words seems to me to lead to the conclusion that he is describing no more than extraction with a craniotomy forceps. If the forceps fail, the child is to be extracted by incision, as in the case of a fœtus already dead (and decomposed so that the forceps would not hold)."

Thus we may be sure that there is no availale evidence of the use of delivery forceps by the Hindus, Greeks, Romans and Arabs; and the Chamberlens are still the undisputed claimants to the glory of the invention.

But there is no doubt that the Hindu surgeons tried extraction of the living fœtus by manual traction. The hands are recommended to be well oiled and introduced into the uterus. If the child be dead, sharp intruments are advised to be intro-

[1] Smellie. Treatise on Midwifery, p. 40.

[2] Ibid, Edited by McClintock. New Syd, Soc, vol. I. Introduction p. 50.

[3] Researches on Operative Midwifery, p. 10.

[4] Græco-Roman Surgical Instruments, p. 156.

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duced into the vagina for cutting upon the fœtus. But on no account such instruments are to be used so long as the child is alive.[1]

Sarpa-phaṇā or Snake's Hood.

It is also called agra-bakra *i. e.* the end bent. It is a śaṅku or hook similar to the above, the end being bent like the hood of a snake.[2] It is to be used for the purpose of extracting stone after operation.

Suśruta, in the operation for extraction of stone through the perineal incision, directs us to use the agra-bakra to bring the entire stone out of the wound. But in the case of females, he recommends us to use a knife having a spoon like a scoop, to prevent the formation of a vescico-vaginal fistula.[3] Is it a spoon-shaped knife, or is it a double instrument on a handle—a knife at one end and a scoop at the other? The Greeks used a knife having a scoop at the end.

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[1] गर्भे जीवति मूढे तु गर्भं यत्नेन निर्हरेत्।
दक्षेण सर्पिषाक्तेन योनिरन्तर्गतेन सा॥
मृते तु गर्भे गर्भिण्या योनौ शस्त्रं प्रवेशयेत्।
शस्त्रशास्त्रार्थविदुषी लघुहस्ता भयोज्झिता।
सचेतनं तु शस्त्रेण न कथञ्चन दारयेत्॥

Yogaratnākara, Mudhagarva Cikitsā.

[2] अग्रमर्धाङ्गुलं सर्पफणावदक्रं यतः॥

Aṣṭāṅga Hṛdaya Saṁhitā. I. xxv.

[3] यथा च न भिद्यते न चूर्ण्यते वा तथा प्रयतेत चूर्णमल्पमप्यवशिष्टं हि पुनः परिवृद्धिमेति तस्मात् समस्तामपवक्त्रोपादादीत। स्त्रीणान्तु वस्तिपार्श्वगतौ गर्भाशयः सन्निकृष्टः तस्माद्वा सामुत्सङ्गवच्छस्त्रं पातयेदतोऽन्यथा खल्वासां मूत्रस्रावी व्रणो भवेत्।

Suśruta Saṁhitā. IV. vii.

Celsus[1] describes the extraction of stone through a perineal section by means of the lithotomy scoop. "The scoop is slender at the end and flattened out in the shape of a semi-circle, smooth externally where it comes in contact with the tissue, rough internally where it meets the calculus". It was a long hook-like instrument.

Aetius[2] mentions a special stone extractor, under the treatment of calculus in the female. Some understand by it the lithotomy forceps.

In modern times we use the lithotomy forceps and scoop for the same purpose.

I take this opportunity of referring to the celebrated passage in the famous Hippocratic oath, which runs as follows: "I will not cut persons labouring under the stone, but will have this to be done by men who are practitioners of this art". This sentence has given a good deal of trouble to the commentators and they have failed to understand the true reasons as to why Hippocrates specially forbade the practice of this operation. "M. Littré finds some difficulty in accounting for the circumstance that the noviciate in surgery is interdicted from the operation of lithotomy." Adams,[3] commenting on the sentence, says: "Why this operation was proscribed, can not indeed be satisfactorily ascertained," and he quotes the Arab Physician, Avenzoar[4], who "pronounces the operation to be one, which no respectable physician would witness, and far less to perform."

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[1] Celsus. vii. xxvii.

[2] Aetius. IV. iv. 94.

[3] The Genuine Works of Hipprocrates. Vol. II. P. 777—8.

[4] Avenzoar. II. 2, 7.

The explanation that this was proscribed because there were men who devoted themselves exclusively to this kind of treatment, and that if the qualified surgeons be allowed to practise the operation, they would interfere in the sphere of action of the lay lithotomists, cannot be considered satisfactory. For the question still remains the open one, why should Hippocrates proscribe this operation from the domains of scientific surgery, simply because a few laymen happened to practise it.

The real explanation is that in Hippocrates' time success in the operation was very difficult to achieve, consequently he interdicted the operation much in the same way as abdominal operations were considered sacred before the days of antiseptic surgery. It is curious to find that Suśruta calls this operation the worst of all surgical operations, for he says[1]: "Even experienced and able surgeons fail to attain success by operation for the stone. So the surgical treatment is the worst of all treatment here. But if you do not operate, the patient will die; and it is doubtful whether he will live after the operation; so give him the chance of operation in God's name." I do not know whether this passage of Suśruta has any causal relation to the remarks of Hippocrates, but there is no doubt that the former serves as a better commentary on the latter, than anything hitherto suggested.

Adams[2] says that this operation was practised by a class of men,

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[1] कुशलास्यापि वैद्यस्य यत: सिद्धिरिहाध्रुवा।
उपक्रमो अचन्त्योऽयमत: स परिकीर्तित:॥
अक्रियायां ध्रुवो मृत्यु: क्रियायां संशयो भवेत्।
तस्मादाप्रच्छ्य कर्त्तव्यमीश्वरं साधुकारिणा॥

Suśruta Saṁhitā, IV. vii.

[2] Commentary on Paulus Ægineta, Vol. II. P. 363.

separate from the surgeons, in all countries in ancient times, and points out that the ancient operation of lithotomy is still practised with great success by the native doctors of Hindusthan. No conclusion is, however, to be drawn from the modern practices in India, as we find separate classes of men not only for stone, but also for bone-setting, cataract, etc. And whatever may be the practice in modern times, we find that during Suśruta's time, the operation was not the privilege of the laymen.

Śarapuṅkha-mukha Probe.

This instrument is also described to have its end bent like the hood of a snake. It is four aṅguli long and is recommended to be used for the purpose of extracting a tooth from its socket.[1]

Tooth elevator or instrument for levering teeth is mentioned by Galen.[2] It is of the same size as the bone lever which, according to Paul,[3] is seven or eight aṅguli long.

This instrument resembles in shape and action the tooth elevator of the modern surgeons.

Ardhacandra-mukha Śalā. Half-moon Probe.

The first half of this variety of śalā is curved like a half-moon, to which is attached the second half as a rounded handle.[4] Suśruta advises us to use it for the purpose of applying actual

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[1] शरपुङ्खमुखं दन्तपातनं चतुरङ्गुलम् ॥

Aṣṭāṅga Hṛdrya Saṁhitā. I. xxv.

[2] Galen. xviii. 593.

[3] Paulus Ægineta. VI. cvi.

[4] शलाकामल्लवर्त्मनि ।

मध्येऽर्द्ध इत्तदग्राच्च मूले चार्द्धेन्दुसन्निभां ॥

Aṣṭāṅga Hṛdaya Saṁhitā I. xxv.

cautery to the groin in bubonecele, to prevent the hernia from entering into the scrotum.[1]

A crescent-shaped cautery was also used by the Greek and Roman surgeons. So Paul[2] says that in cases of sloughing of the prepuce we must cut it off and use lunated cauteries to stop haemorrhage and prevent the spreading of the wound. Again he mentions a cautery shaped like the Greek letter Γ, in the radical cure of hernia.[3]

Bone lever.

Instruments for levering fractured bones into their proper positions are mentioned several times by Suśruta. In the treatment of fracture of the nasal bones, a śalākā is recommended to be used as a bone lever for raising and depressing the fractured ends.[4] Sometime a muṣala or pestle is advised to be used.[5] It is a thick wooden pestle the end of which is plaited with iron. It is still used to strike upon paddy to seperate the husk from the rice. Suśruta mentions its use to reduce dislocations of the joints of the shoulder and neck.[6]

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[1] तत्र या वङ्क्षण्या ता: दहेद्दर्दुवक्त्रया।
सम्यङ्नागावरोधार्थं कोशप्राप्तां तु वर्जयेत्॥
Suśruta Saṁhitā, IV. xix.

[2] Paulus Ægineta. VI. lvii.

[3] Ibid. VI. lxii.

[4] नासां सन्धां विडग्नां वा सन्धौ कृत्वा शलाकया।
Suśruta Saṁhitā, IV. iii.

[5] सन्नमुन्नमयेत् क्षिप्रमवकम् मूषलेन तु।
तथोन्नतं पीडयेच्च वध्नीयाद्वाडमेव च॥
Ibid.

[6] तैलपूर्णे कटाहे वा द्रोण्यां वा शाययेन्नरं॥
मूषलेनोत्क्षिपेत् कक्षामंसमन्धौ विसंहते।
स्थानास्थितश्च बध्नीत स्वस्तिकेन विचक्षण:॥
Ibid.

The pestle was also used by Hippocrates[1] to reduce dislocation of the shoulder joint. He says: "Those who accomplish the reduction forcibly bending it round a pestle, operate in a manner which is natural. But the pestle should be wrapped in a soft shawl (for thus it will be less slippery), and it should be forced between the ribs and the head of the humerus. And if the pestle be short, the patient should be seated upon something, so that his arm can with difficulty pass above the pestle. But for the most part the pestle should be longer, so that the patient when standing may be almost suspended upon the piece of wood. And then the arm and forearm should be stretched along the pestle, whilst some person secures the opposite side of the body by throwing his arms round the neck, near the clavicle"

The bone lever used by the Greeks is thus described by Paul:[2] "It is an instrument of steel about seven or eight fingers' breadth in length, of moderate thickness that it may not bend during the operation, with its extremity sharp, broad and somewhat curved."

Director.

Suśruta[3] mentions the use of eṣaṇī or metallic probes not only to ascertain the course of the fistulous track but also to raise the bridge of skin covering the sinuses, so that the surgeon may operate on it as a guide. Cakradatta[4] also uses a probe to

[1] The Genuine Works of Hippocrates. Adams' Trans. p. 372.

[2] Paulus Ægineta, Vi. cvi.

[3] पक्वेषु चोपक्लिन्नमवगाढस्थितं शल्यायां सन्निवेश्यार्शसमिव यन्त्रयित्वा भगन्दरं समीक्ष्य पराचीनमवाचीनं वा बहिर्मुखमन्तर्मुखं वा ततः प्रणिधायैषणीमुन्नम्य सावयमुत्तरेच्छस्त्रेण
Suśruta Saṁhitā, IV. viii.

[4] नाड़ीनां गतिमन्विष्य शस्त्रेणापाल्य कर्म्मवित्।
Cakradatta, Nāḍivraṇa Cikitsā.

learn the direction of the wound before operation. It is also mentioned in the Yogaratnākara.[1]

In the treatment of fistulæ, Celsus[2] also says: "A director being inserted into them down to their termination, the skin ought to be incised." It is not mentioned that the eṣaṇī or probe was grooved, but there is no doubt of its use like a grooved director, so common nowadays. The discovery of such a director, along with several other surgical instruments, which are preserved in the Musée de Cinquantenaire, Brussels, proves that it was known to the Romans.

Urethral Probe.

A variety of śalākā is described by Suśruta[3] to have its end rounded like the stalk of a mālatī flower (Echites caryophyllata, Rox.) It is to be used for cleaning the urethral canal.

Caraka[4] mentions a probe for examining the direction of the urethral canal and its pathological condition, before introducing the tube of the urethral or bladder clysters into it.

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[1] नाड़ीनां गतिमन्वीत्य शस्त्रं शोतपाश्च कर्म्मवित्।

Yogaratnākara, p. 346.

[2] Celsus, VII. iv.

Græco-Roman Surgical Instruments. p. 73.

[3] मृतमार्गविशोधनार्थं एकं मालतीपुष्पदलायग्रमाश्च परिमण्डलमिति।

Suśruta Saṁhitā, I. vii.

[4] ऋजोः सुखोपविष्टस्य वृषणौ मेढ्रं वृताम्बिते।
ललाटयान्विश्य गतिं यथाप्रतिहता व्रजेत्॥
ततः शैफःप्रमाणेन पृथनेतं प्रवेशयेत्॥

Caraka Saṁhitā, VIII. ix.

Class VI. The Upayantra or Accessory Instruments.

The sixth class of the blunt instruments comprises the upayantra or accessory instruments. By surgical instruments, the Hindus consider not only the instruments proper, but also any mechanical aid by which the object of the surgical treatment is attained. Thus even medicinal agents are considered under this head for they help the inflammatory swellings to subside, or suppurate, or burst open as by various external applications. The accessory instruments are :

1. Rajju or Thread.

As an example of thread being used as an instrument of surgery, we know that the thread smeared with caustics are recommended by Suśruta[1]—kṣāra sūtra or caustic thread—for the operation of fistula-in-ano. For further informations on the subject see "Eṣaṇī or sharp probes" under the Śastra.

Thread as a material of phalavarti or tent is mentioned by Śārṅgadhara.[2] If after a vaginal or intra-uterine douche, the injection does not flow out, he advises us to introduce a strong tent made of thread, dipped in oleaginous medicines of the

[1] क्षारदग्धबलभौरुषां नाड़ीमस्थिताच या।
चारसूत्रेण छिन्द्यात्तत् शस्त्रेण बुद्धिमान्॥
Suśruta Saṁhitā, IV, xvii.
Cakradatta, Nāḍīvraṇa Cikitsā.

[2] फलवर्त्तिं निदध्याद्वा योनिमार्गे दृढ़ं भिषक्।
सूत्रैर्विनर्म्मितां स्निग्धां शोधनद्रव्यसंयुताम्॥
Śārṅgadhara Saṁgraha, III. vii

śodhana (Purifier) group. Cakradatta[1] uses caustic threads in the treatment of piles by ligature.

2. Veṇikā or Twine.

The use of twine as a ligature to be applied above the part bitten by a snake to arrest the circulation of blood towards the heart is mentioned by Suśruta.[2] Caraka[3] also advises us to tie ligatures above and below the bitten part, then to squeeze out the poison towards the wound, whence it is to be drawn out through incisions made by a knife.

3. Paṭṭa or Bandages.

For the proper application of bandages, Suśruta mentions the following materials to be necessary :[4] *viz.*, cloth manufactured

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[1] भावितं रज्वनीचूर्णैः क्षुद्दौचीरैः पुनःपुनः।
बन्धनात् सुदृढं सूत्रं भिनत्त्यर्शो भगन्दरं॥
Cakradatta, Arśaroga Cikitsā.

[2] सा तु रज्वादिभिर्बद्धा विषप्रतिकरीभता।
Suśruta Saṁhitā, V. v.

[3] दंशात् तु विषं दष्टस्य विसृतं वेणिकां भिषक् बद्धा।
निष्पीड्यवेदनार्तं दंशमुद्धरेन्मर्म्म वर्ज्जम्॥
Caraka Saṁhitā, VI. xxv.

[4] अत ऊर्द्धं व्रणबन्धन द्रव्याण्युपदेक्ष्यामः। तद्यथा चीनकार्पासविकृतस्य कौशेयं पत्रोर्णं चीनपट्टचर्म्मान्तर्बल्कलालाबुशणक्षौमता विदलरज्जुतूलफलसन्तानिका लोहानीति तेषां व्याधिकालं चावेक्ष्योपयोगः प्रकरणतश्चैषामादेशः। तत्र कोशदामस्वस्तिकानूर्वेल्लितप्रतोली-मण्डलस्रगिकायमकखट्टाचीनविवस्त्रवितानगोफणाः पञ्चाङ्गी चेति चतुर्हस्तबन्धविशेषाः।

तेषां नामभिरेवाकृतयः प्रायेणव्याख्याताः। तत्रकोशमङ्गुष्ठाङ्गुलिपर्व्वसु विदध्यात्। दाम सन्धावङ्गे। सस्त्रिकं कक्षमूलनाभ्यन्तरतलकर्णेषु स्वस्तिकं। अनुवेल्लितन्तु शाखासु। ग्रीवामेढ्रयोः प्रतोलीं। ह्रस्वेऽङ्गे मण्डलं। अङ्गुष्ठाङ्गुलिमेढ्रगुदेषु व्यग्रिकां। यमलत्रयोर्यमकं। जानुशङ्खगण्डेषु खट्टां। अपाङ्गयोश्चीनं। पृष्ठदरोरःसु विवस्त्रं। मूर्द्धनि वितानं। चिबुकनासौष्ठ सवस्तिषु गोफणां। अनुक्तऊर्द्धं पञ्चाङ्गीमिति। यो वा यस्मिन् शरीर प्रदेशे सुविधिष्टो भवति तं तस्मिन् विदध्यात्।

Suśruta Saṁhitā, I. xviii.

from the fibres of plants, flax, cotton, wool, blankets, silk, leather, Chinese cloth, inner barks of trees, bark of bottle gourd (Cucurbita lagenaria), tendrils of twining plants, cane or pieces of split bamboo, rope, fruits as those of Bombax Malabaricum, blades of knives, and plates of metals as gold, or lead, or iron. These articles should be used with due consideration as regards the nature of the disease, the time of their use and the purpose in hand. He describes fourteen varieties of bandages as follows:—

1. Kośa:— a hollow cylinder or sheath to be applied to the joints of the thumb and fingers. This form of bandage is to be applied over the stumps after amputation of the limbs.

2. Dāma (*i.e.* tail of a quadruped?):— it is a large bandage to be tied round a part for the relief of pain or cramps.

3. Svastica or a circular cross-bandage:— it is to be applied round the joints, the space between the tendons of the great and second toes, the intermammary region, the glabella (space between the eyebrows), the plantar surfaces of the feet, the palmer surfaces of the hands, and the ears. It is also the form of bandage recommended in dislocations of the shoulder joint.

4. Anuvellita or an encircling bandage:—it is to be applied to the limbs. This form of bandage is recommended to be applied to the limbs in cases of oblique, deep, and large cuts inflicted by a knife. A leather bandage applied in the form of gophaṇā would also serve the purpose. The encircling bandage is also advised in cases of fracture of the ribs.

5. Protolī:— a broad bandage for the neck and penis.

6. Maṇḍala or a circular bandage:— it is to be applied to

the round parts of the body such as the arms, sides, abdomen, thighs, and back.

7. Sthagikā or a supporter:— a bandage enclosing a splint and pastes of medicaments to keep the parts firm. It is to be applied over the ends of the thumb, fingers, and penis. Suśruta directs us to use this bandage round the scrotum after tapping the hydrocele.

8. Yamaka or a double-bandage:— a pair of circular bandages applied to a couple of ulcers on a part.

9. Khatvā or a four-tailed bandage:— it is recommended for the temples, cheeks and lower jaw.

10. Chīna or a banner bandage:— a bandage for the inner angles of the eyes.

11. Vivandhana or a circular chest-bandage:— it is the bandage for the back, abdomen and chest.

12. Vitāna or a canopy bandage:— a large bandage for the head.

13. Gophaṇā[1] (*lit.* a sling for throwing stones):— a concave bandage for the chin, nose, lips, shoulders and pelvis.

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[1] शाखासु प्रतितां तिर्यक् प्रहारान्विद्धतान् भृशं।
सीव्येत् सम्यग्विवेश्याग्र सन्धस्त्रीन्यनुपूर्व्वशः॥
वद्धा वैद्रितकैनाग्र ततस्तैलेन सेचयेत्।
चर्म्मणा गोफणावत्सः कार्य्यो यो वा छिती भवेत्॥

Suśruta Saṁhitā, IV. ii.

पादौ निरस्तसुप्तस्य जलेन प्रोक्ष्य चाचिषी।
प्रवेश्य तुन्नसेवन्या सुक्ष्मौ सीवेत्ततः परं॥
कार्य्यौ गोफणिकावत्सः कक्षामाविध्य यत्नतः॥

Ibid, IV. ii.

14. Pañcāṅgī or a five-tailed bandage[1] :— it is intended for the parts above the clavicle, as in the dislocations of the lower jaw. Caraka[2] mentions a bandage called kavalikā, to be tied tightly after setting a fracture or reducing a dislocation. It is so-called from the medicinal paste which is applied to the affected parts, underneath the splints.

Dunglison mentions a bandage called Accipitar to be applied over the nose. It is so called from its likeness to the claws of a hawk. It resembles the pañcāṅgī bandage of the Hindus.

So the bandages are recommended to vary according to the different parts of the body ; and the surgeon, using his discretion, is to select the form of bandage suitable to the part. The bandages are recommended to be firmly secured to their place by three strings, applied upwards, downwards and obliquely. The knot is avoided over the seat of ulcer and tied on a side.

Suśruta says : "Bandages are applied with three degrees of tightness according to the seat of the abscess :— 1. A tight bandage causes uneasiness but not actual pain ; 2. A loose bandage is loose and relaxed ; 3. An even bandage is properly applied—neither tight nor loose. The tight bandage is to be applied to the buttocks, sides of the abdomen, axilla, groin, chest and head. The eyes and joints

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[1] इन्वस्थिनी समानीय हनुसन्धौ विसंहते ।
सेदयित्वा स्थिते सम्यक् पञ्चाङ्गीं वितरेद्भिषक् ॥
Suśruta Saṁhitā, IV. iii.

[2] अस्थिभग्नं च्युतं सन्धिं संदधीत समं पुनः ।
समेन समसूत्रेण क्रत्वान्येन विचक्षणः ॥
स्थिरैः कवलिकावस्थैः कुशिकाभिश्च संस्थितम् ।
पट्टैः प्रभूत सर्पिष्कैर्वध्नीयादवलं सुखं ॥
Caraka Saṁhitā, VI. xiii.

are loosely bandaged. The even bandage is for the extremities, face, ears, neck, penis, scrotum, back, sides, and abdomen."[1]

Suśruta next deals with the alterations in the mode of applying bandages according to the rules laid down. He also advises the surgeon to be guided by the dictates of his common sense. He directs us to practise bandaging on the various large and small limbs of a human figure made of cloth or clay.[2]

With regard to the mode of application of bandages, Hippocrates says:[3] "It should be done quickly, without pain, with ease and with elegance, ... it should fit well and neatly. The forms of it are the simple, the slightly winding (called ascia), the sloping (sima), the monoculus, the rhombus, and semi-rhombus".

The whole chapter of Suśruta is very interesting and will repay perusal. If bodily transferred, it will adorn any modern text book on surgery.

As it is very difficult to covey a correct idea of these bandages in words, I have given figures of them from modern works on surgery, from which their construction and uses will be readily understood at a glance.

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[1] तत्र व्रणायतनविशेषादस्य विशेषस्त्विधौ भवति गाढः समः शिथिल इति।
पौड़यन्नरुजो गाढः सोच्छ्वासः शिथिलः श्रुतः।
नैव गाढो न शिथिलः समोबन्धः प्रकीर्त्तितः।
तत्र स्फिक् कुक्षि कक्षावङ्क्षणोरः शिरः सुगाढः। शाखावदन कर्णकण्ठमेढ्रमुष्कहृदपार्श्वोदरेषु समः। अक्षीः सन्धिषु च शिथिल इति।

Suśruta Saṁhitā, I. xviii.

[2] पुत्तलय पुरुषाङ्ग प्रत्यङ्गविशेषेषु बन्धयोग्यं।

Ibid. I. ix.

[3] The Genuine Works of Hippocrates, Vol. II, P. 477. Syd. Soc. Ed.

Abdominal Binder.

Caraka[1] mentions the use of abdominal binder for the recently delivered woman to prevent derangement of air by its expansion in her abdomen.

Dr. Barnes says:[2] "The sudden expulsion of one-tenth of the body-weight from the abdominal cavity is attended by a sudden removal of a force hitherto pressing upon the vessels and organs of the chest, abdomen, and pelvis. This entails in some cases a tendency to vacuum. Hence disturbance of the circulation. Now the binder, by supporting the abdominal walls, restores the equilibrium of pressure. The pressure exerted upon the uterus works as a gentle continuous stimulus to contraction. The woman is conscious of the support and is greateful for it. . . . . The figure, so precious, and rightly so, to women, is better preserved . . . . So applied, the binder becomes one of the most efficient agents in antiseptic midwifery; it keeps the walls of the uterus and vagina in contact, thus preventing the collection of fluids or clots, and shutting out air".

The use of cloth for other surgical purposes is also mentioned:—

Field hospital.

The cloth is to be used for the manufacture of tents for the doctors to live in. The wounded in war are to be treated in such tents. The tent of the surgeon-general should be close to that of the king in the battle-field.[3]

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[1] वेष्टयेदुदरं महता वाससा तथा तस्या न वायुरुदरे विकृतिमुत्पादयत्यनवकाशत्वात्।
Caraka Saṁhitā, IV. viii.

[2] Obstetric Medicine and Surgery, Vol. II. p. 87.

[3] स्कन्धावारे च महति राजवेश्मादनन्तरं।
भवेत् सन्निहितो वैद्यः सर्वोपकरणान्वितः॥

Small tents are also recommended for applying vapour bath to patients.

Dressings.

Dṛḍhavala[1] mentions the use of medicated gauzes to be used as sponge by the females and says: "In discharges from the vagina, pieces of cloth soaked in decoction of barks of Vata (Ficus Bengalensis) and Lodha (Symplocos racemosa) and dried, should be put inside the canal."

In the Mohāvāgga[2] we find the use of itch-cloth:— "I allow, O Bhikkhus, to whomsoever has the itch, or boils, or a discharge, or scabs, the use of an itch-cloth".

"According to the 90th Pakittiya such cloth must not be more than four spans in length and two in breadth."

I can not help quoting from Mohāvāgga,[3] another discourse of Buddha as it shows clearly the surgical treatment of boils in ancient times:—

Now at that time a certain Bhikkhu had boils.

"I allow, O Bhikkhus, the use of the lancet".

Decoctions of astringent herbs were required.

"I allow, O Bhikkhus, decoctions of astringent herbs".

Sesamum salve was required.

ततस्त्वमीनं व्रजवदाशः ख्याति समुच्छ्रितं।
उपसर्पन्त्यमोहेन विपदाश्यामयद्दिताः॥

Suśruta Saṁhitā, I. xxxiv.

[1] न्यग्रोधत्वक् कषायेण क्षीरकल्कं तथा पिबेत्।
स्रावे चौमपदं वा भावितं तेऽनुधारयेत्॥

Caraka Saṁhitā, VI. xxx.

[2] Mahāvāgga. VIII. 17, 2.

[3] Ibid. VI. 14, 4 & 5.

"I allow, O Bhikkhus, the use of sesamum salve".

5. Compresses were required.

"I allow, O Bhikkhus, the use of compresses."

It was necessary to tie up the sore with cloth.

"I allow, O Bhikkhus, the use of bandages for tieing up wounds".

The sore itched.

"I allow you, O Bhikkhus, the sprinkling of a sore with mustard-powder".

The sore became moist.

"I allow you, Bhikkhus, to fumigate (the sore)."

Proud flesh formed on the wound.

"I allow you, O Bhikkhus, to cut off (proud flesh) with a lancet".

The wound would not close up.

"I allow, O Bhikkhus, the use of oil for wounds".

The oil ran over.

They told this thing to the Blessed One.

"I allow, O Bhikkhus, the use of fine rags, and of all kinds of ways of treating wounds".

If the object of fumigating the sore was to sterilize it, as it certainly was, we may take this dialogue as the best sketch of the scientific treatment of boils,— remembering that it represents the knowledge of surgery more than 2500 years ago.

Cakrapāṇi advises us to tie the ends of the hairs of a patient, by a piece of cloth,[1] before performing phlebotomy on the vessels of the head and neck.

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[1] शदपट्टाग्रकेशाग्रौ जानुस्थापितकर्परः।

Cakradatta, Śirobyadhādhikāra.

4. Carma or Leather.

The use of leather in ancient medical practice in India was manifold.

Leather bandage.

Straps or belts of leather were used as bandages. Suśruta[1] advises us to apply the leather bandage in cases where more than half the thickness of the upper or lower extremities are cut by some sharp instruments in a slanting direction. Then the parts of the wound should be well adjusted, the bone and the soft parts kept in apposition, and the wound closed by sutures and well covered by dressings, over which the leather bandage is to be applied in the form of a gophaṇā or sling.

Leather bandage in the form of gophaṇā is mentioned by Suśruta[2] to be applied over the anus to prevent recurrence of procidentia of the rectum. The prolapsed bowl should be well bathed with ghee and fomented; and then reduced by gentle pressure. There should be a hole in the bandage just in front of the anus to allow flatus to pass out. Vṛnda[3] alludes to it. Similarly the modern surgeons use a pad supported by a bandage as an aid in

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[1] See foot-note 1, P. 178.

[2] गुदभ्रंशे गुदं स्विन्नं स्नेहाभ्यक्तं प्रवेशयेत्।
कारयेद्गोफणावस्त्रं मध्यच्छिद्रेण चर्म्मणा॥

Suśruta Saṁhitā, IV. xx.

[3] गुदभ्रंशे गुदं स्नेहैरभ्यज्याऽथ प्रवेशयेत्।
प्रविष्टं स्वेदयेच्चापि वस्त्रं गोःफणया शनैः॥
गोःफणयेति। गोःफणा वस्त्रविशेषः।
तत्रं हि:—उत्सारनिर्गमाय मध्यच्छिद्रेण चर्म्मणा चास्य गोःफणावत्स्थः कार्य्य इति॥

Vṛndamādhava or Sidhhayoga, Ch. 57.

preventing descent of the gut. It is mentioned also in the Cakradatta[1] and the Yogaratnākara.[2]

Dṛḍhavala mentions the use of a piece of untanned leather to be applied over a layer of ointment during the day, while during the night the leaf of Eraṇḍa (Ricinus communis) is directed to be used.[3]

Leather ligatures.

In the treatment of snake-bite, a ligature is advised to be used above the seat of injury to stop the circulation of poisoned blood. This ligature is advised to be made of leather, or braided fibres of trees, or soft cord of jute, etc.[4]

Yantra-śāṭaka. Lithotomy Strap or Binding Apparatus.

This is the name of the leather shackle, which is recommended to be used during the operation for stone in the bladder. The patient should flex his knees and elbows; and the parts are to be

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[1] गुदभ्रंशे गुदं स्नेहैरभ्यज्याऽऽशु प्रवेशयेत्।
प्रविष्टे स्वेदयेच्चापि वङ्गं गोःफणया दृढम्॥
Cakradatta, Kṣudraroga Cikitsā.

[2] गुदभ्रंशे गुदं स्निग्धं स्नेहेनाक्तं प्रवेशयेत्।
प्रविष्टं रोधयेदयाद्व्यसच्छिद्रं चर्म्मना॥
Yogaratnākara, P. 343.

[3] एरण्डपत्रैः प्रच्छाद्य रात्रौ कार्य्यं विमोचयेत्॥
चीराम्बुधा ततः सिक्तं पुनर्नैवोपनाह्यितम्।
सुचेद्रात्रौ दिवावद्धं चर्म्मभिश्च सुलोमभिः॥ ९४।
Caraka Saṁhitā, VI. xxviii.

[4] सर्व्वैरेवादितः सर्पः शास्त्रादष्टस्य देहिनः।
दंशस्योपरि बध्नीयादरिष्टायतुराङ्गुलं॥
श्रोतश्चर्म्मान्त-वल्कानां मदनान्वतमेन च।
न गच्छति विषं देहमरिष्टाभिर्निवारितं॥
Suśruta Saṁhitā, V. 7

tied together by this instrument.[1] Similarly, it is to be used during the operation for piles; but then, according to Suśruta,[2] the neck and thighs are to be tied by the instrument which is to be held firmly by the assistants. Vāgbhaṭa[3] uses cloth instead of leather.

Yantra-śāṭaka is also to be used during the operation of phlebotomy. Suśruta says[4]: "If venesection is required to be done, the patient is to be seated on a stool, an aratni high (from the elbow to the end of the little finger), facing towards the sun. The thighs are to be flexed, the two elbows to be placed over the knees, and the hands (the fingers being clenched into fists) to be fixed on the two sides of the neck. The two ends of the shackle which pass over the fists, are held up at his back by the left hand of an assistant, who with his right hand steadily (neither forcibly nor loosely) presses above the part selected, to make the veins prominent, and at the same time rubs on the back to

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[1] सङ्कुचितजानुकपुरसन्निवेश सहावबद्धं सूत्रेण शाटकेनेवा।

Suśruta Saṁhitā, IV. vii.

[2] वस्त्रकम्बलकोपविष्टं यन्त्रशाटकेन परिक्षिप्त शीवासकधंपरिकर्षिभिः सुपरिगृहीतमस्यन्दनशरीरं कृत्वा।

Ibid, IV. vi.

[3] अथ यन्त्रेण वाससा।
सक्थ्नो शिरोधराया च परिक्षिप्त सृजुस्थितम्॥

Aṣṭāṅga Hṛdaya Saṁhitā, IV. viii.

[4] तत्र व्यधसिरं पुरुषं प्रत्यादित्यसुखमरविमाचोक्षिते उपवेश्यासने सक्थ्नोराकुञ्चितयोर्निवेश्य कूर्परसन्निवेशोपरि कृत्वावनम्रं दाहुदकृतसन्धी मन्ये: स्थापयित्वा यन्त्रशाटकं शीवासुकोरुपरि परिक्षिप्यान्येन पुरुषेण पश्चात्स्थितेन वामहस्तेनोत्तानेन शाटकान्तर्यं गृहयित्वा ततो वैद्यो ब्रुवाद्दक्षिणहस्तेन सिरोव्यधनार्थं नाधावतमिविर्वं यन्त्रमावेष्टयेत्यसकृत्स्रावयार्थे यन्त्रं पृष्ठनम्ये च पीड़येति कर्मणुरुपश्च वायुर्पूर्णसुखं स्रावयेदेव उत्तमाङ्गगतानामन्तर्मुखकर्णानां सिराणां व्यधेन यन्त्रविधि:।

Suśruta Saṁhitā, III. viii.

stimulate bleeding, the patient being then told to inflate his mouth with air forcibly. This is the method of binding for puncturing the veins of the head except those (veins) which have their mouths turned inside the body". Vāgbhaṭa describes a similar procedure in bleeding from the vessels of the neck[1].

The Greeks also used ligatures to tie up the arms and legs of a patient in the lithotomy position. Paul[2] says: "In operating, the woman should be placed on a seat in a supine posture, having her legs drawn up to the belly, and her thighs seperated from one another. Let the arms likewise be brought down to her legs and secured by proper ligatures about the neck".

In modern times, similarly, we use lithotomy straps or crutch, after placing the patient in the lithotomy position during the operation of lithotomy and excision of piles.

Pāśa.

This is a different shackle to be used for binding insane persons.[3]

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[1] ऋजितापातपक्षिण्यौ जानूखासन संस्थितः।
सदृपद्मासकैमान्यौ जानुस्थापित कूर्परः॥
मुष्टिभ्यां वस्त्र गर्भाभ्यां मन्थे गाढ़ं निपीड़येत्॥
Aṣṭāṅga Hṛdaya Saṁhitā, I. xxvii.

[2] Paul. VI. lxxiii.

[3] भीमाकारैर्नरैर्नागैर्दान्तैर्व्यालैश्च निर्विषैः॥
भीषयेत् सततं पाशैः कशाभिश्चाथ ताड़येत्।
बन्धयित्वा सुपुष्टं वा त्रासयेत्तं हताग्निना।
Suśruta Saṁhitā, VI. lxxii.

Abdominal Binder.

The use of cloth binder has been described before[1]. Leather binder is to be used after the operation of paracentesis abdominis to apply pressure over the abdomen. After draining the fluid of ascites, the abdomen of the patient should be well wrapped with blankets, or silk cloth, or leather binder, for then the abdomen would not be flatulently distended by air.[2]

Leather bags.

The use of leather in the formation of bags of the vasti-yantra has been described before[3].

Śiro-vasti. Leather bag for the head.

For application of oil on the head, Suśruta[4] directs us to use a goat's bladder filled with medicated oil, just in the same way as ice bags are used nowadays.

Śārṅgadhara[5] describes another variety of śiro-vasti: "It is

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[1] See P. 181.

[2] निःस्रुतेच दोषे गाढतरमाविक काशेय चर्मपट्टामस्थतमेन परिवेष्टयेदुदरं तथा नाध्मापयति वायुः ॥

Suśruta Saṁhitā, IV. xiv.

[3] See P. 129-30.

[4] खट्वासीनस्य वधीयाद् वस्तिकोषं ततो दृढं ।

Ibid, VI. xviii.

[5] शिरोवस्तिविधिश्चाथ प्रोच्यते सुश्रुतव्रतः ।
शिरोवस्तिरुरग्रीवः स्वादिसुखो वादशाङ्गुलः ॥
शिरःप्रमाणं तं वद्वा मस्तके मापपिष्टकैः ।
सन्निरोध्यन्विधायादौ स्नेहैः कोषैः प्रपूरयेत् ॥
तावत् धार्य्यस्तु यावत् स्यान्नासानेत्रसुखस्रुतिः ।
वेदनोपशमो वापि मात्राणां वा सहस्रकम् ॥

Śārṅgadhara Saṁgraha, III. xi.

made of leather, has a length of twelve aṅguli and has two orifices or mouths. The leather bag is to be well tied round the head, the junction of the circumference of the bag and the skin should be well pasted with māṣa (Phaseolus Rox) glue. Then the cavity thus formed is to be filled with hot oily medicine. This is to be retained until the headache is relieved." Cakradatta[1] also mentions it. The bag is described to be sixteen aṅguli high in the Yogaratnākara[2]. Vāgbhaṭa[3] advises us to use leather of a cow or buffalo, and it is said to have been twelve aṅguli broad.

Leather band.

In phlebotomy, a band is advised to be applied above the spot where the vein is to be punctured. This band is recommended to be made of cloth, or jute, or leather, or barks of

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[1] चाशिरो व्यायतं चर्म कृत्वाष्टाङ्गुलमुच्छ्रितम् ॥
तेनावेष्य शिरोऽधस्तान्माषकल्केन लेपयेत् ।
निवातस्थोपविष्टस्य तैलैरुष्णैः प्रपूरयेत् ॥
Cakradatta, Śiro-roga Cikitsā.

[2] चाशिरो वापितचर्म षोड़शाङ्गुलमुच्छ्रितम् ।
तेनावेष्य शिरोऽधस्तान्माषकल्केन लेपयेत् ॥
Yogaratnākara, P. 402.

[3] विधिवत्स्थ निषण्णस्य पीठे जानुसमे सदौ ।
यत्राक्षिसिन्नदेशस्य दिनान्ते गव्यमाहिषम् ॥
द्वादशाङ्गुलविस्तीर्णं चर्मोपहं शिरः समम् ।
चाकर्णं बन्धनस्थानं ललाटे वस्त्र वेष्टिते ।
चैलवेष्टिकया बद्धा माषकल्केन लेपयेत् ॥
ततो यथाव्याधि घृतं स्नेहं कोष्णं निषेचयेत् ।
स्रवं क्षेत्रभुवो यावद्वाङ्गुलं धारयेच्च तम् ॥
Aṣṭāṅga Hṛdaya Saṁhitā, I. xxii.

trees, or tendrils of twining plants[1]; and it should not be applied either too tight or too loose. As for example, in phlebotomy in the foot, the yantra-śāṭaka or ligature should be applied below the knee-joint, while the band is to be tied round, at a distance of four aṅguli above the part selected for the operation.[2] Vāgbhaṭa[3] says: "In phlebotomy, a band is to be tied round the upper extremity, four aṅguli above the spot selected for opening the vein which is to be made prominent by pressing it upwards with the closed fist." Cakradatta[4] also quotes it. Vāgbhaṭa[5] recommends us to use a cloth band to be tied round the leg, four aṅguli above the spot selected for opening the vein in the leg.

This band corresponds to the band of Antyllus used by the Greeks. Antyllus applies a ligature of two fingers'

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[1] गाढं वद्धोपरि दृढं रज्ज्वा पट्टेन वा समम्।

Aṣṭāṅga Hṛdaya Saṁhitā, I. xxvi.

वस्त्रपट्टचर्म्मान्तर्श्लक्ष्णलतानामन्यतमेन यन्त्रयित्वा नातिगाढं नातिशिथिलं शरीर प्रदेशमासाद्य यथोक्तं शस्त्रं गृहीत्वा सिरां विध्येत्॥

Suśruta Saṁhitā, III. viii.

[2] तत्र पादव्यधसिरस्य पादं समीस्थाने सुस्थिरं स्थापयित्वान्यं पादमीषत्सङ्कुचितमुभैः करैः कृत्वा व्यधपादं जानुसन्धेरधः शाटकेनावेष्य दृढाभ्यां प्रपीड्य गुल्फं व्यधप्रदेशस्योपरि चतुरङ्गुलम् स्रोतोदौनान्यतमेन बद्धां पादासिरां विध्येत्॥

Ibid.

[3] विध्येद्वस्तसिरां बाहावनाकुञ्चित कूर्परे।
बद्धा सुखोपविष्टस्य मुष्टिमङ्गुष्ठ गर्भिणीम्।
ऊर्द्धं वैद्यप्रदेशाच्च चतुरङ्गुले॥

Aṣṭāṅga Hṛdaya Saṁhitā, I. xxvii.

[4] Cakradatta, Śira-vyādhādhikāra.

[5] पादे तु सुस्थितेऽधस्ताज्जानु सन्धेर्निपीड़िते।
गाढं कराभ्यामागुल्फं चरणे तस्य चोपरि॥
द्वितीये कुञ्चिते किञ्चिदाकृष्टे दृढबन्धतः।
बद्धा विध्येत् सिरामित्थमनुक्तेष्वपि कल्पयेत्॥

Aṣṭāṅga Hṛdaya Saṁhitā, I. xxvii.

breadth round the arm in bleeding at the elbow, while to bleed at the ankle, the band is to be applied at the knee. It is mentioned as fillet in the pseudo-Hippocratic treatise on Ulcers;[1] and Oribasius[2] gives an interesting dissertation on the subject, principally condensed from the works of Herodotus, Antyllus and Galen. Paul[3] also ties a narrow band round some muscular part of the arm before abstracting blood from the inner part of the elbow. "Wherefore we must tie a narrow band around some muscular part of the arm, and having by friction of the hands upon one another produced the necessary fulness of the vein, we divide it transversely, but only along its breadth."

Leather bottles, jars, maṣaka, etc.

Leather was used in the manufacture of bottles and jars. Leather maṣaka for honey, Soma juice, and dadhi (curdled milk), is mentioned in the Ṛgveda[4] and also in the Laws of Manu where

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[1] Ulcers, iii. 328.

[2] Med. Collect., vii, Phlebotomy.

[3] Paulus Ægineta. Adam's Trans. Bk. VI. Sec. XL.

[4] इतेरिव ते३कमस्तु सख्यं ।
ऋच्छिद्रस्य दधनतः सुपूर्णस्य दधन्वतः ॥
Ṛgveda, 6 M. 48 S. 4 A. 8 Ch. 18 v.

यो ह वां मधुनो ह्तिराङ्क्षितो रथचर्यदे ।
ततः पिबतमश्विना ॥
Ibid, 8 M. 5 S. 5 A. 8 Ch. 19 v.

उच्छिष्टं चम्वोर्भर सोमं पवित्र आ सृज ।
नि धेहि गोरधि त्वचि ॥
Ibid, 1 M. 28 S. 1 A. 2 Ch. 9 v.

एष सोमो अधि त्वचि गवां क्रीळन्नदिभिः ।
इन्दुं मदाय जोषयत् ॥
Ibid, 9 M. 66 S. 7 A. 2 Ch. 29 v.

it is called dṛti[1]. Leather maṣaka or inflated skins were in use as swimming bladders, and we have a representation of "figures with garlands in their hands, swimming and disporting themselves, supported on maṣaks or inflated skins."[2] In the Ṛgveda, Agastya in his spell to neutralise poison, says:[3] "I deposit the poison in the solar orb, like a leather bottle in the house of a vendor of spirits."[4] Dr. Mitra points out that "other smṛtis ordain that oleaginous articles preserved in leather bottles do not become impure by the contact of the impure cowhide; and in the present day, jars of that material are in extensive use in Bengal and the North-West Provinces for the storage of oil and ghee. In the latter place, leather bags are universally used for raising water from wells, and

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स्वति भौमो दशभस्तविष्यया ग्रहे शिशानो हरिषी विचक्षणः।
आ योनिं सोमः सुकृतं नि षीदति गव्ययो त्वग्भवति निर्धिगव्ययी ॥

Ṛgveda, 9 M. 70 S. 7 A. 2 Ch. 7 v.

एष स्य मानुषदियति युज्यते रथः परिज्मा दिवो अस्य सानवि।
पचासो अग्निमिन्धते अधि त्वयो दशिस्तरीयो मधुनो वि रप्शते ॥

Ibid, 4 M. 45 S. 3 A. 7 Ch. 1 v.

See Wilson's Ṛgveda, II. 28.

[1] इन्द्रियाणां तु सर्वेषां यद्येकं क्षरतीन्द्रियम्।
ततोऽस्य क्षरति प्रज्ञा दृतेः पादादिवोदकम् ॥

Manu Saṁhitā, II. 99.

"But when one among all his organs fails, by that single failure his knowledge of God passes away, as water flows through one hole in a leathern bottle."

Ibid, Jones' Translation.

[2] Pl. xxxi. fig. 1. Fergusson's Tree and Serpent Worship, P. 127.

[3] सूर्ये विषमा सजामि दृतिं सुरावतो गृहे।

Ṛgveda, 1 M. 191 S. 2 A. 5 Ch. 10 v.

[4] Ibid. Wilson's Translation.

according to the law books of Śaṅkha and Likhita,[1] that water is declared pure which is kept in old leather bottles"[2]. To this may be contrasted the prevailing Hindu notion that water is defiled if touched by a Brāhmana in his shoes. Though the leather is not allowed to be a material of dress of the Hindus, except his shoes which are considered as unclean, leather belts formed one of the eight sacred utensils necessary for a śramaṇa of the Buddhist order; and in the Manu Saṁhitā[3] we find the students of theology advised to "wear for their mantles, the hides of black antelopes, of common deer, or of goats."[4]

5. Antarvalkala. The inner barks of trees.

Barks of trees are recommended to be used as splints for the support of fractured bones. In fractures of bones of the foot, leg and thigh, Suśruta directs us to use splints made of barks of trees[5] to surround the limbs. In the treatment of a simple fracture, Bhāva Miśra advises us to use cold water first, then mud is to be applied, and lastly the fractured bones should be secured

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[1] आपो रूपवदगन्धवत्यः परित्रं जीर्णचर्मकरण्डकेवध्युताः।
चर्मकरण्डः चर्मपुटः।
Śaṅkha and Likhita.

[2] Dr. R. C. Mitra's Indo-Aryans. vol. II.

[3] कार्ष्णरौरवबास्तानि चर्माणि ब्रह्मचारिणः।
वसीरन्नानुपूर्वेण शाणक्षौमाविकानि च॥
Manu Saṁhitā, II. 41.

[4] Ibid. Sir Wm. Jones' Translation. II. 41.

[5] भग्नञ्च सन्धिस्थापार्दं तल्लभग्नं कुशोत्तरं।
वल्कपट्टेन वध्नीयाच्च व्यायाममाचरेत्॥
Suśruta Saṁhitā, IV. iii.

by splints and bandages.[1] In the Yogaratnākara[2], we are advised to treat fractures, by lowering the raised end and elevating the depressed end of the bone, and then by using splints and bandages to keep them in position. Bhāva Miśra[3] describes it similarly after Suśruta. Suśruta directs us to use barks of Vata (Ficus Indica. Rox.) and bamboo strips as splints to support the neck after reducing its dislocation by holding at the temporo-maxillary articulations on the sides and the occipital protuberance on the back, and raising him up in the air. He should lie down with his head raised for seven days[4]. In modern times, the Sayre's suspension apparatus and jury mast serve the same purpose.

The barks of Madhuka (Bassia latifolia), Aśvattha (Ficus religiosus.), Kukubha (Terminalia arjuna), Polāśa (Butea frondosa, Rox.), Udumbara (Ficus glomerata, Rox.), bamboo, śāla (Shorea robusta), Vata (Ficus Indica. Rox.) are mentioned as

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[1] आदौ भग्नं विदित्वा तु सेचयेच्छीतलाम्बुना।
पट्टनालीपनद्धार्थं वन्धनञ्च कुशान्वितम्॥
Bhāva Prakāśa, II. iii. Bhagnādhikāra.

[2] पट्टेनालीपनं कुर्यादन्धनं च कुशान्वितम्।
अवनामितमुन्नाम्योदुन्नतं चावपीड़येत्॥
चित्रं दिवापि च स्थाने संस्थाप्य विधिमाचरेत्॥
Yogaratnākara, P. 345.

[3] अवनामितमुन्नम्य दुन्नतञ्चावपीड़येत्।
आक्षेदतिचिप्तमधोगतञ्चोपरि वर्तयेत्॥
Suśruta Saṁhitā, IV. iii.
Bhāva Prakāśa, II. iii. Bhagnādhikāra.

[4] अवटावग्रहन्वोश्च प्रगृह्योन्नमयेन्नरं।
तथा कुशान् समंदत्त्वा वस्त्रपट्टैश्च वेष्टयेत्।
उत्तानं शाययेच्चैनं सप्तरात्रमतन्द्रितः॥
Suśrutā Saṁhitā, IV. iii.

supplying the materials of splints[1]. Bhāva Miśra[2] adds Kadamba (Anthocephalus cadamba), Hijjala (Barringtonia acutangula), Sarjja (Pinus longifolia) to the list. Such splints are called kuśa, and Vāgbhaṭa[3] says that the splints should be broad, thin, pliant and clean.

Dr. Jacobi, of Dublin, says that he has seen an excellent splint made from the "fresh bark of a tree, taken off while the sap is rising". "It fits admirably", says he, "just like paste-board soaked in water"[4]. Dr. C. C. Jewet[5] recommends for the same purpose the bark of leriodendron, or tulip tree.

The Crutches.

The crutches were used to help the crippled. In the Vajasenīya Saṁhitā of the White Yayurveda, there is a passage describing the different kinds of human victims, appropriated to particular gods and godesses. The passage occurs also in the Taittirīya Brāhmaṇa with slight differences. There we

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[1] मधूकोडुम्बराश्वत्थ पलाश ककुभत्वच:।
वंशसर्ज्जार्जुनानाञ्च कुशार्थमुपसंहरेत्॥
Suśruta Saṁhitā, IV. iii.

[2] मधुकोदुम्बराश्वत्थ कदम्ब निचुलत्वच:।
वंशसर्ज्जार्जुनानाञ्च कुशार्थमुपसंहरेत्॥
Bhāva Prakāśa, II. iii. Bhagnādhikāra.

[3] कदम्बोदुम्बराश्वत्थसर्ज्जार्जुन पलाशजै:।
वंशोद्भवै र्वा पृथुभि स्तनुभि: सुनिवेशिते:॥
सुव्रतै: सुप्रतिस्तम्भै वैल्वलै: शकलैरपि।
कुशाद्यै: समं बन्धं पट्टस्योपरि योजयेत्॥
Aṣṭāṅga Hṛdaya Saṁhitā, VI. xxvii.

[4] Hamilton's Fractures and Dislocations. 5th Ed. P. 50-51.

[5] The 20th Mass. vols.

find "to the two (deities) who preside over the gains above or below one's expectation (utkula and vikula), a cripple, who can not move even with the help of a crutch" is recommended to be sacrificed. And again "to the divinity of land, a cripple who moves about on a crutch."[1]

The use of the sound limb as a splint of support for the fractured bone of the opposite side was well known. Wooden splints resembling in shape the injured member are also recommended. Suśruta says[2] that if the hand be fractured, it is to be tied with the opposite hand, but in fractures of both the hands, Gayadāssa[3] recommends a wooden hand to be used as a splint for both. After union of the fractured bones, the hands should be made to hold balls of cow-dung, mud and stones.

6. Latā or creepers (tendrils of).

The tendrils of creepers as materials of ligature are mentioned

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[1] उत्कुलविकुलाभ्यां (उत्कुलविकुलेभ्यः) लिखिन ।
भूम्ये पौठसर्पिनमालभते ।

Taittirīya Brāhmaṇa.

Quoted in Mitra's Indo-Aryans. vol. II. P. 84—85.

[2] उभे तले समे कृत्वा तलभग्नस्य देहिनः ।
बध्नीयादामतैलेन परिषेकञ्च कारयेत् ।
प्राग् गोमयमयं पिण्डं धारयेन् सक्षयं ततः ।
हस्ते जातबलेचापि कुर्य्यात् पाणे ॥

Suśruta Saṁhitā, IV. iii.

[3] गवोतु उभेऽपि हस्ततले तवैकस्य भङ्गे वामं दक्षिणेन दक्षिणं वामेन, उभयोस्तुभङ्गेन तत्समेन, काष्ठमयेन कृत्वा इं चपि बध्नीयादेवं दार्ढ्यं भवतीति, सत्पिण्डादिधारणसामर्थ्यकरणं प्राग्वत्कर्म ।

Quoted in Dallana's Commentary, IV. iii.

by Suśruta. He recommends[1] to give up a patient, bit by a snake, as hopeless when he does not respond to the application of stimuli, such as cold water, tendrils of creepers, etc. Vāgbhaṭa[2] advises us to introduce the stalk of the lotus, with a thread tied to it, inside the throat to extract any foreign body stuck there. When the soft stalk is touched by the śalya, it should be extracted by the sudden withdrawal of the stalk and thread.

7. Vastra or cloth.

Cloth[3] as a material of bandages, tents, gauze, etc. has been described before[4].

8. Aṣṭhīlaśma. Stone or pebble.

It is a piece of stone—long and round. It is advised to be used for moving arrows fixed in the bone[5]. Caraka[6] advises us to strike two pieces of stone against each other to resuscitate a

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[1] अजीर्णं पित्ततप्तं पीड़ितेषु बालप्रमेहिण्यच गर्भिणीषु।
ह्रद्रातुर चौषधसुचितेषु रूक्षेषु भीरूष्वथ दृष्टिमत्सु॥
शस्त्रक्षते यस्य न रक्तमस्ति राज्योलताभिश्च न सम्भवन्ति।
शीताभिराद्भिश्च न रोम हर्षो विषाभिभूतं परिवर्जयेत्॥

Suśruta Saṁhitā, V. iii.

[2] कण्ठस्रोतोगते शल्ये मूल कण्ठे प्रवेशयेत्।
विसेनाग्रे ततः शल्यं विसं सूत्रं समं हरेत्॥

Aṣṭāṅga Hṛdaya Saṁhitā, I. xxviii.

[3] वस्त्रं प्रसिद्ध तूलक सूत्रनिर्म्मितं वेष्टनार्थं प्रयुज्यते॥

Vāgbhatārtha Kaumudī, I. xxv.

[4] See P. 176-83.

[5] अश्मप्रस्तरखण्डं शल्यपीड़नार्थं निर्घातनाच्च युज्यते॥

Ibid.

[6] अश्मनोः संघट्टनं कण्ठ्यामुक्ते शीतोदकेनोष्णोदकेन वा सुखपरिषेकः।

Caraka Saṁhitā, IV. viii.

still-born child. In bleeding from the veins of the neck, Vāgbhaṭa[1] advises the patient to hold firmly two pieces of stones in their hands.

A piece of stone is to be used by a person, for holding it with his hand, after recovery from fractures of the carpal and metatarsal bones[2].

In ancient times, in India, the kings used to decorate themselves with antidotary gems, as a safeguard against poisons.[3] Even now the snake charmers apply a black stone on their bodies where they are wounded by the venomous reptile. This stone is popularly known as the vi-a-pāthara or poison-stone, and is supposed to have the property of extracting poison from the body.

9. Mudgara. Hammer.

Suśruta directs us to use a hammer or a piece of stone to strike an arrow firmly fixed in the bone, until loosened, when it can be conveniently extracted by means of a pair of forceps[4]. It should be pointed out that the tubular instrument—śalya

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[1] पाषाणगर्भहस्तस्य जानुघ्ने प्रसृते भुजे।
कुर्चेरारभ्य सदिते विध्येदङ्गोर्ध्वपट्टके॥

Aṣṭāṅga Hṛdaya Saṁhitā, I. xxvii.

[2] See foot-note. 2. P. 196.

[3] विषघ्नैरुदके स्नाती विषघ्नमणिभूषितः।
परीप्सितं समन्त्रौषधाङ्गुलाविद्विषम्वृतः॥

Kāmandakīya Nītisāra, Ch. vii. v. 10.

रचितो गरुडोद्गार मणिर्यस्य विभूषणं।
स्थावरं जङ्गमं तस्य विषं निर्व्यापितां व्रजेत्॥

[4] अस्थिदेशोन्नुखित मष्ठीलाग्रमुद्ररादामन्यतमस्य प्रहारैरेव विचाल्य यथामार्गमेव।

Suśruta Saṁhitā, I. xxvii.

nirghātanī—described before[1], served the same purpose. Vāgbhaṭa also uses a hammer[2] to shake an arrow fixed in the bone, and directs us to extract it with the hands or by the various kinds of forceps[3].

The Greeks used some iron instrument to shake such an arrow from the place where it was lodged. The hammer was also used by the Greeks and Romans but in a different capacity. Paul mentions its use in cranial surgery to strike the lenticular and gouge[4]. Paul and Celsus describe a "method of extracting foreign bodies from the ear by laying the patient on a board and striking the under side with a mallet."[5] Vāgbhaṭa describes this method for draining out water from the ear.[6]

10. PĀNIPĀDATALA. THE PALM OF HAND AND SOLE OF FOOT.

11. AṄGULI OR FINGERS.

The surgeon's hand is considered by Suśruta to be the principal instrument as the use of all other instruments depends

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[1] See P. 111.

[2] सुद्गराहतया नाड्या निर्घात्योत्तुखितं हरेत्।
तैरेव चानयेन्मार्गमार्गोत्तुखितं तु यत्॥
Aṣṭāṅga Hṛdaya Saṁhitā, I. xxviii.

[3] चक्षाहरेत् करप्राप्यं कारयेच्चेतरत् पुनः।
हस्तं सिंहाहिमकरजिह्मं कर्कटकाननैः॥
षड्यं ब्रर्थसंस्थानाद् गृहीतुं शक्यते यतः।
कङ्क भल्लाग्र कुरर शरारी वायसाननैः॥
Ibid.

[4] Paulus Ægineta VII. xc.

[5] Milne, Graeco-Roman Surgical Instruments, p. 125.

[6] कर्णेऽम्बु पूर्णं हस्तेन मथित्वा तैलवारिणी।
विपेदधीमुखं कर्णं हत्वाद्या चूषयेत वा॥
Aṣṭāṅga Hṛdaya Saṁhitā, I. xxviii.

upon it[1]. But again he mentions the hand and foot as accessory to, or substitutes for, the instruments. Longmore[2] says: "Of all instruments for making a complete examination of a gun-shot wound as well as for exploring for foreign bodies which may be lodged in it, the finger of the surgeon is the most appropriate, whenever a wound is large enough to admit of its insertion." There are many instances of the use of hand and foot in the treatment of surgical diseases but I shall point out a few of them.

1. Both Suśruta[3] and Cakradatta[4] say that "if a swelling be hard but slightly painful, then it should be well fomented, pressed and rubbed by a piece of bamboo, or palm of the hand, or thumb to cause its subsidence. Bhāva Miśra also quotes this verse [5]. Suśruta [6] and Vāgbhaṭa [7] recommend a similar treatment for enlarged glands.

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[1] See foot note, P. 90.

[2] Longmore, Gun-shot Injuries, 1877, P. 319.

[3] अभ्यज्य स्वेदयित्वा तु वेणुना वा शनैः शनैः।
विमर्दयेद्भिषक् प्राज्ञस्तलेनाङ्गुष्ठकेन वा॥
Suśruta Saṁhitā, IV. i.

[4] अभ्यज्य स्वेदयित्वा च वेणुनाद्याततः शनैः।
विस्रापनार्थं सञ्जीयात् तलेनाङ्गुष्ठकेन वा॥
Cakradatta, Vraṇaśotha Cikitsā.

[5] अभ्यज्य स्वेदयित्वातु वेणुनाद्या शनैः शनैः।
विमर्दयेद्भिषङ्मन्दन्तलेनाङ्गुष्ठकेन वा॥
Bhāva Prakāśa, II. iii.

[6] हतेषु दोषेषु यथानुपूर्व्वं यन्त्री भिषक् स्रोत्र च समुत्थितेषु।
सिग्रस्य विस्रापनमेव कुर्य्यादङ्गुष्ठलीढोपलवेणुदण्डैः॥
Suśruta Saṁhitā, IV. xviii.

[7] संस्वेद्य वङ्गीयन्त्रिं विमर्द्दीयात् पुनः पुनः।
Aṣṭāṅga Hṛdaya Saṁhitā, VI. xxx.

2. Suśruta says[1] that "when a morsel of food sticks in the throat, a blow should be fearlessly struck with the fist on the shoulder of the patient without his knowledge". Vāgbhaṭa[2] also describes it.

It is however curious to find that exactly the same procedure was adopted by Alsaharavius. Adams in his commentary[3] on Paul says that "when a morsel of food sticks to the œsophagus, Alsaharavius directs that the person should be struck on the back, which will facilitate the descent of it".

3. In the reduction of dislocation of the lower jaw, Caraka used his fingers to do it exactly in the same way as recommended by the modern surgeons. He directs us to depress the lower jaw by the thumbs and at the same time to raise the chin by the index fingers[4]. The verses are quoted by Cakradatta.[5] The description of the method, quoted from any modern text book, would be a good commentary on the above passage of Caraka. Erichsen says[6]: "The reduction is best effected, by the surgeon,

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[1] यासग्रस्यैतु कण्ठासक्तं निःशङ्कमनवृङ्क्ष्यं मुष्टिनाभिहन्यात् खेदं मद्यं पानीयम् वा पाययेत्।

Suśruta Saṁhitā, I. xxvii.

[2] अन्यान स्कन्धघाताभ्यां यासग्रस्ये प्रवेशयेत्।

Aṣṭāṅga Hṛdaya Saṁhitā, I. xxviii.

[3] Adam's Commentary on Paulus Ægineta, VI. xxxii.

[4] व्यात्ताननं हनू खिनमङ्गुष्ठाभ्यां प्रपीड्य च।
प्रदेशिनीभ्यामोष्ठाभ्यं चिबुकोन्नमनं हितं॥
सम्यां सङ्गमयेत् स्थानं सम्यां खिन्नं विनामयेत्।
प्रत्येकं स्थानदृष्ट्यादिक्रिया वैद्येष्वमाचरेत्॥

Caraka Saṁhitā, VI. xxviii.

[5] Cakradatta, Vātabyādhi Cikitsā.

[6] Surgery, Vol. II, p. 658.

standing before the patient, placing his thumbs, well protected by napkins, or a few turns of a narrow bandage, on the molar teeth on each side, and then depressing the angles of the jaw forcibly, at the same time that he raises the chin by means of his fingers spread out and placed underneath it."

4. Caraka says[1] : "After pairing her nails and covering the tip of her index finger with cotton, the nurse is to clean the palate, lips and throat of the new-born child".

With this passage we may compare what Barnes says on the point[2]. "The attendant having then placed the child close to the mother, so as to avoid any strain on the cord, should cleanse its mouth from any fluids, such as blood and mucus, it may have partially swallowed during its passage through the vagina. This should be done at once, as such fluids drawn into the lung vescicles may give rise to inflammation of the lungs, or even septicæmia."

5. Suśruta[3] recognises "six modes of diagonosing diseases, namely by the five senses *i.e.* by hearing, smell, taste, sight and touch, and by questions. "Symptoms descernible by the sense of touch are coolness or heat, smoothess or roughness, softness or hardness, and other tangible qualities of the skin in fever, dropsy,

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[1] अथास्य तालौष्ठकण्ठजिह्वाप्रमार्ज्जं नमारभेत अङ्गुल्यासुपरिलिखितनखया सुप्रक्षालितोपधानकार्पासपिचुमत्या प्रथमं प्रमार्ज्जि तस्यास्य च शिरस्तालु कार्पासपिचुना श्लेष्मणं प्रतिच्छादयेत्।

Caraka Saṁhitā, IV. viii.

[2] Obstetric Medicine and Surgery, Vol. II, p. 105.

[3] षड्विधो हि रोगाणां विज्ञानोपायः। तद्यथा पञ्चभि श्रोत्रादिभिः प्रश्नेन चेति।
* * * * स्पर्शनेन्द्रियविषेयाः शीतोष्णश्च कर्कशमृदुकठिनतादयो ज्वरशोफादिषु।

Suśrutā Saṁhitā. I. x.

and other diseases." And we know how important it is to educate the tactile sense in the diagonosis of diseases.

6. The foot is recommended to fix a part of the human body whence any foreign body may be removed easily by the hands.[1] Suśruta says[2]: "If a foreign body cannot be easily extracted, as when it is impacted in the hollow or the substance of a bone, the part should be pressed by the feet, and it should by drawn out by the instrument." Vāgbhaṭa also gives a similar description[3]. Caraka describes a method of removal of the placenta if not spontaneously seperated. One of the female attendants should press upon the navel of the peurpera forcibly with her right hand, while with the left hand placed upon her back, she should shake her. Then the heel is to be placed on the patient's buttock while the two sides of the gluteal regions are also to be pressed and shaken[4].

12. Jihvā or tongue.

The organ of taste as a means of diagonosis is noted by

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[1] पाद इति पादेन शरीरदेशं धृत्वा इस्तादियन्त्रेण वा उद्धरणादि क्रियते।

Vāgbhaṭārtha Kaumudī, I. xxv.

[2] अस्थिविवरप्रविष्टं अस्थिविदष्टं वा अङ्गस्य पादाभ्यां यन्त्रेणापहरेत्।

Suśruta Saṁhitā, I. xxvii.

[3] अस्थिदष्टं नरं पद्भ्यां पीड़यित्वा विनिर्हरेत्।
इत्यशको सुवलिभिः सुगृहीतस्य किङ्करैः॥

Aṣṭāṅga Hṛdaya Saṁhitā, I. xxviii.

[4] तस्यार्थे दमरा न प्रपन्ना स्यादधैनामन्यतमा स्त्री दक्षिणेन पाणिना नाभेरुपरिष्टादलवत् निपीड्य सव्येन पाणिना पृष्ठत उपसंगृह्य सुनिर्हृतं निर्हृतयात्। अधस्ताः पादपार्ष्ण्या-श्चौमाकोटयेदस्याः स्फिचावुपसंगृह्य सुपीड़ितं पीड़येत्।

Caraka Saṁhitā, V. viii.

Suśruta[1]. "Symptoms discernible by the sense of taste are the various tastes noticeable in morbid secretions of urine and other diseases". Cakrapāṇi "explains that 'inference' is necessary, because the sense of taste can not be exercised by the physician on the patient directly;"[2] he must do it through some intermediate agents such as ants, whose attraction to sugar is well-known and so the presence of sugar in urinary diseases can be inferred."

13. Danta or tooth.

Ivory as a material of surgical instruments has been described bofore[3]. Suśruta[4] advises us to use the ash of ivory with stibium as a stimulant to the growth of hair on a scar. It is also recommended by Vāgbhaṭa[5].

14. Nakha or nails.

Suśruta advises the surgeon to use his nails[6] for the operation of cutting, piercing and extraction, if these can be possibly helped by his nails.

In modern times, nails often help the surgeons in separating

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[1] रसनेन्द्रियग्राह्याः प्रमेहादिषु रसविशेषाः।

Aṣṭāṅga Hṛdaya Saṁhitā, I. x.

[2] Hœrnle's Commentary on the Suśruta Saṁhitā, I. x. (Bibliotheca Indica).

[3] See page 67.

[4] इभदन्तमसीं कृत्वा मुखस्यैव रसाञ्जनं।
रोमास्थितेन जायन्ते सिषाः पानितलेष्वपि॥

Suśruta Saṁhitā, IV. i.

[5] तैलाक्ता इभदन्तस्य मषी वा व्रणे परम्॥

Aṣṭāṅga Hṛdaya Saṁhitā, VI. xxiv.

[6] आहार्य्यच्छेद्यभेद्येषु नखं शस्त्रेषु योजयेत्।

Suśruta Saṁhitā, I. viii.

layers of tissues during operation as in the operation for the radical cure of hydrocele. We often extract thorns, impacted in our body, with our nails.

15. Mukha or mouth.

The use of mouth as a suction apparatus was well known to the ancients. Suśruta advises us to use ārā or pāṇimantha (awl) to perforate bone in diseases of the medullary canal, caused by obstructed and deranged air. He next introduces one end of a tube, open at both ends, into the canal through the perforation in the bone, while through the other end the surgeon sucks out air by his mouth[1]. The use of mouth for sucking out air through the śṛṅga or horn has been described before[2]. Caraka says[3] that the poison of a snake-bite may be sucked out by the surgeon's mouth, filled with flour or ash. Even in modern times, it is common amongst Indians to suck out blood, in accidental cuts by knives, by the mouth. The practice of the suckers in Europe has been noted before[4].

16. Vāla or hair.

Horse-hair is to be used for applying ligatures round the piles[5]. It is also a material of suture for the skin. Horse-hair is also described to have been used for raising pterygium. Paul[6] also used horse-hair to raise a pterygium.

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[1] निरुद्धेऽस्थनि वा वायौ पाणिमन्थेन दारिते।
नाड़ीं दत्त्वास्थनि भिषक् चूषयेत् पवनं बली॥
Suśruta Saṁhitā, IV. iv.

[2] See P. 148-49.

[3] दंशं वा चूषेन्मुखेन यवचूर्णपांशुपूर्णेन।
Caraka Saṁhitā, VI. xxv.

[4] See P. 149-50.

[5] वालाः, अश्वादीनां पुच्छभवकेशा वृक्षाग्र अर्शो वाल्यादि बन्धनार्थं युज्यते।
Vāgbhaṭārtha Kaumudī, I. xxv.

[6] Paulus Ægineta, VI. xviii.

Suśruta[1] says: "Bundles of hairs or tents are to be used in the treatment of wounds in the skull, formed by the extraction of an arrow from the brain. These would prevent the hernial protrusion of the cerebral subtances from passing out through the wound. The hairs are to be removed one by one, as the wound heals up gradually." Vāgbhaṭa[2] also approves this treatment.

A bundle of hairs tied to a long thread is mentioned by Suśruta to have been used for the extraction of fish-bones from the throat[3]. The patient is directed to swallow the ball of hairs with some liquid. Next emetics are to be administered to excite vomiting. During this act, the foreign body gets entangled in the meshes of the ball, which being then suddenly pulled out by the thread outside, extracts the fish-bone satisfactorily. Vāgbhata[4] also describes it similarly. For this purpose

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[1] शिरसीऽपहृते शल्ये बालवर्त्तिं प्रवेशयेत्।
बालवर्त्त्यामदत्तायां मस्तुलुङ्गं स्रवात् स्रवेत्॥

Suśruta Saṁhitā, IV. ii.

[2] कार्य्या शल्याहृते विद्धे भङ्गादिदलिते क्रिया।
शिरसीपहृते शल्ये बालवर्त्तिं प्रवेशयेत्॥
मस्तुलुङ्गस्रुते क्लुप्तो ह्यादेनं क्लीऽन्यथा।
व्रणे रोहति चैकैकं शनैरपनयेत् कचम्।
मस्तुलुङ्गस्रुतौ खादेन्मत्स्यास्थानन्यजीवजान्॥

Aṣṭāṅga Hṛdaya Saṁhitā, VI. xxvi.

[3] अस्थिशल्यमन्यदा तिर्य्यक्कण्ठासन्नमवेक्ष्य कैश्चोष्णुकं दृढे क सूत्रवद्धं द्रवभक्तोपहितं पयसेदाकण्ठाच्च पूर्वकोष्ठं वामयेद्यमतश्च शल्यं कदंशसक्तं ज्ञात्वा सूत्रं सहसा त्वाचिपेत्।

Suśruta Saṁhitā, I. xxvii.

[4] कोशोन्दुकेन पीतेन द्रवैः कण्टकमाचिपेत्।
सहसा सूत्रवद्धेन वमतः स्रोत चेतरत्॥

Aṣṭāṅga Hṛdaya Saṁhitā, I. xxviii.

a tooth brush formed by chewing the end of a narrow branch of a tree is also recommended[1]. A common domestic remedy is to make the patients swallow large morsels of boiled rice, plantain, etc.

Paul[2] mentions a similar contrivance, and says: "Some are of opinion that the patient ought to be made to swallow large morsels, such as stalk of lettuces or pieces of bread; but others direct us to bind a thread about a small piece of clean soft sponge and give it to the patient to swallow, and then taking hold of the thread to draw it up, and to do this frequently in order that the thorn may get fixed in the sponge and be brought up". For this purpose Aetius used the epilation forceps. Paul calls it acanthobolus or the fish-bone forceps.

The modern surgeons use a probang for the same object. "Small sharp bodies, such as bristles, fish-bones, or pins, are generally found sticking between the pillars of the fauces and the tonsils." Such bodies "should not be pushed on, but an endeavour should be made to catch them with the "horse-hair probang." This being pushed gently, unexpanded, beyond the point where the pin or bone is stuck, is expanded by pulling up the handle and then withdrawn with a slight rotatory motion."[3]

Caraka[4] mentions the practice amongst the recently delivered

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[1] सदना वा दन्तधावनकुर्चकैनापहरेत्।
Suśruta Saṁhitā, I. xxvii.

[2] Paulus Ægineta, VI. xxxi.

[3] Swain's Surgical Emergencies, 3rd ed., Pp. 32-33.

[4] यथाक्षा बालवेष्या कण्ठतालु परिसृजेत्।
Caraka Saṁhitā, IV. xviii.

women to push a braid of her hair into her throat, to help the expulsion of the placenta. So in the Yogaratnākara[1], her throat is advised to be rubbed by a finger surrounded by hairs. This practice is still prevalent among the women of Bengal to a certain extent.

Suture Material.

Horse-hair was the material used by the Hindus for sutures. Besides it, they used[2] sutures of fine thread, or the fibres of the bark of Aśmantaka (Cæsalpina digynia), or threads made of hemp or flax, or of the fibres of which bow-strings were made, or of the fibres of the Mūrvvā (Sansevieria zeylanica) or Guḍūcī (Tinspora cordifolia). Besides these, the Hindu surgeons used the mouth parts of the ants as clasps to close incisions on the intestines. Suśruta[3] describes the use of living black ants to close the incisions on the walls of the intestines, during the operation for intestinal obstruction, after removing the scyballi, stones, etc. He advises us to remove the bodies of the ants, leaving their heads fixed on the margins of the incision,

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[1] केशवेष्टित्वाङ्गुला तस्या: कण्ठं प्रघर्षयेत्।

Yogaratnākara, P. 437.

[2] सीव्येत् सूक्ष्मेण सूत्रेण वल्केनाश्मन्तकस्य वा।
सनजचीनसूत्राभ्यां स्नायुना बालेन वा पुनः॥
मूर्व्वागुडूचीतानैर्वा।

Suśruta Saṁhitā, I. xxv.

स्नायुना सूत्रेण वल्कलैः।
सीव्येद्व दूरे नासन्ने गाढान्नात्यं न वा बहु॥

Aṣṭāṅga Hṛdaya Saṁhitā, I. xxix.

[3] परिस्राविण्यपेक्षेवमेव शल्यमुद्धृत्यान्त्रवान् संशोध्य तच्छिद्रमन्त्रं समाधाय कृष्णपिपीलिकाभिर्दंशयेत् दष्टे च तासां कायानपहरेन्न शिरांसि ततः पूर्ववत् सीव्येत्।

Suśruta Saṁhitā, IV. xiv.

in the act of biting. Then the intestines should be replaced with the ants' heads sticking to them. Caraka[1] also describes the use of ants for obliteration of small perforations in the intestines, but he takes away the ants before replacing the gut into the abdominal cavity. If by any accident, the abdominal muscles be incised and the intestines come out of a gaping wound, Suśruta recommends us to allow black ants to bite the exposed coils of intestines before replacing them into the abdomen[2]. This is a curious practice of ancient surgery of the Hindus. The Greeks and Arabs never mentioned it. "Amongst some Indian tribes, it is customary to allow both edges of a wound to be seized by the sharp head-nippers of certain ants, whose bodies are then rapidly cut off; one ant after another being used, the wound is closed."[3]

Suśruta describes four sorts of sutures, *viz*:

1. Vellitaka or winding.
2. Gophaṇikā or like a sling.
3. Tunna sevanī or continued sutures.
4. Ṛjugranthi or interrupted sutures.

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[1] छिद्राण्यन्तस्य तु स्थूलैर्दंशयित्वा पिपीलिकैः।
बहुशः संगृहीतानि मत्वा च्छित्वा पिपीलिकान्।
प्रतियोगैः प्रवेश्यान्त्रं यद्वि: सीव्येद व्रणं ततः॥

Caraka Saṁhitā, VI. xviii.

[2] अभिघ्रमन्त्रं निष्कृष्टं प्रवेश्यं नान्यथा भवेत्।
पिपीलिकाशिरोयन्त्रं तदाप्यं के वदन्ति तु॥
प्रचाल्य पयसा दिग्धं व्रणशोणित पांशुभिः।
प्रवेशयेत् छत्तनखो घृतेनाक्तं शनैः शनैः॥

Suśruta Saṁhitā, IV. ii.

[3] Neuburger's History of Medicine. Playfair's Translation, Vol. I., P. 9

These are advised to be so applied as they may suit the different parts of the body[1]. The needles must not be introduced either too far from, or too close to the edges of the wound. In the former case, the lips of the wound shall be inflamed and so cause pain, while in the latter, the sutures will give way".

The use of horse-hair as a material for suturing wounds was unknown to the Greeks and Romans. They used sutures of flax and woollen threads for wounds. Paul says: "Afterwards we unite the seperated parts with a needle containing a woollen thread, being satisfied with two sutures."[2] Celsus[3] advises us to use sutures of soft thread; and the apolinose of Hippocrates[4] is directed to be made of crude flax.

17. Aśvakaṭaka. THE RING OF A HORSE'S BRIDLE.

Suśruta says that when the arrow is firmly fixed in the bone and if it can not be extracted by forcible pulling by hands or instruments, it should be tied to the ring of a horse's bridle. Then the animal is to be whipped, when by the sudden movement of the horse, the weapon would be jerked out of the wound[5].

18. Śākhā OR BRANCH OF A TREE.

Another method is to tie such an arrow by means of a rope

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[1] सौव्येदङ्गितकं शनैः।
सौव्येद्वौफणिकां वापि सौव्येद्वा तुन्नसीवनीं।
सञ्जयन्विमथो वापि यथायोगमथापि वा॥
Suśruta Saṁhitā, I. xxv.

[2] Paulus Ægineta, VI. xii. Adam's Translations.

[3] Celsus, V. xxvi.

[4] Hippocrates, iii. 132.

[5] चक्रवक्रकटके वा बध्नीयादथैनं कशया ताडयेयुश्चोद्भ्रमयन् शिरोवेगेन शल्यमुद्धरति।
Suśruta Saṁhitā, I. xxvii.

to the branch of a tree, lowered by pressure[1]. When the pressure is released, the branch suddenly goes high up, and thereby it pulls the weapon out of the wound[2]. Dallana, however, mentions another view that a bridle-ring and a branch of a tree are both required for the extraction of foreign bodies[3]. Hœrnle remarks: "The branch apparently is put through the ring to afford a stronger pull"[4]. Vāgbhaṭa[5] also mentions these contrivances.

19. Ṣṭhīvana or spittle.

Dallana[6] understands by it—"throwing out expectoration and saliva by the mouth." By this means any foreign body lodged in the oral cavity, such as in the gums, fauces, may easily be got rid of.

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[1] दृढां वा द्रुशाखानवनम्य तासां पूर्ववदवहोद्धरेत्।

Suśruta Saṁhitā, I. xxvii.

[2] शाखा, द्रुशाखा, वङ्क्षायास त्विनमितायां शाखायां शल्यायभागं दृढं बद्धा, सहसा शाखात्यागेन उन्नमितया शाखया शल्यमुध्रियते।

Vāgbhaṭārtha Kaumudī, I. xxv.

[3] यन्त्रे त्वेवं पठन्ति अशक्यमेवं वा बलवद्भिः सुपरिग्रहितस्य यन्त्रे चैनं याहयित्वा शल्यनावहं प्रविभज्य धनुर्गुणैर्बध्वैकतःशाखाद्रुवक्त्रकटके बध्नीयात्। अथैनम् इत्यत्र कारकेण पाठः कशया ताडयेत् यथोन्नमयन् शिरोवेगेन शल्यमुद्धरति, नमितायां पश्चाद्गायां द्रुशाखायां व पूर्ववद् बद्धोद्धरेदिति॥

Nivandha Saṁgraha, I. xxvii.

[4] The Suśruta Saṁhitā. Bibliotheca Indica. P. 48. foot note 109.

[5] तथाप्यशक्यो वारद्धं वक्त्रीकृत्य धनुर्ज्यया।
सुबद्धं वक्त्रकटके बध्नीयात् सुसमाहितः॥
सुसंयतस्य पश्चाङ्गा वाजिनः कशयाथ तम्।
ताडयेदिति मूर्धानं वेगेनोन्नमयन् यथा॥
उद्धरेच्छल्यमेवं वा शाखायां कल्पयेत्तरोः।

Aṣṭāṅga Hṛdaya Saṁhitā, I. xxviii.

[6] छीवथुः श्लेष्मादिनिरसनम्।

Nivandha Saṁgraha, I. vii.

20. Provāhana or fluxing the patient.

This comprises the acts of emesis, purgation and lacrymal secretion. Thus the foreign bodies lodged in the alimentary canal or eyes may be got rid of by causing discharges from the bowels, the stomach, or the eyes[1].

21. Harṣa or objects exciting happiness.

Persons suffering from vraṇa or wound are directed to have their minds in a state of cheerfulness by the sight of objects exciting happiness[2]. A cheerful man is a better subject for a surgical operation than a morose and gloomy one. Vāgbhaṭa[3] adds fear as an accessory instrument. Joy and fear cause a sudden change in the temper of a man and so may be of some help in curing diseases[4]. Suśruta regards, sorrow as a śalya or foreign body which is to be removed by joy.[5]

22. Ayaskānta or load-stone.

Magnet was known to the ancient Hindus[6] and they used it

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[1] तवानुचवचूद्वार कास मूत्र पुरीषानिलै: स्वभाववलप्रवृत्तै नयनादिभ्य: पतति।
Suśruta Sāṁhitā, I. xxvii.

[2] सुहृदो विचित्रपन्थाग्र कथाभिर्न्नवेदना:।
आश्वासयन्तो वहुशस्तनुकूला: प्रियम्वदा:॥
* * * *
सम्यदायनुकूलाभि: कथाभि: प्रीतिमानस:।
आशावान् व्याधिमीचाय चिप्रं सुखमवाप्नुयात्॥
Suśruta Saṁhitā, I. xix.

[3] See foot-note 1, P. 98.

[4] भय हर्षौ शरीरस्थ सहसा भावान्तरमुत्पादयन्ती यत्नकार्यं कुरुत इति।
Vāgbhaṭārtha Kaumudī, I. xxv.

[5] हृदयस्थित मनेक कारणोत्पन्नं शोकशल्यं हर्षेणेति।
Suśruta Saṁhitā, I. xxvii.

[6] मणिगमनं सूच्यभिसर्पणमदृष्टकारणकं।
Vaiśeṣikā Darśanam, Ch. V. Āhnika 15.

to extract minute foreign bodies such as iron particles from the eyes and teeth. Suśruta[1] also mentions its use for extracting an arrow from the wound, if it be without barbs.

In modern times, a magnet is still used for removing a particle of iron from the eye. "Indeed, cases have occurred in which the application of an inch bar-magnet connected with four Grove's cells to the outside of the cornea has caused the foreign body to retrace its course and emerge through the wound"[2]. A fragment of iron lying in the vitreous has been removed by the Snell's electro-magnet introduced through the scleral wound behind the ciliary region. "The following plan of ascertaining whether a portion of needle be really impacted has been suggested by Marshall, and successfully carried into practice by Littlewood of Leeds. A powerful magnet is to be held upon the part for a quarter of an hour, so as to magnetise the fragment; a firmly hung polarised needle should then be suspended over it, when, if any iron is present, deflection will ensue."[3]

23. Kṣāra. Caustics or potential cautery.

Caustics were highly extolled by the ancient surgeons as the external applications are better tolerated by the weak and

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सूच्यभिसर्पणमिति सूचीपदेन लौहमात्रं ब्रुवन्नोपलक्षयति: तथा चायस्कान्ताभिमुखं यत् सूच्यादेर्गमनं * * * * * * *

Śaṅkara Miśra, Upaskāra.

[1] चतुलोमसनववद्वकर्षणमन्त्र ब्रुवमुखमयस्कान्तेन।

Suśruta Saṁhitā, I. xxvii.

[2] Carter's Ophthalmic Surgery, 2nd ed., P. 369.

[3] Erichsen's Surgery, Vol. I, P. 343.

timid persons who are afraid of the surgeon's knife[1]; though Suśruta[2] distinctly states: "The following persons should not be treated with caustics: weak people, children, old and timid people, etc." They even give them preference to the knife for they argue that surgical diseases are radically cured by the application of the caustics, without any possibility of recurrence. Suśruta says[3]: "Of all cutting instruments and their substitutes, caustics (or vegetable alkalis) are the most important, because by means of them deep and superficial incisions and scarifications may be made, derangements of the three humours may be rectified and some diseases can be treated with special advantage."[4]

For the preparation and uses of caustics, see the Suśruta Saṁhitā, I. xi.

For the application of potential cauteries, three classes of instruments are recommended.[5]

1. Darvvī—it is to be made of wood and should resemble a spoon in appearance.

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[1] अल्पसत्वेऽबले बाले पाके चातर्थ्यमुद्गते।
दारणं मर्म्म सस्यादिस्थिते चाक्षत पाटनं॥

Aṣṭāṅga Hṛdaya Saṁhitā, I. xxix.

[2] अदहनेते चारकल्याः। तद्यथा दुर्ब्बलबाल स्थविर भीरुसर्व्वाङ्ग गुल्मोदरि रक्तपित्तिगार्भिण्यनुसती प्रदरज्वरि प्रमेहीरः चतचीनटक्षा मूर्च्छापित्तकीवापडक्तीदुग्ध फलयोनयः॥

Suśruta Saṁhitā, I. xi.

[3] शस्त्रानुशस्त्रेभ्यः चारः प्रधानतमश्छेद्यभेद्यलेख्य व्यधनादिदोषघ्नत्वादिशेषक्रियावचारणाच्च।

Suśruta Saṁhitā, I. xi.

[4] Ibid. Hoernle's Trans. Bibliothica Indica.

[5] चारेण च दर्व्वीकूर्च्चशलाकानामन्यतमेन चारं पातयेत्।

Suśruta Saṁhitā, IV. vi.

2. Śalākā or rods,—plain probes are mentioned for application of caustic lotions to parts of the body. But generally the ends of the probes are shaped like spoon. To this class belongs the three spoon-like probes of Suśruta and the three nail-shaped probes of Vāgbhaṭa, described before[1].

3. Kūrca,—it is a brush-like instrument.

The application of caustics has its advantages and disadvantages; and these are to be considered in their relations to the pre-anæsthetic periods of surgery. Patients are still less terrified by their application than by surgical incisions. The real value of caustics is thus summed up by Velpeau.[2] "Nevertheless caustics possess some advantages which can not be denied them. As they do not give the idea of an operation, they shake less the minds of the patients, they are accepted with more calmness and with infinitely less effort, than the action of the knife. Mortifying the tissues step by step, they give rise to no effusion of blood, and affect less deeply the economy than the operation, properly so called. Women treated in this way do not require to remain in bed or to consider themselves as patients. The dressings require little care, and do not demand absolutely the intervention of the surgeon. The wound cleans itself very rapidly in general, and once cleaned, it proceeds speedily towards cicatrisation. Without exempting wholly erysipelas, phlebites or purulent infection as some surgeons have asserted, there is notwithstanding, some reason for supposing that they expose the patient somewhat less to these troublesome complications than the operation".

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[1] See P. 158-159.

[2] Velpeau. Cancer of the breast. Marsden's trans.

25. Agni. Actual cautery.

Suśruta says[1]: "With regard to surgical treatment, actual cautery is said to be superior to caustics, in as much as diseases treated with the actual cautery do not re-appear, and because it can cure diseases which are incurable by medicines instruments, and caustics."[2] This partiality for cauteries is one of the reasons of the gradual decadence of Hindu surgery and its total extinction in the present time. To this belief of the Hindus may be compared the following aphorism of Hippocrates[3]:—

"Those diseases which medicine do not cure, the knife cures; those which iron can not cure, fire cures; and those which fire can not cure, are to be reckoned wholly incurable".

For the application of the actual cautery the following articles are considered necessary[4]:—

1. Pippali or piper longum
2. Goat's dung
3. Teeth of a cow
4. Śara or saccharum sara
5. Probes or śalākā (see before[5])

} These are to be used for diseases of the skin.

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[1] चारादग्निर्गरीयान् क्रियासु व्याख्यातस्तद्घ्नानां रोगानामपुनर्भावाद्वेषजशस्त्रक्षाराद्रसाध्यानां तत्साध्यत्वाच्च।

Suśruta Samhitā, I. xii.

[2] Ibid. Hoernle's Trans. Biblio. Ind.

[3] The Works of Hippocrates. Syd. Soc., vol. II., p. 774.

[4] अथैमानि दहनोपकरणानि। तद्यथा पिप्पल्यजाशकृद्गोदन्त शरशलाका जाम्बवौष्ठेतर लोहाः क्षौद्रगुडसेहाश्च। तत्र पिप्पल्यजाशकृद्गोदन्त शरशलाकास्त्वग्गतानां। जाम्बवौष्ठेतरलोहानि मांसगतानां क्षौद्रगुडसेहाः सिरास्नायु सन्धिस्थितानां।

Suśruta Saṁhitā, I. xii.

[5] See P. 159-60.

6. Jāmvavauṣṭha[1]	Used for diseases of the muscles.
7. Different kinds of iron	
8. Honey[2]	Used for diseases of the vessels, joints and ligaments.
9. Treacle	
10. Ghee	
11. Oil	

"Both Aetius and Oribasius represent goat's dung, pounded with vinegar, as being equally efficacious as the sinapism, and applying particularly to ischiatic diseases."[3] Hippocrates says that cauterisation may be performed with boxwood spindles dipped in boiling oil.[4] In Kordofan, are used "*El kamaia*. primitive instruments used for cauterisation consisting of a piece of camel's or sheep's dung dried and impaled on a long thorn."[5]

12. Cautery knife.—This is to be used in the treatment of prolapse of the omentum in cases of abdominal injuries. The

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[1] अर्शो भगन्दरयन्त्रिनाड़ीदुष्टव्रणादिषु ।
मांसदाढ्यो मधुस्नेह आम्बष्ठो गुड़ादिभिः ॥

Aṣṭāṅga Hṛdaya Saṁhitā, I. xxx.

[2] मधुस्निग्धेन तैलेन मज्जचौद्रवसाघृतैः ।
तत्तैर्वा विविधैर्लौ हैर्दहेद्दाह विभेषवित् ॥

Caraka Saṁhitā, VI. xiii.

[3] Adams' Commentary on Paul. vol. iii. bk. vii. sec. xix.

[4] Hippocrates, ii. 482.

[5] Medical Practices in Kordofan, Third Report. Wellcome Research Laboratory, Khartoum.

prolapsed part is to be ligatured well and the cautery knife used to remove the prolapse below the ligature[1].

Cautery knife was also known to the Greeks and Romans. Galen[2], speaking of cancer, says that "some use heated razor blades, at once cutting and burning". Paul[3] also mentions a sword shaped cautery in the radical cure of hydrocele.

13. Plates of copper, lead or iron.—In the application of both kinds of cauteries, plates of these metals are to be used to surround a tumour to prevent injury to the adjacent structures (Suśruta).[4]

Hippocrates[5] in the treatment of nasal polypus, says that "when that occurs we must insert a tube and cauterise with three or four irons". Celsus[6] says that this tube may be a calamus or a tube of pottery.

14. Cakradatta mentions a probe of gold for applying actual cautery to the hair follicles after the removal of the eyelashes, to prevent a recurrence of trichiasis.[7]

Albucasis similarly recommends burning the roots of hairs

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[1] उदराग्मेदसो वर्त्तिं निगता यस्य देहिनः।
कषायभक्षणत्कोथां वह्ना सूत्रेण सुव्रित्।
अग्नितप्तेन शस्त्रेणच्छिन्द्यात्प्रध्वंसमायुतं॥

Suśruta Saṁhitā, IV. ii.

[2] Galen, xiv. 786.

[3] Paul, vi. lxii.

[4] यदत्यमूलं बपुतामसौस पट्टैः समावेष्टा तदायसैर्वा।
क्षाराग्निशस्त्राण्य सकृदविदध्यात् प्राणानहिंसन् भिषगप्रमत्तः॥

Suśruta Saṁhitā, IV. xiii.

[5] Hippocrates, ii. 244.

[6] Celsus, vii. x.

[7] See foot-note 2, p. 66.

in trichiasis with a probe of gold. Paul[1] applies a heated olivary probe or an aural probe for the same purpose. Haly Abbas and Rhazes also describe this operation.

26. Bheṣaja or medicines.

This means such medicines as become necessary in the treatment of surgical diseases and do the work of surgical instruments to a certain extent. Suśruta gives a list of medicines,[2] required in the treatment of various kinds of inflammations, and I quote a few passages from the English translation[3] to illustrate the action of medicines in surgical practice. "Warm poultices made of the following drugs promote suppuration, namely, fruits of *sana* (*Crotalaria juncea*), *Múlaka* (*Raphanus sativus*), *Śigru* (*Moringa pterygosperma*), seasum and mustard seeds, flour of barley and wheat, kiṇva (the drugs used as a ferment in distilling spirits) and linseed. The following medicines are applied for opening abscesses, namely, *chiravilva* (*Pongamia glabra*), *agnika* (*Semicarpus anacardium*), *chitraka* (*Plumbago Zeylanica*), *danti* (*Baliospermum montanum*), *hayamáraka* (*Nerium odorum*), and the excrement of the pigeon, vulture and heron. Caustic alkalies are also very offectual in opening abscesses. Demulcent articles, such as, flour of barley, wheat or *másha* (pulse of *Phaseolus Rox.*) promote discharge from the interior of abscesses. * * * * Pastils for fumigating ulcers should be made of *śríveshṭaṭka* gum of (*Boswellia Thurifera*), *sarjarasa* (resin of *Shorea robusta*), *sarala* (*Pinus longifolia*), and *devadáru* (*Cedrus*

[1] Paul viii. xiii.

[2] See Suśruta Saṁhitá, I. xxxvi.

[3] Dr. U. C. Dutt's Translation, Bibliotheca Indica. P. 151-154.

deodara); decoctions or cold infusions of astringent and unirritating barks should be used as washes for promoting granulations in ulcer. Tents for promoting granulations should be made of *soma* (*Sarcostemma brevistigma*), *amṛita* (*Cocculus cordifolias*), *aśvagandhá* (*Withania somnifera*), the plants included under the class of *kákolyádi*, and the buds of (Ficus Bengalensis)".

In treating inflammation, the Hindu surgeons used pastes to give relief to the pain and tension; warm poultices to promote suppuration; medicinal applications and incisions by knife for opening abscesses; demulcent articles to promote discharges; decoctions of drugs as corrective washes; tents of drugs and lints for introducing them into the cavities of the abscesses; decoctions in oils and clarified butter to improve the character of ulcers; pastils for fumigating sores; tents, pastes, powders and lotions for promoting granulations; drugs to repress high granulations; drainage to prevent infection, and bandages to give the part rest. This shows that the Hindus were not wholly ignorant of the antiseptic methods of treating wounds; and Suśruta enjoins that a certain incense should be kept burning in the operation room.

Of the additions to the list of Suśruta by Vāgbhaṭa, we need consider the goat's gut only.

Goat's gut.

The intestines of the goats, etc. are to be dried and prepared as materials of ligature[1]. They should be used in ligaturing fine vessels after incision by knife, evidently to check hæmorrhage.

[1] See foot note 1, P. 223.

The use of goat's gut in surgery is generally considered to have been unknown to the Greeks and Romans, as it is not mentioned in their works. But Adams points out[1] "that the strings of ancient harp were made of the guts of a sheep," and this he clearly proves from a passage in the Odyssey of Homer.

Hippocrates[2] used apolinose made of crude flax, which is also mentioned by Paul for the delegation of arteries. Rhases however describes the use of strings of harp[3] as a material for suture in the operation called gastroraphé.

Arrest of hæmorrhage.

It is generally believed and often stated in modern works on surgery that the ancients were unacquainted with the proper treatment of hæmorrhage. Suśruta however enumerates four different ways of arresting hæmorrhage after venesection; namely:

1. Sandhāna:—Contraction of the wound by astringent decoctions of Chebulic Myrobolan and the root-barks of the panchavalkala trees (five barks).
2. Skandana:—or thickening of the blood by the application of severe cold.
3. Pāchana:—or desiccating or drying up the wound by ashes.
4. Dahana:—or cauterising the veins to make them shrink[4].

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[1] See Commentary on Paul, VI. lii. vol. II, P. 345. Syd. Soc. Ed.

[2] Hippocrates, iii. 132.

[3] Rhases. Cont. xxviii.

[4] चतुर्विधं यदेतद्धि रुधिरस्य निवारणं।
सन्धानं स्कन्दनञ्चैव पाचनं दहनं तथा।

If the blood does not thicken by the application of cold, astringents should be applied; if these fail ashes should be used. By means of these three modes, the physician should endeavour to the best of his abilities to stop the bleeding, but if success be not still obtained, cautery may be resorted to as the absolute effective means[1]. To stop bleeding from an artery, he advises us to apply astringents and pressure with the fingers. Vāgbhaṭa[2] also describes these methods of arresting hæmorrhage, and advises us that if the ordinary means do not check the bleeding, the vessel must be again opened at a point in its course beyond the bleeding area, or actual cautery applied. Cakradatta also repeats these directions[3].

Vāgbhaṭa however mentions the sheep's gut amongst the accessory instruments. His commentator explains its use for

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व्रणः कषायः सस्नेहं रक्तं स्कन्दयते हिमं।
तथा सम्पाचयेद्दग्धः सद्दोचयेत् सिराः॥

Suśruta Saṁhitā, I. xiv.

[1] अस्कन्दमाने रुधिरे सस्नेहादि प्रयोजयेत्।
सस्नेहे भस्मनि तु पाचनैः समुपाचरेत्॥
कर्म्मैरेतैस्त्रिभिर्वैद्यः प्रयतेत यथाविधि।
असिद्धिमत्सु चैतेषु दाहः परम इष्यते॥

Ibid.

[2] रक्ते त्वतिष्ठति क्षिप्रं सस्नेहीमाचरेत् क्रियाम्।
लोध्र प्रियङ्गु पद्मक माधवत्वाङ्ग गोरिकैः॥
सतकपालाञ्जनचीम मधौ चीरौत्पलङ्गुरैः।
विचूर्णयेद व्रणमुखं पद्मकादि हिमं पिबेत्॥
तामेव वा शिरां विध्येद्बाधात् तस्मादनन्तरं।
शिरामुखं वा त्वरितं दहेत् तदगलाकया॥

Aṣṭāṅga Hṛdaya Saṁhitā, I. xxvii.

[3] See Cakradatta, Śirāvyādhādhikāra.

ligaturing blood-vessels[1]. Suśruta says that if in venesection, or in treating wounds, excessive bleeding occurs, it should be stopped by proper means[2].

Celsus[3] advises us to fill up the wound with dry pledgets, then to apply a sponge squeezed out of cold water and to press with the hand. If not successful, cut the vessel asunder between two ligatures, or apply cautery, or try the method of revulsion. Galen[4] applies pressure by finger on the wounded vessel, or twists it moderately. If the vessel be an artery, he gives the alternative of a ligature or cutting across. Paul[5] mentions all the methods to stop the bleeding, *viz.*, pressure, styptics, ligature, escharstics, and cauteries with fire.

Albucasis[6] mentions four methods of stopping the discharge of blood from an artery :

1. By cautery.
2. By dividing the artery across.
3. By using the ligature.
4. By styptics and bandage.

Avicenna[7], Rhases[8] and others also mention these methods

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[1] यत्तं सेवादीनां शस्त्राणां तीक्ष्णत्वात् शस्त्रच्छेदानन्तरं सूक्ष्मसिरादिवन्धनादिषु युज्यते।
Vāgbhaṭārtha Kaumudī, I. xxv.

[2] क्षेत्रैस्त्रिभिर्गतैर्वहुधा शोणिते प्रसृते भृशं।
क्षार्ये यथोक्तं वैद्येन शोणितस्रावणं भवेत्॥
Suśruta Saṁhitā, IV. i.

[3] Celsus, v. 26.

[4] Galen. Meth. Med. v.

[5] Paulus Ægineta, IV. lii. vol. II. P. 127. Syd. Soc. Ed.

[6] Albucasis. Chirrug. i. 58.

[7] Avicennæ Cantic. ii. 2., and Collig. vii. 23.

[8] Rhases. Divis i. 39; Contin. xxviii.

for arresting hæmorrhage. Thus it becomes apparent that the use of ligature for stopping bleeding was well known to the ancient surgeons and the present methods of arresting bleeding are only the revival of the old practice. Adams[1] concludes: "It appears, therefore, that the use of the ligature for stopping hemorrhages was well understood by the ancients, and had never been lost sight of even in the darkest ages."

[1] Adam's Commentary on Paul, vol. II. p. 132.

CHAPTER VI.

THE ŚASTRA OR THE SHARP INSTRUMENTS.

1. The Maṇḍalāgra or round headed knife.

It is described as a round or circular headed cutting instrument, having a length of six aṅguli. Two sub-varieties are noted —one with a circular edge and the other shaped like a razor (Dallaṇa).[1] Vāgbhaṭa[2], however, describes the blade to be shaped like the index finger when its nail points towards the palm of the hand. This would then resemble the decapitating hook of Ramsbotham.

It is said to have been principally used for the operation of cutting through and scraping[3]; so it is recommended to be used

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[1] मण्डलमिवाग्रं यस्य तत् मण्डलाग्रं तच्च द्विविधम् तथाहि—

यदग्रे मण्डलं इत्तं क्षुर संस्थानमेव वा।

मण्डलाग्रस्य जानीयात् प्रमाणन्तु षडङ्गुलम्।

Nivandha Saṁgraha, viii.

[2] मण्डलाग्रं फले तेषां तर्जन्यग्ननखाकृति।

लेखने छेदने योज्यं पोथिकौ गलशुण्डिकादिषु॥

Aṣṭāṅga Hṛdaya Saṁhitā, I. xxvi.

मण्डलाग्रं, मण्डलाग्रं नाम शस्त्रं, फले, फल प्रदेशे, तर्जन्यग्ननखाकृति स्यात्, अग्नः, अग्नहितो नखः, अग्ननखः, तर्जन्या अग्ननखः तर्जन्यग्ननखः, तस्येवाकृति राकारो यस्य तत् तर्जन्यग्ननखाकृति। तच्च पोथकौ गलशुण्डिकादिषु, लेखने, लेखन कर्म्मणि, तथा छेदने, छेदन कर्म्मणि, योज्यं।

Vāgbhaṭārtha Kaumudī, I. xxvi.

फलोद्देशे तर्जन्या अग्ननखस्तर्जन्यग्ननखस्तस्येवाकृतिर्यस्य तदेवम्।

Sarvāṅga Sundarī, I. xxvi.

[3] तच्च मण्डलाग्रकरपत्रे स्यातां छेदने लेखने च।

Suśruta Saṁhitā, I. viii.

in the operative treatment of enlarged tonsil[1]. It is also advised to be used for piercing the skull of a dead fœtus in utero to help its easy extraction by other instruments. So any other presenting part causing difficulty in the delivery of the dead fœtus, is to be cut with it. It is claimed that there is less likelihood of damaging the soft parts of the mother by this instrument than by the sharp pointed vṛddhipatra.[2]

We find that Suśruta recommends a maṇḍalāgra knife in ophthalmic practice for scraping away the membranous expansion in the operation of pterygium[3] and other ophthalmic operations,

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[1] अङ्गुष्ठाङ्गुलिसन्दंशेनाक्रम्य गलयन्थिकां।
छिदयेन्मण्डलाग्रेण च जिह्वोपरि तु संस्थिताम्।
नोत्कृष्टञ्चैव क्षीणञ्च विभागं च्छेदयेद्भिषक्॥

Suśruta Saṁhitā, IV. xxii.

[2] तच्च स्त्रियमाक्रम्य मण्डलाग्रेणाङ्गुली शस्त्रेण वा शिरो विदार्य शिरःकपालान्याहृत्य शङ्कुना मुष्टीवोरसि कक्षायां व्यपहरेदभिन्नशिरसि चाविक्षुटे गर्भे वा अंससक्थ्यंसदेशे वाङ्कं क्षिप्त्वा इतिनिवातर्तं वातपूर्णोदरं वा विदार्य निरस्यान्याधि शिथिलीभूत माहरेच्चघनसक्थ्न वा जघनकपालानीति।

यद्, यदङ्गं हि गर्भस्य तस्य स्रजति तद्भिषक्।
सम्यग्विनिर्हरेच्छित्वा रक्षेन्नारीञ्च यत्नतः।
गर्भस्य गतयश्चिता जायन्तेऽनिलकोपतः।
तचानात्मवतिर्म्बन्धो वर्त्तते विधिपूर्वकं॥
नोपेक्षेत मृतं गर्भं मूहूर्त्तमपि पण्डितः।
सद्यायु जननीं हन्ति निरुच्छ्वासं यथा॥
मण्डलाग्रेण कर्त्तव्यं छेदमन्तर्विजानता।
क्षुद्रिप्रयं हि तीक्ष्णाग्रं नारीं हिंस्यात् कदाचन।

Ibid, IV. xv.

[3] अक्ष्णि यत्र वलीजातं तत्रैतल्लक्षयेद् भिषक्॥
अपाङ्गं प्रेक्षमाणस्य वडिशेन समाक्षितः।
मुक्तुग्राम्टश्य मेधावी सूचीसूत्रेण वा पुनः॥
नचोत्पाटयता क्षिप्रं कार्य्यमन्थ्रं हि तत्।

such as for vascular net-work and nodules on the eyeball[1]. Cakradatta says[2] that if the pterygium extends to the black part of the eye, the membrane is to be raised by the point of a needle, transfixed by a vaḍiśa or hook, and leaving the pupil free, is to be excised, as Sivadāsa[3] explains, by the maṇḍalāgra. He also uses it to scrape away the root of any new growth in the eye[4] and to perform the operation of scratching in ophthalmic surgery[5].

शस्त्रपातभयाद्वासा वक्त्रं नो गाढयेद् दृढं ॥
ततः प्रशिथिलीभूतं तिमिरेव विलम्बितं ।
उल्लिखन्मण्डलाग्रेण तीक्ष्णेन परिशोधयेत् ॥
विमुक्तं सर्व्वतश्चापि कृष्णाच्छुक्लाच्च मण्डलात् ।
नीत्वा कनीनकोपान्तं छिन्द्यान्नाति कनीनकं ॥
चतुर्भागस्थिते मांसे नाचि व्यापत्तिमर्हति ।

Suśruta Saṁhitā, VI. xv.

[1] सिराजालं सिरायास्तु कठिनास्थ बुद्धिमान् ।
उल्लिखेन्मण्डलाग्रेण वडिशेनावलम्बितः ॥
सिरासु पिडकाजाता या न सिध्यन्ति भेषजैः ।
अर्म्मवन्मण्डलाग्रेण तासाञ्छेदनमिष्यते ॥

Ibid.

[2] अर्म्म तु च्छेदनीयं स्यात् कृष्णप्राप्तं भवेद्यदा ।
वडिशविद्धमुन्नम्य विभागस्थात वर्ज्जयेत् ॥

Cakradatta, Netraroga Cikitsā.

[3] अर्म्मछेदनीयमिति मण्डलाग्रेणेति शेषः । समुन्नम्येति सूच्यग्रेणेति शेषः । सूच्यग्रेण समुन्नम्य उत्तोल्य अनन्तरं वडिशेन विद्धा मण्डलाग्रेण छेदयेदित्यर्थः ।

Tattva Candrikā, Netraroga Cikitsā.

[4] अर्शस्तथावर्त्मनाथा शुक्लार्शोऽर्व्बुदमेव च ।
मण्डलाग्रेण तीक्ष्णेन सूक्ष्मैर्च्छिन्द्याद भिषक् शनैः ॥

Cakradatta, Netraroga Cikitsā.

[5] भिलीपनाहं कफजं पिप्पली मधुसैन्धवैः ।
विलिखेन्मण्डलाग्रेण प्रच्छयेद्वा समन्ततः ॥

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A small instrument with a broad blade and a rounded cutting tip is figured by Albucasis[1] in connection with ophthalmic work. This was the scalpel for the plastic operation on the eyelid as for trichiasis. Incisions were made by this knife on the eyelids in such a way as to enclose a leaf-shaped area which was then dissected off. The lips of the incisions were then united with three or four sutures[2]. Paul[3], quoting Aetius[4], describes the operation for pterygia :—"Having separated the eyelids, and seized upon the pterygia with a hook-like instrument, having a small curvature, we stretch it, and taking a needle having a horse-hair and a strong flaxen thread in its ear (eye?), and a little bent at the extremity, we transfix it through the middle of the pterygium, and with the thread we bind the pterygium and raise it upwards, while with the hair we separate and saw as it were the part at the pupil away unto its extremity ; but the remainder of it at the great canthus we cut off from the base with the scalpel used for the operation by suture, but leaving the natural flesh of the canthus, lest there be a running of the eye when it is taken away. Some stretching as aforesaid with a thread, dissect away the whole pterygium with the instrument called pterygotomos, taking care not to touch the corner."

Cakradatta mentions the use of the maṇḍalāgra for scarifying

घृतसैन्धव चूर्णेन कफानाहं पुनः पुनः।
विलिखेन्मण्डलाग्रेण प्रच्छयेद्वा समन्ततः॥

Cakradatta, Netraroga Cikitsā.

[1] Milne. Græco-Roman Surgical Instruments, Pl. ix. fig. 3.
[2] Paulus Ægineta, VI. viii.
[3] Ibid, VI. xviii.
[4] Aetius, II. iii. 60.

the tongue for bleeding in the disease called jihvākaṇṭaka (prickly tongue)[1]. He also uses it in adhijihvā or ranula and says: "The tongue is to be raised, the ranula is to be drawn up and fixed by a sharp hook, and then excised by the maṇḍalāgra. Afterwards a strong gargle is to be prescribed".[2] Pālakāpya[3] also describes it to have a length of nine aṅguli, the handle being six, and the blade three aṅguli long. The end is full-moon-shaped and it is directed to be used for scarification on the eyeball.

It seems that maṇḍalāgra of different sizes and shapes were used. For the instrument used for perforating the fœtal cranium in uterus would scarcely be thought fit for a delicate operation on the eyeball.

Soranus[4] mentions a special instrument for perforating the fœtal head. Rhases[5] directs us to open the head when the child's cranium is large and cannot be brought down. Haly

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[1] कण्ठकेषु कफोत्थेषु लिखितेष्वसृज: क्षये।
पिप्पल्यादिर्मधुयुत: कार्य्यस्तु प्रतिसारणम्॥
Cakradatta, Jihvāroga Cikitsā.

लिखितेष्विति मण्डलाग्रादिना।
Tattva Candrikā, Ibid.

[2] उन्नाम्य जिह्वामाकृष्य वडिशेनाधिजिह्विकाम्।
छिदयेन्मण्डलाग्रेण तीक्ष्णौषैर्लवणादिभि:॥
Cakradatta, Mukharoga Cikitsā.

[3] लिखनं मण्डलाग्रेण कर्त्तव्यं दलिनां भवेत्।
Pālakāpya, III. i.

पूर्णचन्द्राकृत्यामण्डलाग्रम् लिखनार्थमक्षी।
Pālakāpya, III. iii.

[4] Soranus, II. viii., P. 366.

[5] Rhases, Cont. xxii.

Abbas[1] also advises us to open the head when it is preternaturally large. Aetius[2] also gives a similar discription. Some authors recommend the polypus-scalpel or the phlebotome in embryotomy. The embryotome figured by Albucasis[3] is a straight two-edged blade, and we may conjecture that the maṇḍalāgra used by the Hindus for perforating the fœtal cranium was a similar instrument.

2. Karapatra or saw.

It literally means, "an instrument having the blade in the form of a hand", the fingers being represented by the teeth of the saw. Others explain, as Dallaṇa[4] points out, the name from its resemblance to a carpenter's saw. It seems that saws of various sizes were used. Suśruta mentions its length to be six aṅguli, Vāgbhaṭa[5] describes it to be ten aṅguli

[1] Haly Abbas, Pract. ix. 57.

[2] Aetius, XVI. 23.

[3] Græco-Roman Surgical Instruments, Pl. viii. fig. 7.

[4] करपत्रमिति करवत् पत्रं करपत्रं यथा करोऽङ्गुलिभिराचितो भवति तद्वत् यत् कण्टकैराचितं स्यात्तत् करपत्रमुच्यते। अन्ये तु करपत्रशस्त्रं करपत्राकारमेव तच्च द्वादशाङ्गुलं तन्त्रान्तर वचनात्। ननु यदि तन्त्रान्तरात्तद द्वादशाङ्गुलं करपत्रमुच्यते तर्हि सूत्रस्थले विरोधः कुतः सूत्रस्थले करपत्रस्य निर्दिष्टप्रमाणत्वात् शेषाणि तु षड़ङ्गुलानि इत्यनेन वाक्येन षड़ाङ्गुलमेव करपत्रम् स्यान्न द्वादशाङ्गुलं नैवम् तेषाम् नामाभिरेवाकृतयः प्रायेण व्याख्याता इत्यस्मात् सूत्रात् प्रायः शब्दोऽनुवर्त्तते तेनेतावयवं, शेषाणि प्रायेण षड़ङ्गुलानि एवं शस्त्रमाने नात्यन्तविरोधः।

Nivandha Saṁgraha, I. viii.

[5] छेद्येऽष्टौ करपत्रन्तु खरधारं दशाङ्गुलं।
विस्तारि द्व्याङ्गुलं सूक्ष्मदन्तं खत्सरु बन्धनं॥

Aṣṭāṅgā Hṛdaya Saṁhitā, I. xxvi.

करपत्राख्यं शस्त्रमाह छेद्ये इत्यादि करवत् पत्र यस्य तत् करपत्रं, षड़ङ्गुलिभिराचितो यथाकारो भवति तद्वत् यत् कण्टकैराचितं तत् करपत्रमुच्यते। करपत्रं करात् ख्यातं। करपत्रं खरधारं, खरा, तीक्ष्णा, धारा यस्य तत्तथाविधम्, तथा दशाङ्गुलम्,

long and two aṅguli broad; while Bhoja[1] alludes to a saw, twelve aṅguli long. The edge of the instrument is described as rough and serrated; and this is the only instrument that need not have a very sharp edge.

The handle of the saw should be well formed and pegged. Its principal use is to saw a bone. Sometime it is recommended for the purpose of scraping.

Saw is frequently mentioned by the Greek and Roman authors in the descriptions of operations on the bones. Celsus[2] mentions it in describing the amputation of a gangrenous limb. With reference to fractures of the bones of the head, Paul says[3]: "But the mode of operating with saws and the instrument called chœnicides or modioli (trepans ?) is condemned by the moderns as a bad one." Evidently he means flat cranial saws. Galen[4] also mentions the "knife-shaped saws."

In modern times the saw is still used for identical purposes in surgery.

There is no mention of trephine in Hindu surgery though Jīvaka (500 B.C.) is said to have practised cranial surgery with success[5]. Pandit Vallala describes[6], in his Bhojaprabandha or

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दैर्घ्येन दशाङ्गुल परिमाणं, तथा विस्तारे द्वाङ्गुलं, परिसरे षडङ्गुलप्रमितं तथा सूक्ष्म दन्त सूक्ष्म दन्ताकारा दन्त यस्य तत्तथाविधं, तथा सत्सरुबन्धनं, तसरु खड्गादि मुष्टि: बन्धनं, कोलादिना बन्धनं, त्सरुश्च बन्धनञ्च ते तसरु बन्धने, शोभने त्सरु बन्धने यस्य तत्तथाविधं। तच्च चस्त्रां छेदे, छेदन कर्म्मनि योज्यं।

Vāgbhaṭārtha Kaumudī, I. xxvi.

[1] See foot-note 4, P. 230.
[2] Celsus, VII. xxxiii.
[3] Paul, VI. xc.
[4] Galen, XVIII. 331.
[5] See Mahāvagga, VIII. 1.18. Sacred Books of the East. Vol. xvii.
[6] See foot-note 1, p. 60.

Annecdotes of King Bhoja, a surgical operation performed on the king. He was suffering from a severe pain in the head. Medicines did him no good, and so to give relief, surgical interference was thought necessary by two brother surgeons who happened to arrive in Dhar at that time. They are said to have administered a drug called sammohinī to render him insensible. They then trepanned the skull and removed the real cause of his complaint. They closed the opening, stitched the wound and applied a healing balm. They are then said to have administered to the king another drug called sañjibanī to accelerate the return of consciousness.

Trephine was well known to the ancient Greeks and Romans. Hippocrates[1] mentions a trephine or a saw having a circular motion, in the treatment of injuries to the head. Paul also mentions trephine, the use of which is, he says, condemned by the moderns. Sprengel[2] remarks, that "Galen was averse to the use of the trepan, though he performed the operation on the head occasionally."[3]

3. Vṛddhipatra.

This sharp cutting instrument is called vṛddhipatra from its resemblance to the leaf of a medicinal plant called vṛddhi. Two varieties of this knife are described by Vāgbhaṭa[4]—one is

[1] Hippocrates, III, 371, 374.

[2] Hist. de la Méd., 18.

[3] Adam's Commentary on Paul, VI, xc. Vol. ii., p. 436.

[4] द्विपत्रं क्षुराकारं छेद भेदन पाटने।
क्षत्रयमुच्यते शोफ गम्भीरे तु तदन्यथा।
नताग्रं पृथुतो दीर्घं ऋजुवक्त्रं यथायथं॥

Aṣṭāṅga Hṛdaya Saṁhitā, I. xxvi.

straight throughout and it is to be used for opening pointed superficial abscesses; and the other has the end bent or curved. Again amongst the second class of curved knives, some have their ends long and therefore called dīrgha-vaktra or long-mouthed, and these are to be used for opening the deep seated abscesses, while others have their ends short and therefore called hrasva-vaktra or short-mouthed, and these are to be used for superficial abscesses that would not point. Suśruta describes them to be six aṅguli long. Dallaṇa in his commentary[1] says:—Both the varieties, one with a curved,—and this is called a kṣura or razor,—and the other with a resected point, should be seven aṅguli long; the handles and the blades should measure five and a half and one and a half aṅguli respectively." These are to be used for cutting through a part, partially or completely, and also for puncturing it.

द्विपक्षास्त्रां शस्त्रमाह द्विपक्षमित्यादि द्विपक्षं नाम शस्त्रं, क्षुराकारं, क्षुराकृति, क्षुरस्य लोमच्छेदकः शस्त्रविशेषो नरसुन्दराद्यां। तच्च द्विविधमौषध इत्यस्य पक्षसद्भाव कथनात् द्विपक्षास्त्रं लभते। तद् द्विपक्षं नाम शस्त्रं छेदे भेदने पाटने च कर्मणि योज्यमिति ऋजुवक्रमित्यादिना विषय विशेषे द्वि पक्षाकार भेद उच्यते। यत् द्विपक्षं ऋजुवं सरलायभागं, आयतायमित्यर्थः। तत्, उन्नते, उन्नितं, शोफे, शोथे, योज्यं। गम्भीरे, भेद आदि धातुभ्यो शोफे, तथा तदन्यथा, अनुन्नते च शोफे, यत् पृथुतः, पृथुदेशे नतायं वक्रीभूतायभागं, कुक्षितायमित्यर्थः। तत् द्विपक्षं शस्त्रं यथायथं दीर्घं ह्रस्व वक्रं, दीर्घं सुखं, ह्रस्व सुखं वा योज्यं। यथायथमिति गम्भीरे शोफे दीर्घवक्रं, अनुन्नते च शोफे ह्रस्ववक्रमित्यर्थः। अत्र द्विविधं द्विपक्षं शस्त्रयुग्मम्, द्वे अपि सप्ताङ्गुल प्रमाणे, द्वयोरपि अर्द्धपक्षाङ्गुल हस्तं कार्यं सार्द्धाङ्गुलद्वयं फलमिति। भेदनं, भेदं, एकस्मिन् शारीरदेशे शस्त्रमावपनाच्च अपर दिशा शस्त्रायस्य निष्क्रामनं भेदनं। पाटनं, विदारणं फाड़न इति लोके।

Vāgbhaṭārtha Kaumudī, I. xxvi.

[1] द्विपक्षमिति, द्वेः पक्षमिव द्विपक्षं तच्च द्विविधं एकं ऋजुवायं, द्वितीयं प्रयतायं, द्वे अपि सप्ताङ्गुल प्रमाणे द्वयोरपि अर्द्ध पक्षाङ्गुलं हस्तं कार्यं सार्द्धाङ्गुलम् फलम् इति अनयोर्मध्ये ऋजुवायं द्विपक्षं क्षुरमाहुः।

Nivandha Saṁgraha, I. viii.

One form of the vṛddhipatra resembles in shape the razor used by the barbers,—not the English razor that has now become common in Bengal, but the country-made razors which are still used by the barbers in the North-West Provinces.

Suśruta recommends the use of razor, scissors and pinchers for shaving the parts before operation; for "the hairs", he says, "prevent the healing up of the wound rapidly"[1]. He again uses vṛddhipatra as a knife and observes:—"If bitten by spiders whose bites are amenable to treatment, the area of the wound should at once be excised out by the vṛddhipatra, and then actual cautery applied by the red-hot jāmvavauṣṭha probe till the patient requests for its withdrawal"[2].

Suśruta uses the vṛddhipatra knife for the removal of the scrotal tumour and says[3]: "The scrotal tumour is to be well fomented and bandaged. The patient should then be cheered up, and leaving the testicles intact, underneath the me lian raphe, the tumour should be excised by vṛddhipatra knife. The fatty tisues being

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[1] रोमाणीर्षां व्रणो यस्तु न सम्यगुपरोहति।
क्षुरकर्त्तरीसन्दंशै तस्मादेतानि निर्हरेत्॥

Suśruta Saṁhitā, IV. i.

[2] साध्याभिराभिजुताभिर्दष्टमात्रस्य देहिनः।
छिन्द्यादेव मतिमान् सम्यगादंशमुद्धरेत्॥
जाम्बवौष्ठेनाग्नि तप्तेन दहेदाकर वारणात्।

Ibid, V. viii.

[3] स्निग्धं चावेष्ट्य पट्टेन समाश्वास्यातु मानवं।
रक्षेत् फलौ सेवनीञ्च छिन्द्यादेव दारयेत्॥
मेदसस्तः समुद्धृत्य दद्यात् क्षारौषसैन्धवै।
वध्नीयाच्च यथोद्दिष्टं।

Ibid, IV. xix

removed, powdered ferri sulphas and rock salt are to be dusted over the wound and proper bandages applied."

Vṛddhipatra was also used by the ancient veterinary surgeons. Joyadatta Suri writes[1]: "The knife known as vṛddhipatra is shaped like a kṣura or razor. It is three aṅguli long and should be used by the wise to incise a suppurated abscess". In Pālakāpya[2], we find that "it is ten aṅguli long; the handle being six aṅguli and the blade four aṅguli long and three aṅguli broad. It is used for scission and excision". He uses it also in opening a sinus after well ascertaining its course by means of a probe[3].

Hypodermic medication:—The use of hypodermic syringe was not known to the Hindus. They were acquainted however with the hypodermic method of exhibition of drugs. Śārṅgadhara[4]

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[1] वाङ्मूलं इद्विपवच्च क्षुराकारं प्रकीर्त्तितम्।
पक्वशोथादिषु प्राज्ञः पाटनं तेन कारयेत्॥

Aśvavaidyaka, XIV. v. 22.

[2] शस्त्रेण इद्विपत्रेण वाऽसि(शि)तेन सि(शि)तेन वा।
शस्त्रकर्म्मणि निष्णातः सुपक्वं पाटयेद्विषक्॥

Pālakāpya, III. iv.

इद्विपत्रेण नागानां कुर्य्याच्छेदन भेदने।

Pālakāpya, III. i.

[3] अथ भिषगयन्त्राधायोक्तेन विधिना सुयन्त्रितं व्रणमभिविक्षाऽऽश्य(शि)त्य सम्यगनुगतं गतिमन्तं स्वल्पसुखं नाडीव्रणमेषणया च विदित्वा इद्विपत्रेण शस्त्रेणानुलोमं पूयप्रति,रणार्थं-च्छेदं कुर्य्यात्॥

Pālakāpya, III. xv.

[4] प्रक्षिप्य क्षुरेणाङ्गं केवलानिलपीड़ितम्।
तत्र प्रदेहं दद्याच्च पिष्टं गृध्राक्षजैः कृतम्॥
तेनाक्षवाहजा पीड़ा विषची स्पर्शसी तथा।
अन्यापि वातजापीड़ा प्रशमं याति वेगतः॥

Śārṅgadhara Saṅgraha, III. xi.

directs us to scarify a part with a razor and then apply an ointment of guñjā (Abrus precatorius) in sciatica, scrofulous glands of the neck, etc. For treating a person in the state of unconsciousness caused by the derangement of all the humours, he directs us to scarify the anterior fontanelle with a razor, then to apply as much medicine as can be carried on the point of a needle to the part and rub it with fingers[1]. The medicine is to be prepared thus :—take aconite 1 pala, quicksilver 1 śāna; mix, and put inside two sorābas or earthen basins smeared with powdered glass and placed face to face. Apply some external application over this and put it on fire for six hours. Then open the basins, take the soot collected on the upper basin and deposit it in a glass vessel quickly to prevent exposure. Caraka[2] also advises us to apply a medicinal paste on a cranial incision, shaped like

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[1] विषं पलमितं सूतः शाणिकस्तर्णयेद्यम् ।
तत्पूर्णं सम्पुटे च कृत्वा काचलिप्तसरावयोः ॥
मुद्रां दत्त्वा च संशोष्य ततदूर्ध्वां निवेशयेत् ।
वह्निं शनैः शनैः कुर्यात् प्रहरत्रय संख्यया ॥
तत उत्पाट्य तन्मुद्रामुपरिस्थे सरावके ।
संलग्नो यो भवेद्धूमः तं ग्रहीयाच्छनैः शनैः ॥
वायुस्पर्शो यथा नस्यात् ततः कुप्यां निवेशयेत् ।
रसः सूचीमुखेलग्नकृष्या नियति भेषजम् ॥
तावन्मात्रो रसो देयो मूर्च्छिते सन्निपातिनि ।
क्षुरेण प्रच्छिते मूर्ध्नि तदङ्गुल्या च घर्षयेत् ॥
रक्त भेषज सम्पर्कान्मुच्छितोऽपि हि जीवति ।
तथैव सर्पदष्टस्य शतावस्थोऽपि जीवति ।
यदातापो भवेत् तस्य मधुरं तत्र दीयते ॥

Śārṅgadhara Saṁgraha, II. xii.

[2] विदूषित कफमार्गः शीतसंरोधरुद्धवायुश ।
ततश्च श्वसेन्मर्म्मः सादसाध्यलिङ्गैर्विकीर्णय ॥

the foot of a crow, in case of snake-bite when he becomes unconscious but his life is not completely despaired of.

4. Nakha Śastra or nail parer.

Suśruta[1] mentions its length to be eight aṅguli. Dallaṇa[2] says that its blade is two aṅguli long and one aṅguli broad. Vāgbhaṭa[3], on the other hand, describes the length to be nine aṅguli. Aruṇadatta[4] thinks it to be a double instrument, one end having a straight edge and the other an oblique one. Some explain[5] that two different kinds of nakha śastra—one with a straight and the other with an oblique edge—are directed to be used.

चर्मकषायाः कल्कं विलसमं मूर्द्धि काकपदसस्थ।
छित्वा कुर्य्यात् कटभीं कटुकोटफला प्रधमनच्च॥
Caraka Saṁhitā, VI. xxv.

[1] तत्र नखशस्त्रैषण्यावष्टाङ्गुलि मृद्धीवल्यन्ते।
Suśruta Saṁhitā, I. viii.

[2] नखशस्त्रमिति नखानां छेदनाय शस्त्रं नखशस्त्रं तस्य फलं द्वाङ्गुलायामम् एकाङ्गुल विस्तृतम्।
Nivandha Saṁgraha, I. viii.

[3] वक्रऋजुधारं द्विमुखं नखशस्त्रं नवाङ्गुलं।
सूक्ष्मशल्योद्धृतिच्छेदे प्रच्छान लेखने॥
Aṣṭāṅga Hṛdaya Saṁhitā, I. xxvi.

[4] नखशस्त्रं नखच्छेदकं प्रसिद्धं। तच्च वक्रा ऋजुधारा यस्य तदेवम्। तस्येकं मुखं वक्रमन्यदृजु स्पष्टम्।
Sarvāṅgasundarī, I. xxvi.

[5] नखशस्त्रमाह वक्रऋजुधारमित्यादि नखानां छेदनाय शस्त्रं नखशस्त्रं तत् द्विमुखं द्वि र्द्वि: प्रकारं मुखं यस्य तद्विमुखं तथा वक्रऋजुधारं एकं वक्रं धारं अपरम् ऋजुधारं स्यात्, तथा नवाङ्गुलं उभयोरपि दैर्घ्येण नवाङ्गुलपरिमितं तच्च नखशस्त्रं शल्योद्धृत्यादौ योज्यं शल्यानां कण्टकदीनामुद्धृति रुद्धरणं शल्योद्धृतिः प्रच्छानं चेरा इति यस्य प्रसिद्धिः लेखनं चीचन् इति लोके।
Vāgbhaṭārtha Kaumudī, I. xxvi.

They are principally recommended for cutting, puncturing and scarifying[1]; and also for the extraction of needles and minute foreign bodies from the soft parts.

There is no mention of a many-bladed scarificator in the surgical books of the Hindus, but its office was performed by the nakha śastra, in wet cupping, by making parallel incisions close to one another.

Paul[2] alludes to an instrument compounded of three blades joined in such a way that at one stroke, three scarifications were made; but he prefers a single scalpel for the purpose.

Pālakāpya mentions an instrument called rampaka[3], having the handle ten aṅguli and the blade three aṇguli long. It is to be used for paring the nails and cleaning the feet of the elephants.

5. Mudrikā.

It is described to be a cutting instrument of the size of the last phalanx of the index finger[4]; it is also called aṅguli-śastra or finger-knife. Vāgbhaṭa describes this instrument but not clearly. He says that the mouth of the aṅguli-śastra looks as if coming out of a ring, and the blade is half an aṅguli wide. A ring, having the size sufficient to admit the terminal phalanx of the index

[1] इद्विपत नखशस्त्र मुद्रिकोपलपत्रकार्द्ध धारानि छेदने भेदने।

Suśruta Saṁhitā, I. viii.

[2] Paulus Ægineta, VI. xli.

[3] रम्पकस्त्वङ्गुलमुखो दशाङ्गुलस्त पादशोधनार्थं नखच्छेदनार्थं चेति।

Pālakāpya, III, xxx.

[4] प्रदेशिन्यग्रपर्व्वप्रदेशप्रमाणामुद्रिका।

Suśrutā Saṁhitā, I. viii.

finger, should be soldered to it. The base of the instrument has a thread tied to it[1].

It is recommended to be used for cutting through neoplasms in the throat. In its uses, Vāgbhaṭa says that it resembles the maṇḍalāgra and vṛdidhipatra; and so was sometimes required for perforating the skull of a dead fœtus in the uterus of its mother[2].

Dr. Simpson of St. Andrews (1744) is said to have invented an instrument, a "ring scalpel" for opening the skull. It consists of a loop of steel, through which the finger is to be passed

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[1] कुर्य्यादङ्गुलिशस्त्रकं ।
सुद्रिकानिर्गतमुखं फलेऽर्द्धाङ्गुलायतं ।
योगतो ह्रिपत्रेण मण्डलाग्रेण वा समं ।
तत्प्रदेशिन्यय पर्व्वप्रमाणार्पन सुद्रिकम् ।
सूचवद्वं गलस्रोतो रोगछेदन भेदने ॥

Aṣṭāṅga Hṛdaya Saṁhitā, I. xxvi.

कुर्य्यादित्यादिना अङ्गुलिशस्त्रकं व्याख्ये । सुद्रिका अङ्गुरीयकेण निर्गतं निष्क्रान्तं मुखं यस्य तत्तथाविधं सुद्रिकानिर्गतमुखं तथा फले फलीहे मे अर्द्धाङ्गुलायतं अर्द्धाङ्गुलमाच विस्तार अङ्गुलि शस्त्रकं अङ्गुलिनाम शस्त्रं कुर्य्यात् । तत्र योगतः प्रयोगे ह्रिपत्रेण मण्डलाग्रेण वा समतुल्यं भवति । लेखने च्छेदने ह्रिपत्रवत् योज्यं किम्वा छेदन भेदन पाटने मण्डलाग्रवत् योज्यमित्यर्थः । तदित्यादि तदङ्गुलि शस्त्रकं प्रदेशिन्यय पर्व्वप्रमाणार्पण सुद्रिकं कुर्य्यादिति योज्यं । वैद्यस्य प्रदेशिनी नाम्नी अङ्गुलि तस्या अग्रं यत्पर्व्व तत्तथा तस्य यत् प्रमाणं परिमाणं तदर्पणा तत् प्रवेशोपयुक्ता सुद्रिका यस्य तत्तथाविधं । सुद्रिका सुदरी आङटी इति वा ख्याता । तथा सूचवद्वं सूलदेशे सूचे वद्वं तच्च गलस्रोतो गतानां रोगाणां छेदने भेदने च योज्यं ।

Vāgbhaṭārtha Kaumudī, I. xxvi.

[2] विक्रश्यौ नाम तौ सूद्यौ शस्त्रदारणमर्हतः ।
मण्डलाङ्गुलि शस्त्राभ्यां तत्कर्म्म प्रशस्यते ।
ह्रिपत्रं हि तीक्ष्णाग्रं न योनावपचारयेत् ॥

Aṣṭāṅga Hṛdaya Saṁhitā, II. ii.

and from which protrudes a sharp pointed blade about an inch long, by which the cranium was pierced[1].

In the pseudo-Hippocratic treatise[2] a knife to fix on the thumb and dismember a fœtus in utero is mentioned. This knife is called by Turtullian[3] the "ring knife", whereby the limbs are advised to be cut off in the womb. It is intersting to point out that mudrikā also means a ring.

The veterinary surgeons still use a scalpel blade mounted on a ring[4], through which a forefinger is passed to dismember foals and calves in exactly the same way.

6. Utpalapatra.

This knife is described to have the shape of a petal of the blue lotus. The end is long, sharp and pointed. The utpalapatra is dīrgha-vaktra or long bladed, while the arddhadhāra is the hrasva-vaktra or short bladed knife[5]. It is to be used for cutting through and puncturing the parts.

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[1] Ed. Med. Essays, vol. V, Part I, P. 445.

[2] Hippocrates, I. 463.

[3] De Anima, 26.

[4] Græco-Roman Surgical Instruments, Pl. vii. fig. 1.

[5] दीर्घं ह्रस्ववक्त्रं यथायथं।
उत्पलाध्यर्धधाराख्ये भेदने छेदने तथा॥
Aṣṭāṅga Hṛdaya Saṁhitā, I. xxvi.

उत्पलपत्राख्यध्यर्धधाराख्ये शस्त्रे आह उत्पलेत्यादि उत्पलश्च अध्यर्धधारश्च ते आख्ये ययोः शस्त्रयोः ते उत्पलाध्यर्धधाराख्ये शस्त्रे तथा, यथाक्रमं दीर्घं ह्रस्ववक्त्रे भवतः। तत्र उत्पलाख्यं दीर्घवक्त्रं, अध्यर्धधाराख्यं ह्रस्ववक्त्रमित्यर्थः। उत्पलशब्देन उत्पलपत्राख्यं शस्त्रं गम्यते तन्नान्तरदर्शनात्। तस्य फलस्य उत्पलपत्राकारत्वादुत्पलपत्रमिति संज्ञितम्। अधिकमर्धं धारा यस्य तत् अध्यर्धधारं। ह्रस्वफलयोर्मध्ये फलस्यैव किञ्चिदधिकं दैर्घ्यमिति वर्त्तते। तत्र षडङ्गुलायतं उरसि षडङ्गुलं विस्तारं।
Vāgbhaṭārtha Kaumudī, I. xxvi.

In the Aśvavaidyaka, the utpalapatra and vrīhipatra knives are recommended to be used in puncturing the veins in phlebotomy[1]. "The surgeon who is practically acquainted with the methods of puncturing the veins, should use the utpalapatra and vrīhipatra knives for the purpose."

When used for puncturing the large veins the knife is recommended to be encircled with thread at a short distance from the end to prevent unnecessary injury to the vessels by plunging the the knife deeply[2].

Hippocrates similarly "gaurds his phlebotome in the surgical treatment of empyema, by having it wound round with a rag, leaving the breadth of the thumb nail at the point."[3]

Both the utpalapatra and vrīhimukha knives are thus described in the Aśvavaidyaka[4]: The "vrīhimukha knife should be six aṅguli long and half an aṅguli wide. The utpalapatra should also be similarly made."

The utpalapatra knife is recommended to be used for incising

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[1] शस्त्रेणोत्पलपत्रेण व्रीहिपत्रेण वा भिषक्।
शिरावेधविधिं सम्यग् इष्टकर्म्मा प्रयोजयेत्॥
Aśvavaidyaka, XIV. v. 23.

[2] सूत्रकेण च संवेष्य सुखं शस्त्रस्य बुद्धिमान्।
यथाप्रमाणं संस्थाप्य ततो विस्रावयेत् शिराम्॥
Ibid, XV. v. 35.

[3] Hippocrates, II. 258 Kuhn's Ed. and 1. 88 Syd. Soc. Ed.

[4] षडङ्गुलन्तु विस्तीर्णं कुर्य्यच्छस्त्रं षडङ्गुलम्।
नाम्ना व्रीहिमुखं सम्यक् तथा चोत्पलपत्रकम्॥
Aśvavaidyaka, XIV. v. 21.

the abdominal parietis of the horse; then a tube is to be pushed through the wound in the operation of paracentesis abdominis[1].

The phlebotome used by the Greeks is nowhere described in their books; but from considerations of all the various operations to which the instrument was put bears out the fact of its being a sharp pointed, double-edged and straight lancet. The phlebotome of the Greeks might have then resembled in shape the utpalapatra of the Hindus. It was used by the Greeks for various operations besides phlebotomy, as for the opening of abscesses such as the parulis or gum boil[2], puncture of cavities containing fluid as in opening the abdomen for ascites[3], incising the tunica vaginalis as in excision of hydrocele sac[4] and for dissecting out warts[5] and sebaceous cysts[6].

It is interesting to note that Pālakāpya[7] mentions utpalapatra and describes it to be eight aṅguli long, one and a half aṅguli broad and double edged. He uses it for puncturing vessels etc.

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[1] हृदयस्याधरे भागे ऊर्द्धभागे च नाभितः।
अधोवा नाभितः कुर्य्याच्छेदनं चतुरङ्गुले॥
शस्त्रेणोत्पलपत्रेण वामभागे विचक्षणः।
एकमेवाङ्गुलं शस्त्रं कुक्षौचापि प्रवेशयेत्॥
वेधन्त्रये ततस्तस्मिन् नालिकां वस्त्रवेष्टिताम्।
प्रक्षिप्य गालयेद्वारि यावद्वैकोदलाघवम्॥

Aśvavaidyaka, LII. vs. 25, 26 and 27.

[2] Paul, VI. xxvii.
[3] Ibid, VI. L.
[4] Ibid, VI. lxii.
[5] Ibid, VI. lxxxviii.
[6] Ibid, VI. xiv.
[7] द्व्यङ्गुलमुखप्रमाणमुत्पलपत्रं भेदनार्थं।

Pālakāpya, III. xxx.

7. Arddhadhāra.

It is difficult to ascertain the exact shape of this knife. Some translate it as a "single edged knife,"[1] but it really means, as Dallaṇa explains, an instrument which has a sharp edge for half the length[2]. It is also called cakradhāra. Vāgbhaṭa has a variant reading—adhyārddhadhāra—which means an instrument having a sharp edge for more than half the length[3].

It is eight aṅguli long; the blade is two aṅguli long and one aṅguli wide, and the handle six aṅguli long. It is to be used for incision and division of parts of the body.

8. Sūcī or Needles.

Three needles are recommended to be used for applying sutures. They should be strongly made and rounded in shape. At one end they are flattened, grooved and pierced with an eye for the suture. The groove is said to have been intended to be the bed of the suture during stitching to prevent it from doing any harm to the tissue. In fleshy parts such as the thighs, a three ribbed needle, three aṅguli long, is advised to be used. For less fleshy parts and wounds about the joints, a similar straight needle but two aṅguli long should be employed, while for suturing the wounds of the stomach, intestines, scrotum and the vital parts of the body, preference is given to a needle curved like a bow, two and a half aṅguli long and having the pointed end

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[1] Hœrnle's Translations of Suśruta Saṁhitā, Bibl. Ind. I. viii.

[2] अर्द्धधारमिति, अर्द्धं धारा यस्य तत् अर्द्धधारं, चक्रधारमिति प्रसिद्धं तच्च अष्टाङ्गुलायतं चरमि अङ्गुल विस्तारं द्वाङ्गुलंफलं। अन्ये त्वध्यर्द्धधारमिति पठन्ति, अधिकमर्द्धं धारायस्य तत् अध्यर्द्धधारम्।

Nivandha Saṅgraha, I. viii.

[3] See foot-note 5, P. 240.

shaped like a paddy. In thickness, these needles are described to be equal to the stalk of the flower of mālatī (Jasminum grandiflorum). They should have sharp fine points and good shape[1]. The needles are also recommended to be used for extraction of foreign bodies from the soft structures and also for evacuating abscesses[2].

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[1] दीर्घेऽल्पमांसे सन्धौ च सूची ज्ञात्वाङ्गुलद्वयं।
आयता वाङ्गुला चक्षा मांसले वापि पूजिता॥
धनुर्वक्त्रा स्थिता मर्म्मफलकोषोदरोपरि।
इत्येतास्त्रिविधाः सूचीस्तीक्ष्णाग्राः सुसमाहिताः।
कारयेन्मालतीपुष्पदलाग्रपरिमण्डलाः॥

Suśruta Saṁhitā, I. xxv.

ज्ञात्वागूढ़ दृढ़ाः पाशे चिरः सूचीश्च सीवने॥
मांसलानां प्रदेशानां वक्षा चाङ्गुलमायता।
अल्पमांसास्थि सन्धिस्थ व्रणानां द्व्याङ्गुलायता।
व्रीहिवक्त्रा धनुर्वक्त्रा पक्वाशयसमर्म्मसु।
सा सार्द्धद्व्याङ्गुल सन्धौ ज्ञात्वाग्रतुरङ्गुला॥

Aṣṭāṅga Hṛdaya Saṁhitā, I. xxvi.

तिसृणां सूचीनां विषयविशेषे आकारभेदानाह मांसलानामित्यादि 'मांसलानां' ऊर्व्वादीनां शरीर प्रदेशानां सीवनार्थे सूची, 'वक्षा' विकोषविभिन्ना तथा चाङ्गुलमायता, अङ्गुलचतुर्दीर्घा कर्त्तव्या, अस्याश्चासत्व मग्रभागस्यैव न तु सर्व्वावयवस्य। सूच्याः सर्व्वावयवस्य हि साधारणतो ज्ञात्वा कारयेत्यनिर्द्देशादितिगम्यं। अस्या अपि गूढ़ दृढ़ पाशे सामान्योक्ता कथितमेव अल्पमांसलस्थान संस्थितानां, सन्धिस्थि संस्थितानांच व्रणानां सीवने द्व्याङ्गुलायता, अङ्गुलिचय दीर्घा, सूचीकर्त्तव्या, पक्वाशये, आमाशये तथा 'मर्म्मसु' वक्त्रादिषु संस्थितानां व्रणानां सीवने, व्रीहि वक्त्रा, पाटलादि व्रीहिवन्मुखा, 'धनुर्वक्त्रा' धनुर्वक्त्राकारा या सूची सार्द्धद्व्याङ्गुला, अर्द्धाङ्गुलाधिक द्व्याङ्गुल दीर्घा योज्येति योज्यं अथापि गूढ़ दृढ़ पाशे योजनीयं। सार्द्धद्व्याङ्गुलेत्यनेन च्छेदः। सर्व्वेत्यादि परेण सम्बध्यते॥

Vāgbhaṭārtha Kaumudī, I. xxvi.

[2] सूचीकुशपलाशीमुखशरारीमुखान्मुखचिकुरकानि विस्रावणे।

Suśruta Saṁhitā, I. viii.

In modern times, the surgeons use fully curved, half-curved and straight surgical needles. Waring[1] remarks: "The shape of the needle which ought to be used for closing an incision depends upon the depth and accessibility of the wound. In deep wounds, or wounds which are not readily accessible, curved needles will be found to be most useful, while for shallow cuts straight needles will be most convenient."

Suśruta makes mention of a javamukhī needle[2] (*lit.* having the sharp end shaped like a barley corn) for passing a double ligature smeared with escharotic ointment, across the base of a tumour in opposite directions. Then by cutting through the nooses, and tying togeher the contiguous ends of the ligatures, the whole of the growth is encircled and strangled by them, exactly in the same way as in modern times a nævus is ligatured by means of a nævus needle. Cakradatta also quotes this description of the method of extirpating tumours by ligatures.

Erichsen says[3]: "When the tumour is small, an ordinary double ligature may be passed across its base, by means of a common suture needle; and the noose being cut and the thread tied on each side, strangulation will be effected. When it is of larger size, and of round shape, the most convenient method is that recommended by Liston. It consists in passing, by means

[1] Manual of Operative Surgery. By H. J. Waring, M.S., M.B., Third edition, P. 42.

[2] अर्ब्बुदादिषु चोत्क्षिप्य मूले सूत्रं निधापयेत्।
सूचीभिर्यववक्त्राभिराचितं वा समन्ततः।
मूले सूत्रेण बध्नीयाच्छित्त्वा चोपचरेद्व्रणम्॥

Suśruta Saṁhitā, IV. xvii.

Cakradatta, Nāḍīvraṇacikitsā.

[3] Erichsen's Surgery, Vol. II, P. 73.

of long nævus needles, fixed in wooden handles, and having their eyes near their points, double whipcord ligatures in opposite directions beneath the tumour; then cutting through the nooses, and tying together the contiguous ends of the ligatures until the whole of the growth is encircled and strangled by them."

There are many instances of the use of surgical needle by the Greek and Roman Surgeons. Needles of different sizes are recommended. Celsus mentions a large needle in describing the operation of suturing the abdominal parietis[1], and another, evidently a small needle, which is said to have been used in the treatment of staphyloma of the cornea[2]. The needles were either round or three-cornered. "A few three-cornered needles of Roman origin have been found, although they are rare" (Milne[3]). Paul uses a needle in suture of the upper eyelid, and other modes of operating for trichiasis[4], for the repair of wounds of the peritoneum[5], and recommends a large sized needle containing a double thread to close the peritoneum in the operation for enterocele[6].

Pālakāpya mentions sūcī or needles for stitching wounds[7]. They are eight aṅguli long, shaped like the tusk of an elephant and are either three ribbed, or four ribbed, or round, smooth and

[1] Celsus, VIII, xvi.

[2] Ibid, VII. vii.

[3] Græco-Roman Surgical Instruments, P. 75.

[4] Paulus Ægineta, VI. viii.

[5] Ibid, VI. lii.

[6] Ibid, VI. lxv.

[7] सूची सेवनार्थं। अष्टाङ्गुलं नागदन्ताकृति। चतस्रा चतुरस्रा वा दृढा समाहिता यथा शलाका वने व्रणविशुद्ध्यर्थम्।

Pālakāpya, III. xxx.

strong. He reserves curved three-cornered needles for fleshy parts and round needles for skin, veins, nerves and arteries[1].

Caraka recommends the use of leeches, knife and needles for extracting blood from the piles[2]. He also advises us to use needles for pricking the patches of leprous spots[3] before the application of leeches for extracting blood.

9. Kuśapatra.

It is a form of knife resembling in shape the leaf of a kuśa grass (Poa cynosuroides)[4]. The instrument should be six aṅguli long (Suśruta); the blade measuring two aṅguli (Vāgbhaṭa)[5]

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[1] या:सूच्यस्त्रिविधा: प्रोक्ता: शस्त्राध्याये संग्रिता:।
नागदन्ताकृतिस्त्वा विकोषा चेति निश्चयात्॥
शस्त्राश्रितं नागदन्तया मांसजं च विकोषया।
त्वक्स्थायु धमनीस्थं च शिराजं चैव इत्तया।
आहार्थं सर्व्वयन्त्राणां सूचा सीवनमिष्यते॥

Pālakāpya, III. i.

[2] जलौकोभि: तथा शस्त्रै: सूचीभिर्वा पुन: पुन:।
अवर्त्तमानं रुधिरं रक्तार्शोभ्य: प्रवाहयेत्॥

Caraka Saṁhitā, VI. ix.

[3] प्रच्छितमत्र कुष्ठं विरेचयेद्वा जलौकाभि:।

Ibid, VI. vii.

[4] कुशपत्रमिति, कुशपत्रतुल्यं कुशपत्रं तन्मानमाह :—
षड्भिर्यवैश्चकं विद्यादङ्गुलं फलमुच्यते।
इत्तं स्यात् षडङ्गुलं मध्ये कुशपत्रस्य लक्षणम्॥

Nivandha Saṁgraha, I. viii.

[5] कुशाटी वदने शस्त्रे षडङ्गुलंस्यात्तयो: फलं॥

Aṣṭāṅga Hṛdaya Saṁhitā, I. xxvi.

कुशाटीवदने वे शस्त्रे, साद्ये विस्तारय विषये योज्ये। तयो: कुशाटी वदनयो: फलं षडङ्गुलं, षडङ्गुलमेव परिमितं स्यात्।

Vāgbhaṭārtha Kaumudī, I. xxvi.

and the handle four aṅguli, but according to Bhoja, the handle is three aṅguli long. It is to be used for draining pus from abscess. The handle has a ring like ornamentation, about one aṅguli in diameter. Another variant reading describes the blade, the ring, and the handle to have the lengths of two, three, and two aṅguli respectively. This would make the total length of the instrument to be seven aṅguli; so evidently there is some lapsus calami in the second reading.

Cakradatta uses kuśapatra as a bleeding lancet and says[1]: "Out of the twelve vessels that lie on the sides and underneath the tongue, select the two large bluish vessels on either sides of the tongue, raise them up by vaḍiśa or hook and puncture them by the kuśapatra knife and then, after bleeding, apply a paste of treacle and ginger to the wound". In the Yogaratnākara[2], the author advises us to adopt this method of bleeding, in the treatment of tumours in the neck.

Pālakāpya mentions kuśapatra and describes it as being shaped like a kuśa grass[3]. It is nine aṅguli long—the handle being

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[1] जिह्वायाः पार्श्वतोऽधस्तां शिरा द्वादश कीर्त्तिताः।
तासां स्थूलशिरे ह्यग्रे विध्यात् ते तु शनैः शनैः॥
बड़िशेनैव संगृह्य कुशपत्रेण बुद्धिमान्॥
Cakradatta, Galaganda Cikitsā.

[2] जिह्वायाः पार्श्वयोर्मूलाच्छिरा द्वादश कीर्त्तिताः।
तासां स्थूले शिरे द्वे च च्छिन्द्यात्ते च शनैः शनैः।
बड़िशेनैव संगृह्य कुशपत्रेण बुद्धिमान्।
स्रुते रक्ते व्रणे तस्मिन् दद्यात्तत्र गुड़ार्द्रकम्॥
Yogaratnākara, P. 321.

[3] नवाङ्गुलं कुशपत्रं। षड्याङ्गुलं हत्तं। चतुरङ्गुलम् पर्व। अध्यर्धाङ्गुलविस्तृतसुभगतो धारं। कुशपत्राकृति गम्भीरपाकभेदनार्थं षड़ङ्गुलं हत्तम् अध्यर्धाङ्गुलं पर्व।
Pālakāpya, III. xxx.

five or six aṅguli and the blade four aṅguli long. The blade is one and a half aṅguli wide and is sharp-edged on both sides (*i.e.*, double-edged). It is used for incising deep abscesses.

10. Āṭīmukha.

This instrument is described to have the shape like the beak of the jalavardhanī bird or āṭī[1] (Turdus ginginiamus),—a bird living in the marshes. It is six aṅguli long; the blade measuring two and the handle four aṅguli. So it is of the same size as the kuśapatra to which it also resembles in function. Bhoja is of opinion that its blade is one and the handle seven aṅguli long.

11. Śarārīmukha.

This instrument is a pair of scissors resembling the face of the long beaked bird called śarārī. Dallaṇa describes two varieties of the bird, one with white shoulders, and the other with a red head. It is the former kind which is referred to here[2]. Suśruta describes its length to be ten aṅguli[3], while Dallaṇa mentions the length to be twelve aṅguli.

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[1] आटीमुखमिति, आटी जलवर्धनी नाम पक्षिविशेषः तन्मुखवन्मुखं यस्य तत् आटीमुखं तथाचोक्तं :—

द्वन्तं सप्ताङ्गुलं विद्यात् तस्याग्रे फलमिष्यते।
आटीमुख प्रकारं हि फलमङ्गुलमायतम्।

Nivandha Saṅgraha, I. viii.

[2] शरारीमुखमिति, दीर्घचञ्चुः पक्षिविशेषः स द्विविधः धवलस्कन्धः रक्तशीर्षश्च धवलस्कन्धस्य शरारीति संज्ञा तन्मुखवन्मुखं तस्य शस्त्रस्य सौम्ये कर्त्तरीति संज्ञा तांच द्वादशाङ्गुलां चलत्पक्षासां कुर्यात्।

Ibid.

[3] दशाङ्गुला शरारीमुखी सा कर्त्तरीति कथ्यते।

Suśruta Saṁhitā, I. viii.

It is recommended to be used for evacuating abscess[1], etc. Suśruta mentions karttarī as a synonym but Vāgbhaṭa counts it as a separate instrument. He describes karttarī as a pair of scissors used by the barbers for clipping hair and is said to have been necessary for dividing the nerves, ligaments and fine hairs[2].

12. Antarmukha.

Suśruta describes another variety of scissors, used principally for evacuating abscesses. It is so named, for its straight cutting edges are within its curved claws[3]. It is said to be six aṅguli long and one and a half aṅguli broad[4]. It seems that the curvature of the blade varied widely; and Vāgbhaṭa describes a variety called

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[1] स्राव्ये शराव्यास्याविकृर्चिके।

Aṣṭāṅga Hṛdaya Saṁhitā, I. xxvi.

स्राव्ये विस्रावनविषये कर्म्मणि शराव्यास्या विकृर्चिके द्वे शस्त्रे योज्ये:। तत्र शराव्यास्य शरारीमुखं शरारी दीर्घचञ्चु: पक्षिविशेष: तस्या मुखवदास्यं यस्या तत् शराव्यास्यं, तच्च चलत्फलं दशाङ्गुलं दीर्घं कार्य्यं।

Vāgbhaṭārtha Kaumūdī, I. xxvi.

[2] स्नायु सूक्ष्म कचच्छेदे कर्त्तरी कर्त्तरीनिभा।

Aṣṭāṅga Hṛdaya Saṁhitā, I. xxvi.

कर्त्तरीशस्त्रमाह स्नायुत्यादि कर्त्तरीनामशस्त्रं कर्त्तरीसदृशं तच्च स्नायुच्छेदने सूक्ष्मकेशच्छेदने च योज्यं। कर्त्तरी काटारी इति यस्य प्रसिद्धि:।

Vāgbhaṭārtha Kaumūdī, I. xxvi.

[3] अन्तर्मुखमिति मध्यमुखं तल्लक्षणमाह—

षट्याङ्गुलप्रमाणेन जिह्मधारेण चायुतम्।
शस्त्रमन्तर्मुखं नाम चन्द्रार्द्ध इव चोद्गतं।

Nivandha Saṁgraha, I. viii.

[4] तदन्तर्मुखं तस्य फलमध्यर्द्धमङ्गुलं॥

Aṣṭāṅga Hṛdaya Saṁhitā, I. xxvi.

arddhacandrānan[1] or "half-moon faced" scissors in which the blades are curved like the half-moon. It has the length of eight aṅguli, the blade measuring one and a half aṅguli. This is also to be used for letting out pus from abscesses.

Hārīta, however, mentions a śastra, called also arddhacandra or half-moon, but he recommends its use for excising the prolapsed arms of a dead fœtus to effect its delivery[2]. This instrument can not but be a knife, for it seems difficult to cut off the arm, even of a fœtus, with a pair of scissors. Moreover, antarmukha has never been credited with the power of excising the arm.

13. Trikūrccaka.

It has been translated in English as a thin-edged sharp instrument or trocar. Wise, Dutt and Hoernle agree to mean by it a trocar. But it can be better explained if we understand by the term an instrument consisting of three needles fixed on a round

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अपरञ्च विस्रावण शस्त्रमाह तदर्द्धादि तद्वत् कुशाटीवदनवत्, अन्तर्मुखं अन्तर्मुख नाम शस्त्रं साध्ये योज्यं तस्य अन्तर्मुखस्यफलं अध्यर्द्धमङ्गुलं स्यात्। आधि अधिकं अर्द्ध अध्यर्द्ध। सार्द्धकमङ्गुलमित्यर्थः।

Vāgbhaṭārtha Kaumūdī, I. xxvi.

[1] अर्द्ध चन्द्राननं चैत तथाध्यर्द्धाङ्गुलं फले ॥

Aṣṭāṅga Hṛdaya Saṁhitā, I. xxvi.

अन्तर्मुखस्य प्रकारभेदमाह अर्द्धचन्द्राननमित्यादि एतत् अन्तर्मुखं, अर्द्धचन्द्राननं अर्द्धचन्द्राकारमुखञ्च भवति, तदपि तद्वत्, कुशाटीवदनवत् साध्ये योज्यं। तस्य फले अर्द्धाङ्गुलं अर्द्धाङ्गुलपरिमाण फलमित्यर्थः। अर्द्धचन्द्राकारमुखत्वात् अस्य शस्त्रस्यापि अर्द्धचन्द्राननमिति संज्ञेति बोध्यं।

Vāgbhaṭārtha Kaumūdī, I. xxvi.

[2] अथवार्द्धचन्द्रेण शस्त्रेणैव मृतगर्भस्य बाहुयुगलं सञ्छिद्य बाहूनिःसारयेत्।

Hārīta Saṁhitā, III, li.

wooden handle[1]. According to Suśruta, the length of the instrument is six aṅguli. But others describe it as eight aṅguli long, the blade and the handle measuring three and five aṅguli respectively[2]. The distance between the edges is the breadth of a grain of rice. The end of the handle is ornamented with a circular metallic plate as a ring.

It is recommended to be used for evacuating abscesses and for draining blood from the nasal polypus.

Caraka[3] mentions an instrument called kūrcca and says:— "After fomenting and thus softening the rounded nodules (of leprosy) which are fixed and hard, by heated stones and fumigations through tubes, they are to be injured by the kūrcca and the blood that oozes out, should be wiped away."

Two other instruments are described by Vāgbhaṭa as being constructed on a similar principle. One is named kūrcca and the

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[1] चिकूर्चकमिति चयः कूर्चा यस्य तत् चिकूर्चकम्। कूर्चः कूंची इति लोके।

Vāgbhaṭārtha Kaumūdī, I. xxvi.

[2] चिकूर्चकमिति चयः कूर्चा यस्य तत् चिकूर्चकम् तच्च तत्रान्तरम् :—

अङ्गुलानि तथाष्टौ च शस्त्रं कार्यं चिकूर्चकं।
फलेरन्तर्मुखाकारैरङ्गुलैरन्वितं त्रिभिः।
एकैकस्य फलस्यैषामन्तरं व्रीहिसम्मितम्।
शस्त्रं पञ्चाङ्गुलायामं कार्यं रुचकभूषितम्॥

Nivandha Saṅgraha, I. viii.

[3] स्थिरकठिनमण्डलानां स्विन्नानां प्रस्तरप्रणाडीभिः।
कूर्चैर्विघट्टितानां रक्तान्ते स्रोऽपनेतव्यः॥

Caraka Saṁhitā, VI. vii.

other, khaja. The kūrcca[1], he describes as an instrument "consisting of seven or eight rounded sharp needles, four aṅguli long, nicely bound together by a cord and tightly fixed on a circular wooden handle." He mentions its use in the operation of scratching to cure baldness and the brown and black spots on the face. For scarifying a bald spot, Cakradatta[2] uses needles, rough leaves, etc. "The khaja[3]," Vāgbhaṭa continues, "consists of eight rounded needles having the sharp ends half an aṅguli long. It is to be introduced

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[1] कूर्चोऽत्तैक पीठस्थाः सप्ताष्टौ वा सुबन्धनाः।
संयोज्य नौलिका व्यङ्ग केश शातेषु कुट्टने॥

Aṣṭāṅga Hṛdaya Saṁhitā, I. xxvi.

सम्प्रति कूर्चाख्यं शस्त्रं लक्षयितुमाह सप्तेत्यादि ताः सूच्यः सप्तैव अष्टा वर्तुलाः तथा चतुरङ्गुलाः चतुरङ्गुलदीर्घाः कृताः इत्युच्यते। ताः सूचयः पुनः कीदृशाः? अष्टकपीठस्थाः अष्टौ वर्तुले एकस्मिन् पृष्टे संस्थिताः, एकं अष्टाकारं काष्ठफलकं परिवेष्य स्थिता इत्यर्थः। तथा सप्तसंख्यका अष्टसंख्यका वा, तथा शोभनं रज्वादिकृतं बन्धनं यासां तास्तथाविधाः सुबन्धनाः। स कूर्चः नौलिकादिषु रोगेषु कुट्टने कुट्टनार्थं संयोज्यः प्रयोज्य इत्यर्थः। कुट्टनं चाँच्ड़ान इति लोके। नौलिकादयो वक्ष्यमाणा केशशातः केशानां पतनं।

Vāgbhaṭārtha Kaumūdī, I. xxvi.

[2] अवगाढ़पदञ्चैव पुच्छयित्वा पुनः पुनः।

Cakradatta, Kṣudraroga Cikitsā.

अवगाढ़पदमिति गम्भीरपदं यथास्यात् तथा सूचीनखरङ्गादिभिः पुच्छयित्वा * * *

Tattva Candrikā, ibid.

[3] अर्द्धाङ्गुलमुखैरष्टाभिः कण्टकैः खजः।
पार्श्वाभ्यां मध्यमाभ्यान्न घ्राणान्ते न हरेदसक्॥

Aṣṭāṅga Hṛdaya Saṁhitā, I. xxvi.

खजसंज्ञकशस्त्रमाह अर्द्धाङ्गुलमुखैरित्यादि अर्द्धाङ्गुलप्रमाणं मुखं येषां ते अर्द्धाङ्गुलमुखा तैरर्द्धाङ्गुलमुखैः अष्टभिः वर्तुलैः अष्टाभिः अष्टसंख्यकैः कण्टकैः कृतं शस्त्रं खज उच्यते। तेन खजाख्येन शस्त्रेण पार्श्वाभ्यां हस्ताभ्यां मध्यमाभ्यां आलोड्यमानेन घ्राणात् नासिकायाः असक्रक्तं हरेत्, निर्हरेदित्यर्थः।

Vāgbhaṭārtha Kaumūdī, I. xxvi.

into the nostrils and turned to and fro with both hands to bleed the nasal polypi."

The Greeks and Romans used a similar instrument for identical purpose. It was called katiádion, measuring a blade of grass, and was used for opening abscesses of the womb and tonsils, drawing blood from the inside of the nose and perforating the fœtal cranium.

In India, the practice of drawing blood from the nasal polypus by blades of grass is still in vogue; and Aræteus mentions it as a common mode of scarification in ancient Greece also[1]. "On the next day we are to abstract blood from the inside of the nostrils, and for this purpose push into them the long instrument named Katiádion, or the one named Toryne, or in want of these we must take the thick quill of a goose, and having scraped the nervous part of it into teeth like a saw, we are to push it down the nostrils as far as the ethmoid cells, then shake it with both hands, so that the part may be scarified by its teeth. Thus we shall have a ready and copious flow of blood; for slender veins terminate there and the parts are soft and easily cut. The common people have many modes of scarification, by rougher herbs and dried leaves of the bay, which they introduce with the fingers and move strongly." Paul[2] opens the vessels in the nostrils with the reed called typha.

14. Kuṭhārikā.

It is a small instrument shaped like an axe, so called from its resemblance to kuṭhāra, an axe which is still used in India

[1] Extant works of Aræteus, P. 460.

[2] Paul, vol. II. Sec. lx.

for cutting wood[1]. Vāgbhaṭa says[2] that "the base of the blade is thicker and broader than the end and is fitted to a handle, seven and a half aṅguli long. The blade which is shaped like the tooth of a cow, has the width of one aṅguli." Bhoja describes the width of the blade to be a half aṅguli[3]. It is recommended to be used for puncturing vessels in the following manner[4]:—"Hold the handle with the left hand and put the blade on the vessel resting on a bone. Raise the instrument a little upwards and then strike over the thick base of the blade with the downward strokes of the middle or index finger, when let go

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[1] For figure of Kuṭhāra as used in Ancient India, see Pl. xxii in Ferguson's Tree and Serpent Worship.

[2] पृथुः कुठारी गोदन्तसदृशार्द्धाङ्गुलानना।
तयोर्द्वदण्डया विध्येदुपर्यस्थ्नां सिरां स्थितां॥

Aṣṭāṅga Hṛdaya Saṁhitā, I. xxvi.

कुठारिका संज्ञकं शस्त्रमाह पृथुरित्यादि कुठारी पृथुः स्यात्। कुठारिका नामशस्त्रं पृथुः स्थूलमूलं स्यादित्यर्थः। तथा गोदन्तसदृशार्द्धाङ्गुलानना गवां दन्तः गोदन्त तत्सदृशं तुल्याकारं अर्द्धाङ्गुलायतं आननं मुखं यस्याः सा तथा विद्धया तया कुठार्या ऊर्द्वदण्डया अस्थ्नां उपरिस्थितां सिरां विध्येत्। तद्यथा वामहस्तेनौचीकृत्य कुठार्यामुखं शिरोपरि संस्थाप्य दक्षिणाङ्गुष्ठतर्जनीभ्यां कुठारिकामस्तकमभिहत्य सिरां विध्येत्।

Vāgbhaṭārtha Kaumūdī, I. xxvi.

[3] कुठारिकेति कुठारतुल्या कुठारिकाः—

कुठारिकाया हन्तं स्यात् सार्द्धसप्ताङ्गुलायतं।
फलमर्द्धाङ्गुलायामं गोदन्तसदृशं समम्॥

Nivandha Saṅgraha, I. viii.

[4] तथा मध्यमयाङ्गुल्या वैद्योऽङ्गुष्ठ विमुक्तया।
ताडयेदुत्थितां ज्ञात्वा स्पर्शादवाङ्गुष्ठ पीडनैः॥
कुठार्यां लक्षयेन्मध्ये वामहस्त ग्रहीतया।
फलोर्द्ध्वे सुनिष्कम्पं शिरां तदव मोक्षयेत्॥

Aṣṭāṅga Hṛdaya Saṁhitā, I. xxvii.

forcibly from the under surface of the thumb". Cakradatta[1] also advises us to use it in a similar manner. To open the veins in fleshy parts, Vāgbhaṭa recommends the vrīhimukha knife, while the kuṭhārikā is advised to be used in venesection on bony structures.[2]

Pālakāpya[3] mentions the kuṭhāra and describes its shape to be like an axe. It is to be used for excision and scarification. He describes another śastra called vatsadanta (*lit.*, the calf's tooth); it is ten aṅguli long; and the mouth of the instrument is one and a half aṅguli broad. It is also to be used for excision.

"Bleeding from the jugular vein, he (Albucasis) describes much in the same way that it is now practised by veterinary surgeons, namely, by placing a sort of scalpel bent at the point, which he calls fissorium, upon the vein, and striking the instrument with a hammer or some such body. He gives drawings of variously shaped lancets for opening the veins of the arm."[4]

"Ferriers bleed with a fleam, which, though apparently a clumsy method of operating, is certainly safer than the lancet in

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[1] वामहस्तेन विन्यस्य कुठारीमितरेण तु।
ताडयेन्मध्यमाङ्गुल्याङ्गुष्टविष्टब्धमुक्तया॥

Cakradatta Śīrāvyādhādhikāra.

[2] मांसले निचिपेद्वैद्यो व्रीहामं व्रीहिमावकम्।
यवाग्रमस्थ्नामुपरि शिरां विध्यन् कुठारिकाम्॥

Aṣṭāṅga Hṛdaya Saṁhitā, I. xxvii.

[3] कुठाराकृति कुर्य्यात्। कुठारी शस्त्रपच्छेदनार्थं। वत्सदन्ताकृति वत्सदन्तं दशाङ्गुलम्। एकैकमध्यर्द्धाङ्गुलमुखम्। एवमेतानि च त्रीण्यपि यथायोगं प्रच्छनार्थं।

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कुठाराकृतिशस्त्रेण ततस्तं प्रच्छयेद्भिषक्।
नातिगाढं न च लघु न घनं विरलं न च॥

Pālakāpya, III. iii.

[4] Albucasis Chirrug. ii. 97; also see Adam's Commentary on Paul, VI. lx. 323.

unknown hands." "In bleeding with a fleam, the near side is most convenient. In skilful hands, there is no occasion for a blood stick, as the fleam may be struck with the right hand if it is made broad and round at the back. It also may be made much smaller and neater than that generally employed". There is a drawing of such an improved fleam which much resembles in appearance the kuṭhārī of the Hindus. "A fleam is rather more convenient instrument in bleeding, either from the arm or thigh, as the vein is somewhat apt to roll when a lancet is used."[1]

15. Vrīhimukha.

It is described as a kind of trocar[2], the sharp end being pointed and shaped like a grain of paddy. It is six aṅguli long, the handle being two and the blade four aṅguli (Bhoja). But Vāgbhaṭa[3] describes the length of the blade to be one and a half aṅguli.

It is advised to be used for paracentesis abdominis in abdominal dropsy. Suśruta says :[4] "The friends of the patient should

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[1] White's Compendium of the Veterinary Art, 1851, 18th ed. P. 342.

[2] व्रीहिमुखमिति व्रीहिमुखमिव मुखमस्य व्रीहिमुखं तच्च भोजः—

शस्त्रं व्रीहिमुखं कार्य्यमङ्गुलानि षडायतम्।
द्व्याङ्गुलं तस्य हस्तं स्यात् तत्फलं चतुरङ्गुलम्।
तन्मुखं व्रीहिविस्तारं तनुसंगृढकण्टकम्॥

Nivandha Saṅgraha, I. viii.

[3] * * * तथाध्यर्धाङ्गुलं फले।
व्रीहिवक्त्रं * * *

Aṣṭāṅga Hṛday Saṁhitā, I. xxvi,

[4] उदकोदरिणस्तु वातहरतैलाभ्यक्तस्वेदोदकस्निग्धस्य स्थितस्यातैः सुपरिगृहीतस्याकचात्परिवेष्टितस्याधो नाभेर्व्यामतयतुरङ्गुलमपहाय रोमराज्या व्रीहिमुखेनाङ्गुष्ठोदर प्रमाणमवगाढं विध्येत्॥

Suśrutā Saṁhitā., IV. xiv.

hold him under the axilla. Then the abdomen is to be tapped by the vrīhimukha knife at a point, four aṅguli distant on the left side from the median line, underneath the navel." Vāgbhaṭa[1] advises us to surround a broad bandage round the abdomen before tapping it by the instrument, which he recommends to be introduced up to one aṅguli. Cakradatta[2] refers to works on surgery for the surgical treatment of ascites. A small incision is directed to be made before the puncture.

In the Aśvavaidyaka, for this operation, the utpalapatra knife is recommended; an incision four aṅguli long is directed to be made above or below the navel of the horse, and then the end of the knife is to be plunged into the abdominal cavity up to one aṅguli.[3] The vrīhimukha is also advised to be similarly used.[4]

Hippocrates speaks of evacuating the fluid in paracentesis abdominis with an instrument which Camper thinks must have been a kind of trocar.[5]

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[1] सजले जठरे तैलैरभ्यक्तास्थानिलापहैः।
स्निग्धस्वेदाम्बुना कक्षमुदरे परिवेष्टिते॥
वह्निद्वौदितौष्ठाने विध्येदङ्गुलमात्रकम्।
निधाय तन्मिताङ्गीञ्च सावयेदनमसः॥
ततास्य नाड़ीमाकृष्य तैलेन लवणेन च।
व्रणमभ्यज्य वद्धा च वेष्टयेद् वाससोदरम्॥

Aṣṭāṅga Hṛdaya Saṁhitā, IV. xv.

[2] आतं आतं जलं स्राव्यं शास्त्रोक्तं शस्त्रकर्म्म च।

Cakradatta, Udaracikitsā.

[3] See foot-note, 1. p. 242.

[4] See foot-note, 4. p. 241.

[5] See the Commentary on Paul. By Adams, vol. II, P. 338.

It is also to be used for puncturing the vessels in phlebotomy (Vāgbhaṭa)[1] especially in the fleshy parts of the body.[2] Cakradatta uses vrīhimukha in phlebotomy and says: "The sharp end of the vrīhimukha should be kept under the palm between the thumb and index finger and is to be thrust into the seat of puncture."[3]

Suśruta directs us to use it in tapping the hydrocele:[4] "Then the hydrocele is to be wrapped round with a bandage. The fluid is next to be drained by tapping it with a vrīhimukha on the lower part of the scrotum, little externally to the suture." Similar directions are given in the Yogratnākara.[5] Cakradatta also gives a similar discription.[6]

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[1] व्रीहिवक्त्रं प्रयोज्यच्च तत्सिरोदरयोर्वेध्ये:।

Aṣṭāṅga Hṛdaya Saṁhitā. I. xxvi.

व्रीहिमुखाख्यं शस्त्रं आह व्रीहिवक्त्रमित्यादि व्रीहेर्वक्त्रमिव वक्त्रं यस्य तत् व्रीहिवक्त्रं। व्रीहिमुखं यत्शस्त्रं तत्सिरानां व्यधे व्यधने तथा उदरस्य जलोदरस्य व्यधे सावणार्थं योज्यं।

Vāgbhaṭārtha Kaumudī. IV. xxvi.

ताड़यन् पीड़येच्चैनां विध्येद व्रीहिमुखेन तु।

Aṣṭāṅga, Hṛdaya Saṁhitā, I. xxvii.

[2] मांसले निःक्षिपेद्वैद्यो व्रीहास्यं व्रीहिमाचकम्।

Ibid.

मांसलेष्ववकाशेषु यवमाचं शस्त्रं निदध्यादतोऽन्येष्वर्द्धयवमातं व्रीहिमात्रं वा व्रीहिमुखेन।

Suśrutā Saṁhita. IV. viii.

[3] ततो व्रीहिमुखं व्यध्यादेभ्यो न्यस्य पीड़येत्।
अङ्गुष्ठतर्जनीभ्यन्तु तलप्रच्छादितं भिषक्॥

Cakradatta Śīrāvyādhādhikāra.

[4] See foot note 5. P. 123.

[5] संस्वेद्य मूत्रप्रभवं वस्त्रखण्डेन वेष्टयेत्।
सीवन्या पार्श्वतोऽधस्ताद्विध्येत् व्रीहिमुखेन वै॥

Yogaratnākara.

[6] संस्वेद्य मूत्रप्रभवं वस्त्रपट्टेन वेष्टयेत्।
सीवन्याः पार्श्वतोऽधस्ताद्विध्याद्व्रीहिमुखेन वै॥

Chakradatta Vṛddhi Cikitsā.

Paul describes the operation but he recommends a sharp-pointed knife or lancet instead of a trocar. He says: "Wherefore we must make the patient stand erect; or if this can not be done, we must cause him to be seated; * * * . We give orders to the assistants standing behind to press with their hands and push downwards the swelling to the pubes. Then taking a sharp-pointed knife or lancet, if dropsy be among the intestines, in the perpendicular line of the navel, and about three fingers' breadth distance from it we divide the hypogastrium as far as the peritoneum."[1] Celsus mentions that some perform it at a spot four fingers' breadth below the navel in the left side, and recommends us to use a perforator, the point of which should be about the size of the third part of a fingers' breadth.[2] Vegetius, the veterinary surgeon, recommends paracentesis for the dropsy of cattle.[3] The Arabic authors Avicenna,[4] Serapion,[5] Albucasis,[6] Haly Abbas,[7] and Rhases,[8] give similar descriptions.

In modern times, we perform the operation in the same way. "It is necessary in certain conditions to tap the abdomen in order to withdraw fluid which has accumulated there and this is usually done by means of a special trocar and canula. The site for tapping is selected, the usual spot being in the middle line, half-way between the umbilicus and the pubes. A

[1] Paulus Ægineta, Bk. VI. I. Syd. Soc. Ed.
[2] Celsus. vii. 15; ii. 10.
[3] Vegetius. Mulom. iii. 25.
[4] Avicenna, iii. 14; iv. 13.
[5] Serapion. iv. 7.
[6] Albucais: Chirrug. ii. 54.
[7] Haly Abbas, Pract. ix. 41.
[8] Rhases, Cont. xix.

small puncture about one-third of an inch long is made with the knife at the spot selected. The trocar and canula to which the rubber tubing is attached, are then thrust through the abdominal wall into the peritoneal cavity."[1]

The Greeks did not describe the operation of tapping the hydrocele. They always preferred the open incision to puncture. Paul uses a knife for making the skin incision, but when the tunica vaginalis is laid bare, he divides it through the middle with a lancet for bleeding.[2] Some of the Arab authors mention the operation of puncturing the scrotum for hydrocele. If the patient be timid, and do not choose to submit to open incisions, Albucasis advises the surgeon to let out the water either with a scalpel or the instrument used for tapping in dropsy. He states, however, that the water will collect again after this operation.[3] Rhases also describes this operation.[4]

In modern times, trapping for hydrocele is still practised. "When trapping a hydrocele the patient should be sitting up in a chair * * * . The scrotum, having been cleansed, is grasped from behind by the left hand * * * . A spot, free from any large veins, is selected on the anterior and lower part of the swelling, and the trocar and canula introduced with sharp stabbing movement."[5]

Pālakāpya[6] describes vrīhimukha as shaped like a grain of paddy and recommends it for scission and excision of muñja.

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[1] Operations of General Practice. By Corner and Pinches. P. 109, 2nd ed.
[2] Paulus Ægineta, VI. lxii.
[3] Albucasis. Chrug. ii. 62.
[4] Rhases. Cont. xxiv.
[5] Operations of General Practice, P. 145.
[6] खवण पाटनं चैव कुर्यादौहिमुखेन तु ।

Pālakāpya, III.

16. Ārā or awl.

It is a long sharp needle in handle, so called from its resemblance to the shoe-maker's instrument known as awl. "It has a total length of sixteen aṅguli, with a sharp end of the size of a sesamum seed. The handle is tapering like a cow's tail and is equal in circumference to the young stem of Dūrvā (Unodon Dactylon)" (Bhoja)[1]. Suśruta mentions its length to be six aṅguli. Vāgbhaṭa describes the length to be one aṅguli, the basal half being round, and the terminal half, four cornered and sharp pointed. The terminal part is introduced into the inflammatory swellings to confirm the diagonosis of suppuration. It is also to be used to drain the congested blood vessels in the matrix of the nails as a result of traumatism[2].

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[1] आरेति, आरेव आरा असिः चर्म्मकाराणां शस्त्रं। तत्र तल्लानरम् :—

आरा द्व्याङ्गुलायामा कर्त्तव्या तु विशाम्पते।
तिलप्रमाणन्तु फलं तस्याः कार्य्यं समाहितं।
दूर्व्वाङ्कुरपरीणाहं डिम्बं गोपुच्छसन्निभं।

Nivandha Saṁgraha, I. viii.

[2] व्यधने कर्णपालीनां युधिका मुकुलानना।
आरार्द्धाङ्गुलडिम्बास्या तत्प्रवेशो तथोर्द्धतः॥
चतुरस्रा तया विध्येच्छोथं पक्वाम संशये।
कर्णपालीञ्च बहलां बहलाया न च शस्यते॥
सूचा विभागगम्भिरा व्याङ्गुला कर्णवेधनी।

Aṣṭāṅga Hṛdya Saṁhitā. I. xxvi.

सम्प्रति कर्णपालि व्यधन योग्यानि शस्त्राणि वक्तुमाह व्यधने इत्यादि कर्णपालीनां कर्णलतानां व्यधने व्यधनविषये युधिका युधिका नाम शस्त्रं योज्यं। कीदृशी? मुकुलानना मुकुलवत् प्रकृतत्वात् युधिका मुकुलवत् आनन मुखं यस्याः सा तथाविधा। आरेत्यादि अर्द्धाङ्गुलं परिमानं डिम्बं वर्त्तुलं आस्यं मुखं यस्याः सा तथा अर्द्धाङ्गुलडिम्बास्या, तथा स एव अर्द्धाङ्गुलप्रमाणः प्रवेशः प्रवेशन यस्याः सा तथाविधा तत् प्रवेशा तथाऽर्द्धतः डिम्बार्द्धाङ्गुलादुपरिष्टात् तथा अर्द्धाङ्गुल परिमाणैव चतुरस्रा चतुष्कोणा सा आरा कथ्यते।

It is also said to have been used for perforating a thick lobule of the ear, though for this purpose another instrument called karṇa-vedhanī or ear-perforator—a needle specially meant for perforating the lobules of the ears,—is mentoined. It is three aṅguli long, having a slit or eye in the three-fourths of its length. The barbers used a similar needle to perforate the ears on the ceremony of tonsure.

For piercing the lobule of the ear, another instrument is mentioned. It is called jūthikā, from its end resembling in shape the conical bud of jūthikā flower (Jasminum Auriculatum).

Suśruta uses ārā or pāṇimantha to perforate the bone in diseases of the medullary canal caused by the obstructed and deranged air[1]. He next introduces one end of a tube open at

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एतेन आराया: फलं एकाङ्गुलपरिमितमिति फलति तव प्रथमार्द्धाङ्गुलं इत्तंमपरार्द्धाङ्गुलं चतुरस्रं तयोरुभयभागयोर्मध्ये अवस्थचतुरस्री भाग: प्रवेशयोग्य इति सूचितं। तथा आरया पक्वाम संशये अर्थं शोथ: पक्व आमोवेति संशये सति ताडग्रं शोथं विधेयात्, तथा वहलां अतिमांसलां कर्णपालीच तथा विधेयादिति योज्यं। वहलामित्यन्तेन च्छेद:। वहलाया-मित्यादि वहलाया: अतिमांसलाया: कर्णपाल्या: व्यधने कर्णवेधनी नाम्नी सूची च शस्यते। कीदृशी? त्रिभागग्रथिरा, त्रिभाग: ग्रथिरं ग्रन्थं यस्या: सा तथाविधा त्रिभागग्रथिरा तथा ताङ्गुला षडङ्गुलवयदीर्घा। न केवलमारा वहलाया: कर्णपाल्या व्यधने शस्यते अपि तु कर्णवेधनी नाम्नी सूची च शस्यते इत्यर्थ:। कर्णवेधनीं सूचीं अग्रदेशीया नरसुन्दरा कर्णवेधनार्थं व्यवहरन्ति। अतोऽयं वाङ्गुलवर्णनेति।

Vāgbhaṭārtha Kaumūdī. I. xxvi.

[1] निरुद्धेऽस्थनि वा वायौ पाणिमन्थेन दारिते।
नाड़ीं दत्वास्थनि भिषक् चूषयेत् पवनंवली॥

Suśruta Saṁhitā. IV. iv.

निरुद्धे इत्यादि। लङ्घनांसं शस्त्रेण विपाट्य अस्थि पाणिमन्थेन अराशस्त्रेण विद्ध्वा तत्र रन्ध्रे द्विमुखीं नाड़ीं प्रणिधाय सुखमारुतं चूषणेन लवनापकर्षणं कुर्यादिति।

Nivandha Saṁgraha. IV. iv.

both ends into the canal through the hole in the bone, while through the other end the surgeon sucks out the air by his mouth.

For perforating the ears of the elephants, a similar needle is recommended by Pālakāpya. It is known as karmāra or nālī.

17. Vetasapatraka.

It is a long sharp cutting instrument shaped like the leaf of the rattan (Calamus Rotang). Its edge is finely serrated and very sharp. The blade and handle are equal in length, measuring four aṅguli. Bhoja says: "The blade is one aṅguli wide"[1]. It is said to have been used for puncturing vessels in phlebotomy[2].

18. Vaḍiśa or sharp hook.

In shape it is described to resemble the ordinary fish-hook. Bhoja describes the total length to be six aṅguli, its hook being half an aṅguli and its handle five and a half aṅguli long. The end is bent; the curvature varies and may be shaped like a half-moon[3].

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[1] वेतसपत्रमिति, वेतसपत्रमिव वेतसपत्रमत्र भोजः—

तीक्ष्णमङ्गुल विस्तारं चतुरङ्गुलायतं।
षडङ्गुलानि तु चत्वारि ह्रस्वं कार्यं विजानता॥

Nivandha Saṅgraha, I. viii.

[2] वेतसं व्यधने।

Aṣṭāṅga Hṛdaya Saṁhitā, I. xxvi.

वेतसपत्रादि शस्त्रमाह वेतसमित्यादि वेतसं वेतसपत्रं नामशस्त्रं सिरादीनां व्यधन कर्मणि योज्यं। वेतसपत्रवद्ऋजुरत्वासस्य वेतसं वेतसपत्रं वेत्ति संज्ञा।

Vāgbhaṭārtha Kaumūdī, I. xxvi.

[3] वडिशमिति वडिशतुल्यं वडिशं मत्स्यावेधनीमाह:। तस्य तत्स्थानान्तरं :—

वडिशे चापि कर्त्तव्ये प्रमाणे तु षडङ्गुले।
स्यात्तस्य तयोरिकमेकं नात्यायतं भवेत्।

Suśruta says[1] : The end of the hook is sharply edged and is said to have resembled the new leaf of Java (Hordeum vulgare).

It is recommended by Suśruta[2] to be used for extraction of foreign bodies, *e.g.*, the extraction of stone from the urethra. Its use is also mentioned for transfixing the membranous expansion in the operation for pterygium[3] and for fixing and dragging the uvula and tonsil before the performance of any operation on these parts[4]. Cakradatta[5] mentions its use for fixing a growth, before its excision by the knife.

अर्द्धापचाङ्गुलं अन्तं ग्रैवं कार्यं मुखं तयोः।
अर्द्धचन्द्राकृति वक्रं कार्यं नात्यानतसा तु।
स्यानतं नामयेत् तत्र वङ्क्षणाभिमुखन्वरः।
अन्तयोरन्तरं स्याद् यावदर्द्धाङ्गुलं मतं।

Nivandha Saṅgraha, I. viii.

[1] वङ्क्षणोदन्तशङ्कुयानताग्रे तीक्ष्णकण्टक प्रथमयवपत्रमुखे।

Suśruta Saṁhitā, I, viii.

[2] यदृच्छया वा मूत्रमार्गप्रतिपन्नाममन्तरासक्तां शुक्राश्मरीं शर्करां वा स्रोतसा अपहरेत् एवं चाशक्ये विदार्य्य वा नाड़ीं शस्त्रेण वङ्क्षणेनोद्धरेत्।

Suśrutā Saṁhitā, IV. vii.

[3] यङ्क्षणेग्रन्थिकार्म्मादेर्वङ्क्षणः सुनताननः॥

Aṣṭāṅga Hṛdaya Saṁhitā, I. xxvi

वङ्क्षणशस्त्रमाह यङ्क्षणे इत्यादि सुष्ठु नतं धनुश्वत् नमस्कृतं आननं मुखं यस्य स तथाविधः सुनताननः वङ्क्षणं मत्स्यवेधनवत् वङ्क्षणोनाम शस्त्रं स्यात्। स च ग्रन्थिकार्म्मादेर्यङ्क्षणे योज्यं। आदिपदेन उपजिह्विकादे परिग्रहः।

Vāgbhaṭārtha Kaumūdī, I. xxvi.

[4] पिड़कामुन्नमाख्याय वङ्क्षणेनोद्धरेद्भिषक्।
उद्धृत्य मधुसंयुक्तैः कषायैरवचूर्णयेत्॥

Suśruta Saṁhitā, IV. xxi.

[5] उन्नमाख्यात्पिड़कां संक्षिप्य वङ्क्षणोद्धृताम्।

Cakradatta, Śukradoṣa Cikitsā.

It was also used for fixing any growth in the eye, previous to its excision by the maṇḍalāgra[1]. For this purpose the Greeks used the vulsellum (myzon). Aetius says: "If there is a large and malignant excrescence in the angle of the orbit, the enlarged part must be seized with vulsella and cut off."[2]

Evidently vaḍiśa was used on many occasions when in modern times we use the dissection forceps to steady a part before excision.

Vaḍiśa is described in the Aśvavaidyaka[3] to have been similarly used during the operation of pterygium in horses.

Pālakāpya[4] mentions vaḍiśa which is described as eight aṅguli long, the end being rounded like a wheel. It is to be used for raising the membranes of the eye globe.

Sharp hooks were used by the Greeks and Romans, for similar purposes. The use of the sharp hook for fixing the pterygium is mentioned by Celsus[5], Aetius[6], Paul[7] and Albucasis[8].

Its use in the excision of the tonsil is mentioned by Paul[9]. After the patient being placed in the proper position, he narrates: "We take a hook (tenaculum) and perforate the

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[1] See foot notes 1, 2 and 3, P. 227.

[2] Aetius. vi. 74.

[3] क्षितौ निपात्य तुरगं ततोनेत्रं प्रसारयेत्।
क्रतकर्णो भिषग्विद्वान् वडिशेनाधिवर्त्म नि॥

Aśvavaidyka, XXX. v. 32.

[4] वडिशं चक्रायमष्टाङ्गुलप्रमाणमग्रतः पटलोद्धरणार्थं चेति।

Palakāpya, III. xxx.

[5] Celsus. VII. vii.

[6] Aetius. Tet. ii, iii, 60.

[7] Paul. VI. xviii.

[8] Albucasis. Chirrug. ii, 16.

[9] Paul. VI. xxx.

tonsil with it, and drag it outwards as much as we can without drawing its membranes along with it, and then we cut it out by the root with the scalpel suited to the hand, called ancylotomus, for there are two such instruments, having opposite characters".

19. Danta śaṅku or tooth-scaler.

Its head is half an aṅguli long. It is quadrangular in shape and has a sharp edge. Suśruta [1] describes the end as slightly bent, sharp and shaped like the fresh leaf of Java. Bhoja [2] describes the end to be like that of the vrīhimukha.

Vāgbhaṭa[3] describes a similar instrument called dantalekhana or tooth-scaler. It is also quadrangular in shape, one side being sharp-edged and the opposite side little lengthened. It is

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[1] See foot note 1. P. 265.

[2] एवं हि क्रियते एतौ दशशङ्कुविज्ञानता।
शङ्कु वक्त्र मुखं तस्य कार्यमङ्गुलायतम्॥
चतुरस्रं समन्तेव तीक्ष्णधारं समाहितं।
इक्षाग्रं तस्य कर्तव्यं शस्त्रं व्रीहिमुखाकृति।
कपालिकां शर्करांच दन्तस्थान्तेन शोधयेत्॥

Nivandha Saṁgraha, I. viii.

[3] एकधारं चतुष्कोणं प्रहृद्वाकृति चैकतः।
दन्तलिखनकं तेन शोधयेद्दन्तशर्कराम्॥

Aṣṭāṅga Hṛdaya Saṁhitā, I. xxvi.

दन्तलिखन शस्त्रमाह एक धारमित्यादि एका धारा यस्य तत् एकधारं चत्वारः कोणा यस्य तत् चतुष्कोणं कोणः कोणा इति यस्य प्रसिद्धिः तथा एकतः एकदेशात् प्रहृद्वर्द्धनशीला आकृतिः आकारो यस्य। तत्तथाविधं प्रहृद्वाकृति दन्तलिखनं दन्तलिखनाख्यं शस्त्रं स्यात् तेन दन्तलिखनाख्येन शस्त्रेण दन्तशर्कराम् दन्तनिबद्धान् शर्कराख्यान् लिखयेत् कर्षयेदित्यर्थः। दन्तालिख्यन्ते अनेनेति दन्तलिखनं दन्तशर्करा पाथरि इति लोके।

Vāgbhaṭārtha Kaumūdī, I. xxvi.

recommended to be used for the extraction of sordes and tartar from the teeth [1].

The procedure of the operation of tooth-extraction is not described in detail in the medical books of the Hindus. But the operation seems to have been well known, for Suśruta distinctly advises the students to practise the operation of extraction on the fruits of Panas (Atrocarpus Integrifolia), Vimbī (Cephalandra Indica), Vilva (Ægle Marmelos) and on the teeth of the dead animals [2]. He also advises us to extract the wisdom teeth and to apply cautery to their sockets [3]. Also when a tooth becomes loose he directs us to extract it and apply cautery to the socket [4]. In the treatment of sinus caused by carious tooth, he advises us to extract the tooth, otherwise the sinus would extend down to the inferior maxillary bone [5].

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[1] शस्त्रेण दन्तवैदर्भं दन्तमूलानि शोधयेत् ।

* * * *

अहिंसन् दन्तमूलानि शर्करामुद्धरेद् भिषक् ।

Suśruta Saṁhitā, IV. xxii.

[2] See foot note 2, P. 280.

[3] उद्धृत्याधिकदन्तन्तु ततोऽग्निमवचारयेत् ।
क्रमिदन्तक-वद्यापि विधिः कार्य्यो विजानता ॥

Suśruta Saṁhitā, IV. xxii.

[4] चलमुद्धृत्य च स्थानं विदहेच्छुषिरस्य च ।

Ibid.

[5] यन्दन्तमधिजायेत नाड़ी तंदन्तमुद्धरेत् ।
क्षित्वा मांसानि शस्त्रेण यदि नोपरिजीभवेत् ॥
शोधयित्वा दहेदग्नि क्षारेण क्षत्रनेन वा ।
भिनत्ति पेचिते दन्ते हनुकास्थि गतिर्ध्रुवं ॥
समूलं दशनं तस्मादुद्धरेद भग्नमस्थि च ॥
उद्धृतेतूद्धरे दन्ते सशूले स्थिरवन्मने ॥

Ibid.

Pālakāpya[1] mentions the extraction of tooth of the elephant by means of enīpada which is an iron bar, thirty-two aṅguli long and equal to the tooth in circumference.

Paul says[2] : "The laminæ which unite to them (the teeth) we may remove as may appear proper, with the concave part of a specillum, a raspatory, or a file." The operation of tooth-extraction was however, not liked by the ancient Greeks as cases in which the operation proved fatal, occurred in their practice. Cælius Aurelianus, Herophilus, and Galen disapprove in general of the operation, except in extreme cases.

It would, no doubt, be interesting to know that in ancient India, the Hindus knew how to make false teeth to be used by men who have lost them either by accident or by extraction by the dentists. In 1194 A.D., Sahabuddin defeated Jayacandra in battle, "and the incident of the body of the rāja being recognised by his false teeth[3]—a circumstance which throws some light on the state of manners" is well known.

20. Eṣaṇī or sharp probes.

"The probes", says Caraka [4], "are of two kinds, the hard or

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[1] द्वात्रिंशदङ्गुलायतदशनपरिनाहेन लौहदण्डेन।
एनीपदेन कुर्याद्दन्तस्य तयोः सम्यक्॥
व्रीहिमुखेन च परिशोध्य सर्वतस्तां दन्तमूलेषु।
उपोदकधौतेषु मधुसर्पिः पूरणं दद्यात्॥

Pālakāpya, III. xviii.

[2] Paul. VI. xxviii.

[3] Elphinstone's History of India, P. 365, 5th Ed.

[4] द्विविधामेषणां विद्यात्तीक्ष्णां कठिनामपि।
उद्दिष्टेषु दृढनालेलौहानां वा शलाकया॥
गम्भीरमांसगे देशे पार्श्वे लौहशलाकया।
एषां विद्याद् व्रणं नालेविपरीतमतो भिषक्॥

Caraka Saṁhitā, VI. xiii.

metallic probes, and the soft probes such as the young stems of plants. The hard probes are required for deep sinuses in the fleshy parts and the sides of the body, while the softer varieties are used for probing the superficial sinuses". The ends of the probes are generally shaped like the head of the earth-worms[1]. Suśruta[2] describes them to be eight aṅguli long. They are to be used as probes to ascertain the direction of sinuses.[3] The blunt probes have been described before under the śalākās.[4]

The sharp probes have the shape of a needle and are six aṅguli long. The other end carries an eye through which is put one end of a caustic thread (*i.e.*, thread soaked in caustic lotion and then dried). The probe is to be used for piercing the tissues through the blind end of the sinus. The end of the thread is next to be withdrawn from the eye of the probe and a tight knot applied with the other end. The intervening bridge of tissues is thus gradually cut and the sinus ppened. If the cord be found inefficient for the purpose, a second thread is to be tied similarly.[5]

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[1] एषणी गण्डूपदाकारमुखी।

Suśruta Saṁhitā, I. viii.

[2] तच्च नखमर्म्मैषणावटाङ्गुलि।

Ibid.

[3] गतेरन्वेषणे ऋजा गण्डूपदमुखैषणी।

Aṣṭāṅga Hṛdya Saṁhitā, I. xxvi.

एषणीमुक्तं शस्त्रमाह गतेरित्यादि एषणीनाम शस्त्रं गतेः नाड़ीव्रणस्य पूयादिपथस्य अन्वेषणे अन्वेषणे योज्यं। सा चैषणी ऋजा कोमलस्पर्शा, तथा गण्डूपदमुखा, गण्डूलता मुखाकार मुखा च भवति।

Vāgbhaṭārtha Kaumūdī, I. xxvi.

[4] See page 155-7.

[5] ऋजदुर्बलभीरूणां नाड़ीमर्म्मश्रितां च यां।
चारसूत्रेण तां छिन्द्यान्न तु शस्त्रेण बुद्धिमान्॥

This method of treatment is recommended for the weak and timid patients. The needle-shaped probe is also to be used in the extirpation of new growths by means of caustic threads. Cakradatta[1] also describes this operation; evidently he copies it from Suśruta. In the Yogaratnākara[2] the verses describing the operation are also quoted. Vāgbhaṭa also mentions a needle-shaped probe for the same purpose.[3]

In treating of fistula-in-ano, Paul quotes from Hippocrates and says[4] :—"For Hippocrates directs us to pass a raw thread,

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एषणा मतिमन्विष्य चारसूत्रानुसारिणीम् ।
सूचीं निदध्याद्व्रणे तथोद्रम्याश्च निर्हरेत् ॥
सूत्रसात्म्यं समानीय गाढत्वं समाचरेत् ।
ततः क्षार वलं चौत्य सूत्रमन्यत् प्रवेशयेत् ॥
क्षाराङ्कं मतिमान् वैद्यो यावन्नच्छिद्यते गतिः ।
भगन्दरेऽप्येष विधिः कार्यः वैद्येन जानता ॥
अर्बुदादिषु चोत्क्षिप्य मूले सूत्रं निधापयेत् ।
सूचीभिर्यावक्त्राभिराचितं वा समन्ततः ।
मूले सूत्रेण बध्नीयाच्छिन्ने चोपचरेद्व्रणः ॥

Suśruta Saṁhitā, IV. xvii.

[1] These verses are quoted in the Cakradatta, Nāḍivraṇa Cikitsā.

[2] Also quoted in the Yogaratnākara, P. 346.

[3] भेदनार्थेऽपरा सूचीमुखा सूत्रनिविष्टखा ।

Aṣṭāṅga Hṛdaya Saṁhitā, I. xxvi.

अपरमन्येषणी शस्त्रमाह । भेदनार्थं इत्यादि भेदनार्थं नाड़ीव्रणानां गतिभेदनार्थं अपरा पूर्वोक्ताया एषण्या अन्या सूचीमुखा सूच्याकार मुखा स्यात् तथा मूले मूलदेशे निविष्टं, सूत्रनिवेश योग्यं ख छिद्रं यस्याः सा मूलनिविष्टखा सच्छिद्रमूलमित्यर्थः । अस्या एषण्यामूले छिद्रकरणं चारकसूत्रनिबन्धनार्थं । तेन प्रभिन्न क्षारनिष्काशितेन दृढबन्धेन चारसूत्रेण नाड़ीव्रणः प्रकाश्यते ।

Vāgbhaṭārtha Kaumūdī, I. xxvi.

[4] Paul. VI lxxviii.

consisting of five pieces, through the fistula by means of a probe having a perforation, or a double headed specillum; and to tie the ends of the thread and tighten it every day until the whole intermediate substance between the orifices be divided and the ligatute fall out". Hippocrates [1] describes minutely the apolinose and recommends it for those who from timidity avoid a surgical operation. Celsus recommends the thread to be smeared with some escharotic ointment. The process, he says, is slow but free from pain[2]. Albucasis [3] also approves of the operation according to circumstances. The operation called apolinose *i.e.*, by the ligature, is very celebrated. Ambrose Pare, Foubert, Camper, Giudo de Cauliaco and Rogerius approve of the ligature. It has been recommended by some of the modern surgeons[4]. The operation is still practised in India by the Madrasi specialists for fistula-in-ano.

Vāgbhaṭa [5] describes copper probes having the sharp ends shaped like the buds of Kuravaka (Baleria Cristata) to be used in

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[1] Hippocrates. 'De Fistulis'.

[2] Celsus. vii. 4.

[3] Albucasis. Chirrug. ii. 80.

[4] Lancet. vol. 1. 1845, new series.

[5] तासी शलाका द्विमुखा मुखे कुरवकाकृतिः।
लिह्नाम तया विध्येत्॥

Aṣṭāṅga Hṛdaya Saṁhitā. I. xxvi.

शलाका शस्त्रं षड्गुलि शस्त्रवाह तासीत्यादि द्विमुखा, द्विधारा, मुखे, मुखप्रदेशे कुरवकाकृतिः, रक्तझिण्टीपुष्प सुकुलकारा, तासी, तासमयी, शलाका, शलाका शस्त्रं स्यात्। तया शलाकया लिह्नाम, कफीत्थं पटल संज्ञकं चक्षुरोग विशेषं विध्येत्। विध्येदित्यर्थे न च्छेदः।

Vagbhatārtha Kaumūdī I. xxvi.

the operation of cataract. Suśruta[1] describes such a probe to be eight aṅguli long, made of copper, or iron, or gold, the ends being shaped like buds. A thread is spirally twisted round the middle of the instrument for a length of a thumb's breadth, to afford a firm grasp by the surgeon's fingers. This instrument must not be rough, thick or very sharp, for then there would be a greater chance of the eye being injured more than is necessary and at many places. So also in couching of cataract, Celsus says: "Then a needle is to be applied, sharp so as to penetrate, but not too fine."[2]

Pālakāpya[3] mentions eṣaṇī in the surgical treatment of diseases of the elephants. He describes three probes,—smooth and shaped like the collyrium rods. They are recommended to be ten, twenty and thirty aṅguli long respectively.

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[1] शलाका कर्कशाग्रा खरा दोषपरिक्षिति।
व्रणं विशालं स्थूलाग्रा तीक्ष्णा छिंसादनेकधा॥
अलाक्षावन्तु विषमा क्रियासङ्कमणास्थिरा।
करोति वर्जिता दोषैस्तत्रादेभिर्हिता भवेत्॥
षट्टाङ्गुलायता मध्ये सूत्रेण परिवेष्टिता।
षड्ङ्गुष्ठ पर्व्वसमिता वक्त्रयोर्भ्रुकुला कृतिः॥
तास्रायसी शातकौम्भी शलाका स्यादनिन्दिता।

Suśruta Saṁhitā, VI. xvii.

[2] Celsus. VII. viii.

[3] स्थिरा सवी च कर्त्तव्या व्रणानामेषणी भवेत्।
इक्षा गण्डपदमुखी प्रमाणे विंशदाङ्गुली॥
सुवर्णरूप्यताम्राणामायसी अङ्गजाऽपि वा।
दन्तास्थिवेणुदारूणामेषणी दारुणा भवेत्॥

Pālakāpya, III. i.

एषणी दशाङ्गुला विंशत्यङ्गुला विंशदङ्गुला यथायोगमञ्जनशलाकाकृति सुखतः ऋजा समा चैवमेताश्चित्र एषण्यः प्रमाणतः कार्य्याः।

Ibid, III. xxx.

The operation of couching for cataract is essentially an Indian operation; and Suśruta describes the operation minutely as follows :—

The operation of couching for cataract.

Suśruta says[1] : "Now we shall describe the treatment of cataract caused by phlegm. If inside the crystalline lens, anything is seen like a half-moon-shaped drop of water or pearl, hard, irregular

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* श्लैष्मिके लिङ्गनाशे तु कर्म्म वक्ष्यामि सिद्धये।
नचेदर्द्धेन्दुधर्म्माम्बुबिन्दुमुक्ताकृतिः स्थिरः॥
विषमो वा तनुर्म्मध्ये राजिमान्वा बहुप्रभः।
दृष्टिस्थो लक्ष्यते दोषः सरुजा वा सुलोहितः॥
स्निग्धस्विन्नस्य तस्याथ काले नात्युष्णशीतले।
यन्त्रितस्योपविष्टस्य स्वाद्रासां पश्यतः समं॥
मतिमान् शुक्लभागौ द्वौ क्षणाच्छुक्लाच्छपाङ्गतः।
उन्मील्य नयने सम्यक् शिराजाल विवर्जिते॥
नाधो नीर्द्धञ्च पार्श्वाभ्यां छिद्रे देवकृते ततः।
शलाकया प्रयत्नेन विस्रस्तं यवकक्रया॥
मध्य प्रदेशिन्यङ्गुष्ठस्थिरहस्त ग्रहीतया।
दक्षिणेन भिषक् सव्यं विध्येत् सव्येन चेतरत्॥
वारिबिन्दागमः सम्यक् भवेच्छब्दस्तथा व्यधे।
संसिद्ध विद्धमात्रन्तु योषित्स्तन्येन कोविदः॥
स्थिरे दोषे चले वापि स्वे दयेदचि वाश्रतः।
सम्यक् शलाकां संस्थाप्याभ्यङ्गैर शिलाशनैः॥
शलाकायेण तु ततो निर्लिखेद्दृष्टिमण्डलं।
विध्यतो योऽस्य पार्श्वेऽक्ष्णस्तं रुद्धा नासिकापुटं॥
उच्छ्रिङ्गनेन हस्तेन्यो दृष्टिमण्डलजः कफः।
निरस्य इव घर्म्मांशुर्यदा दृष्टिः प्रकाशते॥
तदासौ लिखिता सम्यग् ज्ञेया याचापि निर्व्यथा।
ततो दृष्टेषु रूपेषु शलाकामाहरेच्छनैः॥

or thin, striated or shinning, painful or red, caused by the deranged humours, the oleaginous applications and fomentations are to be tried first at a time when it is neither hot nor cold; then he (patient) is to be ligatured after having him seated conveniently, and should be directed to look towards his own nose. The intelligent (surgeon), then seperating the white part from the black part and the external canthus of the eye after opening it, avoiding the vascular network, and leaving the parts above and below intact, is to pass a yavamukhī śalākā (or sharp needle having its end resembling a wheat) through a natural opening on the side, steadily holding the rod with the thumb, index and middle fingers. If the operation be required on the right eye, the left hand, and if on the left eye, the right hand of the surgeon should use the needle in puncturing. A successful puncture is known by the escape of a drop of fluid and an audible sound. The experienced surgeon is to sprinkle woman's milk just after the puncture, and keeping the needle there, whether the deranged humour be movable or not, should apply fomentations externally by means of oily remedies for the deranged air. The crystalline lens is next to be scarified by the sharp end of the needle. Then keeping the needle fixed in the side of the eye, the patient should be directed to sniff so as to destroy the phlegm of the lens. The proper scarification will be indicated when the lens appears brilliant as the sun uncovered by clouds. Then the vision being clear, the needle in the side of the eye, is to be removed; and the eye is to be well

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घृतेनाभ्यज्य नयनं पक्ष्मपट्टेन वेष्टयेत्।
ततो गृहे निराबाधे शयीतोत्तान एव च॥

Suśrutā Samhitā, VI. xvii.

soaked with ghee (melted butter) and bandaged properly." Vāgbhaṭa also discribes the operation similarly.[1]

To this we may compare the account of the operation as given by Celsus. He "lays it down as a rule, that when the suffusion is small, immovable, and of the colour of sea water, or of shinning iron, and if a small degree of light can be percieved at the side, there is reason to hope well of the case. He forbids us to operate until the disease has attained a proper consistence. He directs us to place the patient opposite the operator, who is to sit on a higher seat, while the patient's head

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[1] अथ साधारणे काले शुद्धसंभोजिताननः।
देशे प्रकाशे पूर्व्याह्णे भिषग् जानुच पीठगः॥
यान्वितस्योपविष्टस्य स्निग्धाक्षस्य मुखानिलैः।
अकृष्ट सदिते नेत्रे दृष्टी दृष्टेष्टतं मलम्॥
सनासां प्रेक्षमाणस्य निश्चल्यं मुष्टिं धारितं।
कृष्णादर्द्धांङ्गुलं मुक्त्वा तदर्द्धांङ्गमपाङ्गतः॥
तर्ज्जनीमध्यमाङ्गुष्ठैः शलाकां निश्चलं धृताम्।
दैवच्छिद्रं नयेत् पार्श्वादूर्द्धमामस्यवद्विध॥
सर्व्यं दक्षिणहस्तेन नेत्रं सव्येन चेतरत्।
विध्येत् सुविद्धे शब्दः स्यादरुक चाम्बुलवस्रुतिः॥
सान्त्वयन्नातुरं चानु नेत्रं स्नग्धेन सेचयेत्।
शलाकायास्तथोद्धरेण निर्लिखेन्नेत्रचर्मखलं॥
अबाधमानः शनकैर्नासां प्रतिनुदंस्ततः।
उच्छिद्यनाद्यापहरेद् दृष्टिमण्डलगं कफम्।
स्थिरे दीप्ते चले चापि स्रवे दग्धेदचिवाह्यतः॥
अथ दृष्टेषु रूपेषु शलाकामाहरेच्छनैः।
घृताक्तं पिचुं दत्त्वा बद्वाक्षं शाययेत्ततः॥
विद्वादन्येन पार्श्वेन तमुत्तानं क्षणोर्ध्वधि।
निवातं शयनेऽभ्यक्तशिरः पादं द्वितीयतम्॥

Aṣṭāṅga Hṛdaya Saṁhitā, VI, xiv.

is held by an assistant. The sound eye is to be previously covered up with wool. If the left eye is affected, the operator must use his right hand, and *vice versa*. A needle which is sharp and not too slender is to be passed direct through the two coats at a place intermediate between the temporal angle and the black of the eye, and towards the middle of the cataract. When the needle has perforated far enough, which is readily known by the absence of resistance, it is to be turned so as gradually to remove the cataract below the region of the pupil and this object being attained it is to be strongly pressed to the lower part. If it remain there the operation is completed, but if it return, it is to be cut and torn by the needle into many pieces, in which state they are easier depressed, and prove less troublesome. The needle is then to be drawn out direct and soft wool smeared with white of an egg, and other anti-inflammatory applications are to be used. Quiet, restricted diet, and soothing treatment will be proper.[1]" Paul [2], Mesue [3], Albucasis [4], Rhazes [5] and others also describe the operation of couching in similar terms. Albucasis gives figures of these needles.

The operation is still practised in India by the māls who consider themselves specialists in diseases of the eyes.

21. Sarpāsya.

Vāgbhaṭa describes an instrument having its end resembling

[1] Celsus. vi. See Adam's Commentary to Paul VI. xxi.
[2] Paul. VI. xxi.
[3] Mesue. De Aegr. oculi, 15.
[4] Albucasis. Chirrug, ll. 23.
[5] Rhazes. Ad mansor.

the mouth of a snake [1]. The blade is said to be half an aṅguli long. It is advised to be used for excision of the nasal and aural polypi.

The fact that it was able to work inside the nose and the auditory canal shows that it could not have been of any great breadth, possibly less than a quarter of an inch at the most. The exact shape of the sarpāsya can not be determined with certainty. The Greeks however used for the same purpose, "a polypus scalpel, having its extremity shaped like a myrtle leaf," which was a double instrument, the other end being a scoop [2].

Gold or Silver knife.

To cut the navel cord, Caraka [3] recommends the use of a knife, made of gold, or silver, or iron. To make gold and silver knives of sharp edges seems absonous to our reason, but we must remember that to cut the navel cord, a very keen edge is not required, and even now the purpose is often served by the native dhāis with a piece of split bamboo.

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[1] सर्पास्या घ्राणकर्णार्शश्छेदनेऽर्धाङ्गुलं फले ॥

Aṣṭāṅga Hṛdaya Saṁhitā. I. xxvi.

सर्पास्यं नाम शस्त्रमाह। सर्पास्यं इत्यादि सर्पास्य नाम शस्त्रं नासिका कर्णार्शसां छेदने योज्यं तच्च फले अङ्गुलार्धपरिमितं अर्धाङ्गुलपरिमित फलकमित्यर्थः। अस्य सर्पमुखसदृश मुखत्वात् सर्पास्यमिति संज्ञा।

Vāgbhaṭārtha Kaumūdī. I. xxvi.

[2] Paul. VI. xxv.

[3] See foot-note 4. P. 65.

PRATUDA.

Suśruta mentions it as a knife to be used for making scarifications on the body of a lunatic.[1]

The mode of holding the sharp instruments.

Suśruta says[2]: "The vṛddhipatra is to be held at the junction of the handle and the blade; and all instruments used for incision should be held similarly. The vṛddhipatra and maṇḍalāgra, if used for scarification, should be held with the hand raised a little; when used for evacuating abscesses, they, as well as all other instruments, should be held by the fore part of the handle. But in the case of children, old or delicate or timid persons, women, and kings and princes, abscesses should be evacuated with the trikūrcaka. The vrīhimukha is to be held with the thumb and forefinger, its handle being covered within the palm. The kuṭhārikā is to be held in position with the left hand, and struck with the middle finger when let go forcibly from the under surface of the thumb of the right hand. The ārā, karapatra and eṣaṇī should be held at their extremities.

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[1] प्रतुदैर्दारयेत्सैन्धं मर्म्मघातं विवर्ज्जयेत्।
सर्पिर्धाने जरत्कूपे सततं वा निवासयेत्॥

Suśruta Saṁhitā, VI. liii.

[2] तेषामयमयोग यहण समासोपायः कर्म्मसु वक्ष्यते। तव वृद्धिपत्रं वृत्तफलसाधारणे भागे ग्रहीयाद्वेदनास्थिवं सर्व्वाणि। वृद्धिपत्रं मण्डलाग्रञ्च किञ्चिदुन्नतपाणिना लेखने वहुशोऽवचार्य्यं वृत्तायं विस्रावयानि। विशेषेण वालवृद्धसुकुमार भीरु नारीणां राज्ञां राजपुत्राणाञ्च विकूर्चकेन विस्रावयेत्। तत्र प्रच्छादित वृत्तमङ्गुष्ठ प्रदेशिनीभ्यां ग्रीहिमुखं। कुठारिकां वामहस्तन्यस्तामित-रहस्त मध्यमाङ्गुल्याङ्गुष्ठ विहव्ययाभिहत्यात्। आराकरपत्रैषण्यो मूले। ग्रेषाणि तु यथायोगं ग्रहीयात्।

Suśruta Saṁhitā, I. viii.

The other instruments are to be held as required in particular cases." Vāgbhata also gives similar directions [1].

The practical training in surgical operations.

Suśruta says [2]: "Even after a pupil has mastered the whole of the medical treatises, the preceptor should instruct him practically how to perform surgical operations and how to administer oils and other medicines. However learned he may be in books, he cannot be fit for surgical practice, unless he has acquired the practical training. Therefore the preceptor should show his pupils the methods of operations, of incision, excision and division, upwards and downwards on the pumpkin, bottle-gourds, water-melons, and the three varieties of cucumbers—Trapuṣa (Cucumis Sativus), Ervārūka (Cucumis Utillissimus), and Karkarūka (Cucumis Melo).

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[1] छिद भेदेन लेख्यार्थं शस्त्रं हस्त फलान्तरे।
तर्जनी मध्याङ्गुष्ठैस्तं धीयात् सुसमाहितः।
विस्रावणादि हस्तार्थं तर्जन्यङ्गुष्ठकौ न च।
तल प्रच्छन्न हस्तार्थं यान्त्रं व्रीहिमुखं मुखे।
मूलेष्वाहरणार्थानि क्रिया सौकर्य्यतोऽपरं॥

Aṣṭāṅga Hṛdaya Saṁhitā. I. xxvi.

[2] अधिगत सर्वशास्त्रार्थमपि शिष्यं योग्याङ्गारयेत्। छेद्यादिषु क्षेत्रादिषु च कर्म्मपथमुपदिशेत्। सुवङ्मुखोत्पक्व योग्यः कर्म्मस्वयोग्यो भवति। तत्र पुष्पफलालाबु कालिन्दकत्रपुषैर्वारुककर्कारुक प्रभृतिषु छेद्य विशेषान् दर्शयेदुत्कर्त्तनपरिकर्त्तनानि चोपदिशेत्। इति वस्ति प्रणिधक प्रभृतिषूदकपूर्ण्णेषु भेद्य योग्यां। सरोजि चर्म्माच्छादने लेख्यस्य। मृत पशुसिरासूत्पलनालेषु च वेध्यस्य। पृष्ठोपरुत काष्ठवेणु नलनालीगुष्कालाबुमुखेषु व्यधस्य। पनसबिल्वीबिल्वफलमज्जमृतपशुदन्तेष्वाहार्य्यस्य। मधुच्छिष्टोपलिप्ते शाल्मलीफलके विस्राव्यस्य। सूक्ष्मघनवस्त्रान्तयोर्मृदुचर्म्मान्तयोश्च सीव्यस्य। पुरुषस्य पुरुषाङ्गप्रत्यङ्ग विशेषेषु वश्ययोग्यां। मृदुमांसपेशीसूत्पलनालेषु च कर्णसन्धिवश्ययोग्यां। मृदुषु मांसखण्डेष्वग्निचारयोग्यां। उदक पूर्णघटपार्श्वं स्रोतस्यलाबुमुखादिषु च नेत्रप्रणिधानवस्तिव्रण वस्ति पीड़न योग्यामिति।

Suśruta Saṁhitā. I. ix.

The operation of puncturing or tapping may be demonstrated on leather bags, bladders and pouches, filled with slush; scarifications, on stretched pieces of leather covered with hair; opening on the veins of dead animals or on stalks of water-lily; probing on worm-eaten wood, bamboo, reed, tube or dried bottle-gourd; extraction, on the pulp of jack fruit, the Bael fruit (Ægle Marmelos), Vimbī fruit (Cephalandra Indica) or on the teeth of dead animals. Evacuation on a lump of wax applied to a board of Śālmali wood (Bombax Malabaricum); sewing, on the two ends of a thick piece of cloth or soft leather; bandaging on the limbs of a dummy (human figure made of cloth and clay), bandaging the root of the ear, on a piece of soft flesh, or the stalk of a water-lily; application of cauteries, on pieces of flesh; introduction of tubes for clysters (urethral, rectal and vaginal) and wound-syringe, on the spout of an earthen vessel filled with water, or on the mouth of a bottle-gourd or similar objects."

CHAPTER VII.

THE ANUŚASTRA.

The anuśastra means substitutes for cutting instruments. They are the following[1] :—

1. Bamboo. 2. crystal. 3. glass. 4. ruby. 5. leeches. 6. fire. 7. caustics. 8. the nails. 9. leaves of Goji (Elephantobus Scaber), 10. Śephālikā (Nyctanthe Arbortristris), and 11. Śākhā (Tectona Grandis). 12. young stems of plants. 13. hair 14. finger.

These are advised to be used in case of infants or timid persons or when the proper instruments are not available.[2]

1. Bamboo.

A piece of split bamboo is said to have been used for cutting through and cutting into some parts of the body. It is still used by the native dhāis or midwives for cutting the funis.

A piece of bamboo is directed to be used for applying pressure on small boils to cure them by subsidence [3]. For the same purpose, the pressure of the thumb is also recommended [4].

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[1] अनुशस्त्राणि तु त्वक्सारस्फटिककाचकुरविन्दजलौकाग्निक्षारनखगोजीशेफालिका-शाकपत्र करीरबालाङ्गुलय इति।

Suśruta Saṁhitā. I. viii.

[2] शिशूनां भस्त्रभीरूणां शस्त्राभावे च योजयेत्।
त्वक्सारादि चतुर्ष्वेषु छेद्येषु भेद्येषु च वृद्धिषु॥

Ibid.

[3] वृतेषु दोषेषु यथानुपूर्व्वं यन्त्री भिषक् स्रोत्र समुल्लिखेत तु॥
स्त्रिग्धस्य विस्रापनमेव कुर्य्यादङ्गुष्ठलोष्ठीपलवेन दक्षैः।

Ibid. IV. xviii.

[4] अभ्यज्य स्वेदयित्वा च वेदनाद्या ततः शनैः।
विस्रापनार्थं मृद्नीयात् तर्जनाङ्गुष्ठकेन वा॥

Cakradatta, Vraṇaśothā Cikitsā.

Bamboo is also mentioned to have supplied largely the materials of splints for treatment of fractures and dislocations. For this purpose it is to be split into thin layers[1]. Split bamboo is still used for the treatment of fractures by the kavirājes and might advantageously be used by the modern surgeons as a cheap and easily available material for splint.

Dissection.

It is generally supposed that the practice of dissection of the human body for anatomical studies was unknown to the ancients. But the practice of human dissection is unmistakably referred to in the Suśruta Saṁhitā.[2] Brushes made of bamboo, barks of trees, grass roots, and hairs are mentioned as instruments of dissection. "Thus a body should be secured which is complete in all the parts and which is of a person who was not more than 100 years old, nor who died from the effects of poison or of a chronic disease. Having cleared the intestines of any fæcal matter, the body should be well wrapped either in Muñja (Saccharam Munja), or grass, or barks of trees or hemp etc., put inside a cage which should be firmly fastened, in a solitary spot, in a calm river and thus allowed to decompose. After seven nights, having taken out

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[1] विभज्य च नरं दृष्ट्वा वेणुखण्डेन वत्सयेत्।
सचयेन्नवनीतेनैरभ्यक्तञ्च वेष्टयेत्॥

Hārita Saṁhitā, II.I lvi.

[2] तस्मात्समसमागात्रमविषोपहतमदीर्घव्याधिपीड़ितमवर्षशतिकं निःसृष्टान्त्रपुरीषं पुरुषमबहुन्यामापगायां निवद्धं पञ्जरस्थं सुश्लक्ष्णकुशशाद्वलीनामन्यतमेनावेष्टिताङ्गमप्रकाशे देशे कोथयेत् सम्यक् प्रकुथितञ्चोद्धृत्य ततो दृढं सप्तरात्रादुशीर वालवेत्र वल्कल कुचैलानामन्यतमेन श्नैः श्नैरवधूय त्वगादीन् सर्व्वानेव बाह्याभ्यन्तराङ्गप्रत्यङ्ग विशेषान् यथोक्तान् सचयेत्सक्षुषा।

Suśruta Saṁhitā, III. v.

the thoroughly decomposed body, it should be slowly rubbed with a brush made either of Uṣīra (Andropagon Muricatus) or hair, or bamboo, or barks of trees, examining at the same time with the eyes, every division and sub-division of the body, external or internal, beginning with the skin, as delineated in the śāstras." Animal anatomy was also thoroughly understood as each part of the body had its own distinctive name.

Hoernle[1] says : "Probably it will come as a surprise to many as it did to myself, to discover the amount of anatomical knowledge which is disclosed in the works of the earliest medical writers of India. Its extent and accuracy are surprising, when we allow for their early age—probably the sixth century before Christ—and their peculiar methods of definition.***Of the practice of such dissection in ancient India we have direct proof in the medical compendium of Suśruta, and it is indirectly confirmed by the statements of Caraka. It is worthy of note, however, that in the writings of neither of these two oldest Indian medical writers is there any indication of the practice of animal dissection."

The Greeks did not practise disection of the human body. "The anatomical knowledge of the Hippocratists was derive chiefly from dismemberment of animals, experience in slaughtering and sacrifices, and from the observation of surgical cases. Systematic dissection of the human body was out of the question owing to the religious precepts which strictly enjoined immediate burial, and to the superstitious horror of the dead which then prevailed. The supposition that outstanding individual investigators, upon rare occasions, did not hesitate to examine

[1] Hoernle. Osteology. Preface. iii.

human bodies or parts of bodies (particularly) bones, in order to correct prevailing opinions, is one which, if not susceptible of direct proof, is at least probable. This supposition, besides being borne out by many statements on the part of ancient writers, is the more probable since tho bodies of savages, traitors and criminals were outside the pale of religious ordinances and were therefore available, as were also accidentally obtained portions of the body, to satisfy the curiosity of scientific investigators. No one of the oft-quoted extracts from the Hippocratic writings, supposed by individual historians to refer to human dissection, is quite conclusive, whilst nowhere is there in the pathology of the day any definite trace of anatomical research upon the bodies of those dead of disease. On the other hand comparisons are frequently instituted by the Hyppocratists referring to facts acquired through zootomy or to anatomico-pathological discoveries such as might have been made in the slaughtering of beasts."[1]

The study of anatomy received its impetus from the Alexandrian School. "Herophilus improved the technique and developed the terminology of anatomy and enriched it by valuable discoveries made in the dessection of human bodies, particularly in the knowledge of nerves, vessels and viscera, but also in that of the eye. With his works, systematic anatomical investigation may in fact be said to begin."[2]

"Like Herophilus, Erasistratos made a successful study of anatomy, even surpassing the former in knowledge of details, and in a series of observations upon the cadavers of men and

[1] History of Medicine. Neuberger. P. 150.
[2] Ibid. P. 177-8.

animals, corrected his own mistakes as well as those of others. His greatest achievement was in the study of nerves and vessels."[1]

2, 3 and 4. Crystal, glass and ruby.

These are recommended to be used for cutting through and cutting into some parts of the body.

Glass vessels for preparing medicines are often mentioned. Śārṅgadhara[2] used it for purifying mercury.

5. Leeches.

Leeches are described to be the mildest of all means for extracting blood, and are recommended for princes, childern, women, and timid people[3].

Twelve kinds of leeches are described[4]; six of them are poisonous and six, non-poisonous.

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[1] History of Medicine. Neuberger. P. 181.

[2] काचकूप्यां विनिक्षिप्य तां च सदस्त्रमुद्रया।
विलिप्य परितो वक्त्रं मूद्रां दत्त्वा च शोषयेत्॥

Śārṅgadhara Saṁgraha, II. xii.

[3] नृपाबालस्थविर भीरुदुर्ब्बलनारी सुकुमाराणामनुरक्षार्थं परमसुकुमारोऽयं शोणितावसे च नोपायोऽभिहितो जलौकसः॥

Suśruta Saṁhitā, I. xiii.

[4] जलमासामायुरिति जलायुका जलमासामोक इति जलौकसः। ता द्वादश तासां सविषाः षट् तावत्य एव निर्व्विषाः। तत्र सविषाः कृष्णा कर्ब्बुरा अलगार्दा इन्द्रायुधा सामुद्रिका गोचन्दना चेति। तासाञ्जनचूर्णवर्णा पृथुशिराः कृष्णा। वर्द्धिमत्स्यवदायता किञ्चोन्नतकुक्षिः कर्ब्बुरा। रोमशा मण्डूकपार्श्वा कृष्णसुस्थलगर्दा। इन्द्रायुधवद्दूरराजिभिश्चित्रिता इन्द्रायुधा। ईषदसितपीतिका विचित्र पृष्ठाकृतिचित्रा सामुद्रिका। गोऽपरवदधोभागे द्विधामूलाकृतिरणुसुस्थी गोचन्देति। ताभिर्दष्टे पुरुषे दंशे क्षयदुरतिमात्रं कण्डूसुप्तां

The poisonous leeches are :—

1. Kṛṣṇā :—it is of the colour of black collyrium and has a broad head.

ज्वरोदाहस्फुर्दिमंद: सदनमितिलिङ्गानि भवन्ति। तच्च सहागद: पानालेपननस्य कर्मादियु-योज्य:। इन्द्रायुधादष्टमसाध्यमित्येता: सविषा: सचिकित्सिता व्याख्याता:। अथ निर्विषा:। कपिला पिङ्गला शङ्कुमुखी मूषिका पुण्डरीकमुखी सावरिकाचेति। तच्च मन:शिलारञ्जिता-भ्यामिव पार्श्वाभ्यां पृष्ठे स्निग्धसुङ्गवर्णा कपिला। किञ्चिद्रक्ता ह्रस्वकाया पिङ्गायुगाच पिङ्गला। यङ्गवर्णा शीघ्रपायिनी दीर्घतीक्ष्णमुखी शङ्कुमुखी। मूषिकाकृति वर्णाऽनिष्टगन्धा च मूषिका। सुङ्गवर्णा पुण्डरीकतुल्यवक्त्रा पुण्डरीकमुखी। स्निग्धा पद्मपत्रवर्णाष्टादशाङ्गुलप्रमाणा सावरिका साच पञ्चधैं। इत्येता सविषा व्याख्याता:।

तासां प्रयङ्गुमार्द्रचर्म्मणान्यैर्वा प्रयोगैर्ह्रीयात्। अथैनां नवे मृति घटे सरसङ्गा-गोदकपङ्कभावाप्य निदध्यात्। भल्यर्थं चासामुपहरेच्चैवलं बहूरभीदकांश्च कस्दां-यूषौंश्च्य अथार्थं ह्रषभीदकानि च पयांसि। ह्रस्वाह्रस्वान्यम्बलं भल्यश्च दद्यात्। सप्तरात्रात् सप्तरात्राच्च घटमन्यं संक्रामयेत्। भवति चात्र।

स्थूलमध्या: परिक्लिष्टा: पृथ्वी मन्दविचेष्टिता:।
अयाश्चिरोऽल्पपायिन्य: सविषाश्च न पूजिता:॥

अथ जलौकोऽवसेकसाध्यव्याधिसुपवेश्य संवेश्य वा विरूक्ष्य चास्य तमवकाशं सद्यो मय-चूर्णैर्यदरुज: स्यात्। गृहीताश्च ता: सर्षपरजनीकल्कोदक प्रदिग्धगात्री: सलिलसरकमध्ये मुहूर्त्तस्थिताविगतक्लमा ज्ञात्वा ताभीरोगं याहयेत्। सूक्ष्मयङ्गार्द्रपिच्छीतावच्छन्नां कृत्वा मुखमपाङ्गयादस्यन्त्यै क्षौरविन्दुं शोणितविन्दुं वा दद्याच्छस्यपदानि वा कुर्वीत यथेवमपि न गृह्णीयात्तदान्यां याहयेत्। यदा च निर्विशतेऽवमुरवदानन कृत्वोन्नम्य च स्कन्धं तदा जानीयाद् गृह्णातीति गृह्णतीं चार्द्रवस्त्रावच्छन्नां धारयेत् सेचयेच्च। दंशे तोदकन्दूप्रादुर्भा-वैर्ज्ञानीयाच्छुद्धमियमादत्त इति गृहमाददानामपनयेत्। अथ शोणितगन्धेन न सुचेन्मुखमस्या: सैन्धवचूर्णेनावकिरेत्। अथ पतितां तण्डुलकणप्रदिग्धगात्रीं तैललवणाभ्यक्तसुखीं वाम-हस्ताङ्गुष्ठाङ्गुलीभ्यां गृहीतपुच्छां दक्षिणहस्ताङ्गुष्ठाङ्गुलीभ्यां शनै: शनैरनुलोममनुमार्ज्जयेदा-सुखाद्गमयेत्तावद्यावत्सम्यग्वान्तलिङ्गानीति। सम्यग्वान्ता सलिलसरकस्था भोक्तुकामा सती चरेत्। या सीदति न चेष्टते सा दुर्व्वान्ता तां पुन: सम्यग्वामयेत्। दुर्व्वान्ताया व्याधिर-साध्यत्वमदो नाम भवति। अथ सुवान्तां पूर्ववत् सन्निदध्यात् शोणितस्य च योगायोगानवेक्ष्य जलौकोव्रणान्मधुनावघृष्यैवाभिरद्भिर्व परिषेचयेद्घृतं वा व्रणं कषाय मधुर स्निग्धशीतैश्च प्रदेहै: प्रदिह्यादिति।

Suśruta Saṁhitā, I. xii,

2. Karvūrā:—it is as long as an eel with elevated stripes across the abdomen.

3. Alagarddā:—it looks as if covered with hair and has large sides and black mouths.

4. Indrāyudhā:—or rain-bow coloured; it has rain-bow coloured longitudinal stripes on the back.

5. Sāmudrikā:—it is of dark yellow colour and has variegated flower like spots on its body.

6. Gocandanā:—it has a bifurcated tail like the scrotum of a bull and a small mouth.

The non-poisonous ones are—

1. Kapilā or the greenish one;—it has its two sides of the colour of orpiment, and on its back, it is smooth and of the colour of a green pea.

2. Piṅgalā or twany;—it is of a reddish-brown colour, has a round body and moves quickly.

3. Śaṅku-mukhī or bluish-red;—it is of the colour of the liver, sucks quickly and has a long sharp mouth.

4. Mūṣikā or rat-like;—it has the shape and colour of a rat's tail and emits a disagreeable smell.

5. Pundarika-mukhi or lotus-faced;—it is of the colour of a green pea and has a mouth liks a lotus.

6. Savarikā;—it is slimy, coloured green like a lotus-leaf and eight angulil long; it is to be used in veterinary practice.

The non-poisonous leeches generally live in meadows and fresh water. They are to be caught with a piece of wet leather and

kept in a new large earthen pot filled with mud, water, green fungi, dry flesh, etc. The water is to be changed every third day and the pot every seventh day.

To apply leeches, the patient is directed to lie down and the part is to be rubbed dry with powdered cow dung and earth. The leech is then to be smeared with a paste containing turmeric, mustard and water, to excite them, washed thoroughly with water and then applied, its body being covered with a piece of wet cloth. To fix it quickly, a drop of milk or blood is to be applied over the diseased part, scarification of which is also recommended instead. When the leech has removed the necessary quantity of blood, a small quantity of salt is advised to be sprinkled upon its head to make it drop off. Then the leech is to be put upon some powdered rice and its mouth is advised to be smeared with oil and salt.

Then it is to be stripped and put in fresh water, and should be used again, if it moved, but if languid, thrown away.

The leech-bites are to be smeared with honey, cold water and astringent substances, or poulticed.

Vāgbhaṭa also gives similar directions for the application of leeches.[1]

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[1] जलौकसन्तु सुखिनां रक्तसावाय योजयेत्।
दुष्टाम्बुमत्सा भेकाहि शवकीटमलोद्भवाः।
रक्ताः श्वेता भृशं कृष्णाश्चपलाः स्थूलपिच्छिलाः॥
इन्द्रायुधविचित्रोर्द्धराजयो रोमशाश्च ताः।
सविषा वर्ज्यवेत्ताभिः कण्डूपाक ज्वरप्रदाः॥
विषपित्तास्रनुत् कार्य्यं तत्र यत्नाच्चुभाः पुनः।
निर्विषाः श्वेतलम्बाद्या हिता नीलर्द्धराजयः॥

Dr. Ray has clearly shown that "the discription of leeches as given by Rhazes agrees almost word for word with that of Suśruta (Sanasrad) in many places". He describes the parallelism at length and comes to the conclusion "of the use of a chapter of the Susruta or some such work[1]".

6 AND 7. FIRE AND CAUSTICS.

The use of cauteries in surgery has been described before under the head of the accessory blunt instuments [2].

कषाय पृष्टास्तनद्याः किञ्चित् पीतदराय वाः ॥
ता अप्यसम्यग् वमनात् प्रततञ्च निपातनात् ।
सीदन्तीः सलिलं प्राप्य रक्तमत्ता इति त्यजेत् ॥
अपेतरा निशाकल्क युक्ते उम्भसि परिप्लुताः ।
अवस्तिसीमि तक्रेवा पुनर्वान्वासिता जले ॥
लागयेद घृतमत्स्याङ्ग शस्त्र रक्त निपातने: ।
पिप्पलीरसगर्भेण स्नेहाभ्यक्तेन सर्षपैः ॥
संपक्वाङ्गुष्ट ग्रहणाच्चलौका दुष्टशोणितम् ।
आदत्ते प्रथमं हंसः क्षीरं क्षीरोदकादिव ॥
दंशश्च तीव्रं कण्डूं वा मोचयेदास्यवेच ताम् ।
पटुतैलाक्तवदनां शस्त्रेण कण्डन रुचिताम् ॥
रक्तमदाद् भृशः सप्ताहं वा न पातयेत् ।
पूर्ववत् पटुता दार्ढ्यं सम्यग् वाच्ये जलौकसाम् ।
क्षीरोदतियोगाभ्यत्युर्वा दुर्बान्ति सत्यता मदः ॥
अवतान्यच ताः स्नाप्या घटे सत्स्नाम्बुगर्भिणि ।
लालादिकोथ नाशार्थं सविषाः स्युस्तदन्यथात् ॥
अथैनी स्नापयेद्गात्र् क्षरित्रा गुडमाक्षिकैः ।
शतधौताज्यपिचवस्तीं लेपाश्च शीतलाः ॥

Aṣṭaṅga Hṛdaya Saṁhitā, I. xxvi.

[1] History of Hindu Chemistry, Introduction P. lxviii.

[2] See Page 213-9.

8 AND 14. FINGERS AND NAILS.

The uses of surgeon's fingers and nails in surgical operations has been described before[1].

9,10 AND 11. LEAVES.

Rough leaves such as those of Fig trees (Ficus Indicus), Goji (Elephantopus Scaber), Śephālikā (Nyctanthes Arbor-tristis) and Śaka (Tectonia Grandis) are recommended for scarifying abscesses if they do not heal up after repeated opening by the knife. If there is any formation of pus in the mouth or eyelids, it may be evacuated with these leaves (Susruta)[2]. These leaves are also to be used for bleeding the gums in gingivitis.

To cover the wounds, Suśruta gives a list of leaves to be used according to the nature of the wound and season of the year[3] :—

For air-deranged wounds;—use leaves of Eraṇḍa (Ricinus Communis), Bhūrjapatra (Betula Bhojpatra), Pūtika (Caesalpinia Bonducella) and Haridrā (Curcuma Longa).

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[1] See Page 199-202, and 204-5.

[2] संशोध्योभयतः कार्यं शिरसीव कुशे तथा।
काकोदुम्बरिका गोजीपवेल्लिसालयेदसृक्॥
Suśrutā Saṁhitā, IV. xxii.

[3] एरण्ड भूर्जपूतीक हरिद्राणान्तु वातजे।
पचमाद्यवलं यत्र काश्मरी पलमेव च॥
पलाशि चीरडचाषामोदकानि तथैव च।
दूषिते रक्तपित्ताभ्यां व्रणे दद्याद्विचक्षणः॥
पाठामूर्व्वागुडूचीनां काकमाचीहरिद्रयोः।
पलञ्च शकनाभाया योजयेत् कफजे व्रणे॥
Ibid, IV. i.

For bile or blood-deranged wounds;—use leaves of Āśvabala (Basella Rubra), Kāśmarīpatra, (Gmelina Arborea), Vata (Ficus Bengalensis) and Kumuda (Nymphae Lotus).

For phlegm-deranged wounds—use leaves of Pāṭhā (Cisamphelos Hexandra), Mūrvā (Sansevieria Zeylanica), Guḍucī (Tinospora Cordifolia), Kākamācī (Solanum Nigrum), Haridrā (Curcuma Longa) and Śuknāśā (Oroxylum Indicum).

For similar purpose Caraka[1] recommends us to use the leaves of Kadamva (Anthocephalus Cadamba), Arjuna (Terminalia Arjuna), Nimva (Azadirachta Indica), Pātalī, Pippala (Ficus Religiosa) and Arka (Calotropis Gigantea).

The leaves of the padma or nymphæ are to be used for handling the eyeballs and the intestines, to replace them in their proper position when prolapsed by injury[2] (Suśruta) Caraka recommends lotus leaves and plantain leaves as coverings to the bleeding piles,[3] Cakradatta[4] mentions the use of

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[1] कदम्बार्जुननिम्बानां पाटलाः पिप्पलस्य च।
व्रण प्राच्छादने विद्वान् पत्राण्यर्कस्य चादिशेत्॥

Caraka Saṁhitā, VI. xiii.

[2] भिन्नं नेत्रमकर्मण्यमभिन्नं लम्बते तु यत्।
तन्निवेश्य यथास्थानमन्याविह्वलिरं शनैः।
पीडयेत् पाणिना सम्यक् पद्मपत्रान्तरेण तु॥

Suśruta Saṁhitā, IV. ii.

[3] कदलीदलैरभिनवैः पुष्कर पत्रैश्च शीतजलसिक्तैः।
प्रच्छादनं मृदुर्मुहरिदं पद्मोत्पलदलैश्च॥

Caraka Saṁhitā, VI. ix.

[4] गोजीकालिका पत्रैरग्रैः संलिख्य लेपयेत्।
धारेण वाक्शतं तिष्ठेद् यन्त्रधारं पिधाय च॥

Cakradatta, Arśa Cikitsā.

Gojī and Śephālikā leaves for scratching the piles before the application of caustics to them. He also directs us to rub the small tumours with the rough leaves before the application of various ointments.[1] Śivodāsa also mentions the use of such leaves for rubbing the eyelids in the pillva disease.[2] Suśruta[3] mentions the use of rough leaves for scratching any part.

Paul[4] mentions the use of fig leaves, for rubbing down the hard granulations of granular lids.

12. Young stems of plants.

The young shoots are described to have served the purpose of a probe. Caraka[5] calls them the soft variety, the metallic ones being called the hard probes. These shoots are to be used for superficial sinuses. Suśruta directs us to use the young shoots

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[1] विघृष्य चोडुम्बरशाकगोजी-
पतेभृशं चोद्रयुतैः प्रलिम्पेत्।

Cakradatta, Granthyarvuda Cikitsā.

[2] वर्त्मावलिखं बहुशस्तदच्छोषितमीक्षणम्।
पुनः पुनर्विरेकञ्च पिल्लरोगातुरो भजेत्॥

Cakradatta, Netraroga Cikitsā.

वर्त्मावलिखमिति। कर्कशशाखोटकादि पतेच वर्त्मघर्षणम्।

Tattva Candrikā. Ibid.

[3] क्षौमं क्षौतं पिचुं फेनं यावशूकं समैन्धवं।
कर्कशानि च पत्राणि लेखनार्थं प्रदापयेत्॥

Suśruta Saṁhitā, IV, i.

[4] Paul, III. xxii.

[5] See foot-note 4. P. 269.

of the pot-herbs called Cuñca and Upādikā (Basella Rubra) as probes in sinuses on the eyelids and arround the anus.[1]

If in young people the teeth become loose as the result of some injury, the patient should be directed to live upon milk only, sucking it through the stalk of lily; and thus affording the teeth rest and a chance of being firmly fixed again.[2]

To excite emesis, Śārṅgadhara,[3] advises us to introduce a tube of Eraṇḍa (Ricinus Communis) into the throat of the patient. The vomiting is also said to have been excited by thursting a finger or a stalk of lily down the throat.

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[1] नाड़ी व्रणान् शल्यगर्भानुन्मार्ग्युन्मङ्गिनः शनैः।
करिरवालांगुलिभिरेषणा वैषयेद्भिषक्॥
नेत्रवर्त्मगुदाभ्यासनाधोऽक्षाः शशोलिताः।
पुत्रपोदकजैः शस्ताः करीरैरेषयेऽन्वताः॥

Suśruta Saṁhitā, IV. i.

[2] भग्नांश्चलितान्दन्तान् सरक्तानवपीड़येत्।
तरुणस्य मनुष्यस्य शीतैरालेपयेद्दृढैः॥
सिक्ताम्बुभिस्ततः शिते: सन्धा .वेरुपाचरेत्।
उत्पलस्य च नालेन क्षीरपान विधीयते॥

Suśruta Saṁhitā, IV. iii.

[3] अजीर्णे कोष्णदानीयं सिन्धु पीत्वा वमेत् सुधीः।
वमनं पाययित्वा च जानुमाचासने स्थितम्॥
कण्ठमध्येऽलिनालेन स्पृशन्तं वामवेद्भिषक्।
ललाटं वमतः पुंसः पार्श्वौ द्वौ च प्रबोधयेत्॥

Śārṅgadhara Saṁgraha, III. iii,

CHAPTER VIII.

HYGIENIC APPLIANCES AND HOSPITAL REQUISITIES.

Tooth-Brush.

The ancient Hindus used branches of trees as tooth-brush. They should have the length of twelve aṅguli and the circumference equal to that of the little finger. Suśruta directs us to use a straight and plain branch of such trees as have an astringent, or sweet, or bitter, or sour taste[1]. Amongst these classes of trees, the twigs of Khadira (Acacia Catechu), Madhuka (Brassia Latifolia), Nimva (Melia Azadirachta), Karñja (Pongamia Glabra) are the best. The end of the stick is to be chewed first to form a brush and the teeth are then to be rubbed with it. He recommends us to use some tooth-powder.[2]

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[1] तचादौ दन्तपवन मादशाङ्गुल मायतं।
कनिष्ठिका परिणाह सञ्जयचितमग्रथं ॥
ऋजुमग्रन्थि यचापि प्रत्यग्रं शस्तभूमिजं।
अथैत्यदन्तंच दीप्तच रसं वीर्यंच योजयेत् ॥
कषायं मधुरं तिक्तं कटुकं प्रातरुत्थितं।
निम्बय तिक्तके श्रेष्ठः कषाये खदिरस्तथा।
मधुके मधुरे श्रेष्ठः करञ्जः कटुके तथा ॥

Suśruta Saṁhitā, IV. xxiv

[2] क्षौद्र व्योष त्रिवर्गाक्तं सतैलं सैन्धवेन च।
चूर्णेन तेजोवत्याश्च दन्तान्हित्वं विशोधयेत् ॥
एकैकं घर्षयेद्दन्तं मृदुना कूर्चकेन च।
दन्तशोधन चूर्णेन दन्तमांसन्न बाधयन् ॥

Ibid.

Bhāvamiśra mentions the names of other trees which may be used for the purpose,[1] and also gives us a list of trees to be avoided.[2] The use of the tooth-brush is contra-indicated in the various diseases of the mouth, ears, &c.[3] Caraka[4] advises us to use the tooth-brush twice a day.

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[1] कर्कं खदीरं वटे दीप्तिः करञ्जे विशदो भवेत् ॥
प्लक्षे चैवार्कसम्पत्तिर्बदर्यां मधुरोध्वनिः ।
खदिरे मुखसौगन्ध्यं विल्वेतु विपुलं धनम् ॥
उदुम्बरे तु वाक्सिद्धिरार्केत्वारोग्यमेव च ।
कदम्बे तु धृतिर्मेधा चम्पके च हृदामतिः ॥
शिरीषे कीर्तिसौभाग्य मायुरारोग्यमेव च ।
अपामार्गे धृतिर्मेधा प्रज्ञाशक्तिस्तथाञ्जनिः ॥
दाढ़िम्यां सुन्दराकारः ककुभे कुटजे तथा ।
जातीतगरमन्दारैर्दन्तः स्वप्नश्च विनश्यति ॥

Bhāva Prakāśa, I. i.

[2] गुवाकस्तालहिन्तालौ केतकश्च हरेणुश्च ।
खर्जूरं नारिकेरश्च सप्तैते वृक्षराजकाः ॥
वृक्षराज समुत्पन्नं यः कुर्याद् दन्तधावनम् ।
नरकान्ताल योनिः स्यादयावद्भूतान्न पश्यति ॥

Ibid.

[3] मुखादिदशलतालोष्ट जिह्वारोग समुद्भवे ॥
श्वासपाके श्वासेच कासश्विका वमीषु च ।
दुर्बलो जीर्ण भक्तश्च मूर्च्छार्त्तोमदपीड़ितः ॥
शिरोरुगार्त्तोमुषितः श्रान्तः पानक्लमान्वितः ।
अर्हितो कर्णशूलीच दन्तरोगीच मानवः ॥

Suśruta Saṁhitā, IV. xxiv

[4] शोधितायं क्षौ काली कषायं कटुतिक्तकम् ।
भक्षयेद्दन्तपवनं दन्तमांसान्यबाधयन् ॥
निहन्ति गन्धवैरस्यं जिह्वादन्तास्यजं मलम् ।
निष्कृष्य रुचिमाधत्ते सद्यो दन्तविशोधनम् ॥

Caraka Saṁhitā, I. v.

Suśruta mentions the use of a tooth-brush to extract a fish-bone from the throat.[1]

After cleansing the mouth with water after meals, I'Tsing ordains[2] "Chew tooth-wood in the mouth; let the tongue as well as the teeth be carefully cleaned and purified." Again he says: "It is surely not seemly for any one to spend his time after meals chaffing and chattering, nor is it right to remain impure and guilty all day and night, without preparing water in a clean jar or without chewing a tooth-wood."

He continues[3]: "Every morning one must chew tooth-woods, and clean the teeth with them, and rub off the dirt of the tongue as carefully as possible. Only after the hands have been washed and the mouth cleansed is a man fit to make a salutation; if not, both the saluter and the saluted are at fault. Tooth-wood is Danta-kāṣṭha in Sanskrit—danta, tooth, and kāṣṭha, a piece of wood. It is made about twelve finger-breadths in length, and even the shortest is not less than eight finger-breadths long. Its size is like the little finger. Chew softly one of its ends, and clean the teeth with it. If one unavoidably come near a superior, while chewing the woods, one should cover the mouth with the left hand.

Then breaking the wood, and bending it, rub the tongue. In addition to the tooth-wood, some tooth-picks made of iron or copper may be used or a small stick of bamboo or wood, flat as the surface of the little finger and sharpened on one

[1] शङ्खना वा दन्तधावनकूर्चकेनापहरेत्।

Suśruta Saṁhitā, I. xxvii.

[2] I'Tsing. Records of the Buddhist Religion.—Takakusu. P. 26-7.

[3] Ibid. ch. viii. Use of Tooth-woods. P. 33.

end, may be used for cleaning the teeth and tongue; one must be careful not to hurt the mouth. When used, the wood must be washed and thrown away.

Whenever a tooth-wood is destroyed, or water, or saliva is spit out, it should be done after having made three fillips with the fingers or after having coughed more than twice; if not, one is faulty in throwing it away. A stick taken out of a large piece of wood, or from a small stem of a tree or a branch of an elm, or a creeper, if in the forest; if in a field, of the paper mulberry, a peach, a sophora japonica (Huai), willow tree, or anything at disposal, must be prepared sufficiently beforehand. The freshly cut sticks (lit. wet ones) must be offered to others, while the dry ones are retained for one's own use.

The younger priest can chew as he likes, but the elders must have the stick hammered at one end *and made soft*; the best is one which is bitter, astringent or pungent in taste, or one which becomes like cotton when chewed. The rough root of the Northern Burr-weed (Hu Tai) is the most excellent; this is otherwise called Tsâng-urh or Tsae-urh, and strikes the root about two inches in the ground. It hardens the teeth, scents the mouth, helps to digest food, or relieves heart-burning. If this kind of tooth-cleaner be used, the smell of the mouth will go off after a fortnight. A disease in the canine teeth or toothache will be cured after a month. Be careful to chew fully and polish the teeth cleanly, and to let all the mouth-water come out; and then to rinse abundantly with water. That is the way. Take in the water from the nose once. This is the means of securing a long life adopted by Bodhisattva *Nâgârguna*. If this be too hard to put in practice, to drink water is

also good. When a man gets used to these practices he is less attacked by sickness. The dirt at the roots of the teeth hardened by time must all be cleaned away. Washed with warm water, the teeth will be freed from the dirt for the whole of life. Tooth-ache is very rare in India owing to their chewing the tooth-wood."

Tooth-Pick.

Suśruta advises us to use sticks of grass as tooth-pick after meals to extract particles of food lodged between the teeth, otherwise these will decompose and the mouth would be smelling badly.[1] Bhāvamiśra gives similar directions but adds that if any particles of food cannot be easily extracted by the tooth-pick, one must not use any force to extract them.[2] "After eating they cleanse their teeth with a wilow stick, and wash their hands and mouth."[3]

Jihvā Nirlekhana or Tongue Scraper.

Suśruta says: "To scrape the tongue, a golden, or silver, or

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[1] दन्तान्तरगतं चान्नं शोधनेनाहरेच्छनैः।
कुर्यादनाहृतं तद्धि सुखस्यानिष्टगन्धताम्॥

Suśruta Saṁhitā, I. xlvi.

[2] एवं भुक्त्वा समाचामेट्टचयहण पूर्वकम्।
भोजने दन्तलग्नानि निर्हरेत्याचमनं चरेत्॥
दन्तान्तरगतं चान्नं शोधनेनाहरेत् शनैः।
कुर्यादनिर्हृतं तद्धि सुखस्यानिष्ट गन्धताम्॥
दन्तलग्नमनिर्हार्यं लिपं मन्येत दन्तवत्।
न तत्र बहुशः कुर्याद् यत्नं निर्हरणं प्रति॥

Bhava Prakasa, I. i.

[3] Beal's Records of the Buddhist Religion. Trans. from Hiuen Tsiang, vol. I, p. 77.

wooden scraper is to be used. It should be ten aṅguli long and must be pliant and polished"[1]. Caraka[2] mentions tongue-scraper of copper, lead or brass. Bhāvamisra[3] also gives a similar discription. It is to be used for scraping the deposit on the tongue. It is still commonly used in India.

Razor and Shears. The Practice of Shaving.

Every one is recommended by Suśruta to have his beard shaved, hair trimmed and nails pared.[4] Caraka[5] also advises

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[1] जिह्वानिर्लेखनं रौप्यं सौवर्णं वार्हमेव च।
तन्मलापहरं श्लक्ष्णं मृदुग्राह्यं दशाङ्गुलं॥
Suśruta Saṁhitā, IV. xxiv.

[2] सुवर्णरूप्यताम्राणि त्रपुरीतिमयानि च।
जिह्वानिर्लेखनानि स्युस्तीक्ष्णान्यनृजूनि च॥
जिह्वामूलगतं यच्च मलमुच्छ्वासरोधि च।
सौमन्यो भजते तेन तच्चाभिज्ञो विनिर्लिखेत्॥
Caraka Saṁhitā, I. v.

[3] जिह्वानिर्लेखनं हैमं राजतं ताम्रजं तथा॥
पाटितं मृदु तत् काष्ठं मृदुपत्रमयं तथा।
"तत्काष्ठं" दन्तशोधनयोग्यं काष्ठम्।
दशाङ्गुलं मृदु स्निग्धं तेन जिह्वां लिखेत् सुखम्।
तच्चिह्वा मलवैरस्य दुर्गन्ध जड़ता हरम्॥
Bhāva Prakāśa, I. i.

[4] पापोपशमनं क्लेशनखरोमापमार्जनं॥
हर्षलाघव-सौभाग्य-करमुत्साह वर्द्धनं।
बाणवारं सजावर्षं तेजोबल विवर्द्धनं॥
Suśruta Saṁhitā, IV. xxiv.
ततादित एव नोचनखरोमा * *
Ibid.

[5] पौष्टिकं श्रथमायुष्यं शुचिरूपविराजनम्।
क्लेशश्मश्रुनखादीनां कल्पनं संप्रसाधनम्॥
Çaraka Saṁhitā, I. v.

us to shave regularly, that is thrice in a fortnight.[1] Bhāvamiśra says that this practice conduces to health, beauty, longevity and purity, and should be observed every fifth day[2]. Razor is mentioned in the Ṛgveda[3] and in the Kaṭhopaniṣad of the White Yayu.[4] In the Śatapatha Brāhmaṇa, we find the method of shaving well described.[5] "Then (in shaving) are used a porcupine quill spotted in three places and a copper razor; that three-spotted porcupine's quill resembles the three-fold science and the copper razor resembles the Brāhmaṇa; for Brahmā is fire, and fire is of reddish (lohita) colour, hence a copper (loha), razor is used".

Again we read[6]:—"For impure, indeed, is that part of man where water does not reach him. Now at the hair and beard, and at the nails the water does not reach him; hence when he shaves his hair and beard, and cuts his nails, he does so in order that he may be consecrated after becoming pure.

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[1] त्रिः पक्षस्य केशश्मश्रुलोमनखान् संहारयेत्।

Carakas Saṁhitā, I. viii.

[2] पक्षरात्रात्रिरु श्मश्रुकेशरोमाणि कर्त्तयेत्।
केशश्मश्रु नखादीनां कर्त्तनं सम्प्रसाधनम्।
पवित्रं धन्यमायुष्यं शौचकान्तिकरं परम्॥
"सम्प्रसाधनम्" शोभाजनकम्॥

Bhāva Prakāśa, I. i.

[3] सं नः शिशीहि भुरिजोरिव क्षुरंरास्वरायो विमोचन।

Ṛgveda, 8 M. 4 S, 5 A. 7 A. 16 V.

[4] क्षुरस्य धारा निशिता दुरत्यय दुर्गंपथस्तत् कवयो वदन्ति।

Kaṭhopaniṣad, I. iii.

[5] Śatapatha Brāhmaṇa, II. 6. 4. 5.

[6] Ibid. III. 1.2.2.

3. Now some shave themselves all over, in order that they may be consecrated after becoming pure all over; but let him not do this. For even by shaving the hair of his head and his beard, and by cutting his nails he becomes pure; let him therefore shave only the hair of his head and his beard, and cut his nails.

4. In the first place he cuts his nails, first of the right hand, for in human (practice) those of the left hand (are cut) first, but with the gods in this manner. First he cuts those of the thumb—for in human practice those of the little fingers are cut first, but with the gods in this manner.

5. He first passes (the comb) through his right whisker—for in human (practice they comb) first the left whisker, but with the gods in this manner.

6. His right whisker he moistens first with the text "may this divine water be propitious unto me".....

There upon he lays a stalk of sacrificial grass on (the hair of the whisker) with the text "O plant, protect me".....Thereto he applies the razor, with the text "O knife, injure him not".

8. Having cut off (part of the stalk and hair), he throws it into the vessel of water. Silently he moistens the left whisker; silently he lays the stalk of grass on it; and having silently applied the razor thereto and cut through (it and the hair) he throws them into the vessel of water.

He then hands the razor to the barber, and the latter shaves off the hair and beard. When he has shaved the hair and beard.....

10. He bathes.....

12. He steps out (from tha water) towards the north-east, with the text "cleansed and pure I go forth from them;".....

13. He then puts on (a linen) garment etc."

"The Atharva-veda relates how, when the ceremony of shaving off his beard was performed on king Soma, Váyu brought the hot water and Savitṛī skillfully wielded the razor."[1]

In para. 3, quoted above, we have evidence of the practice of depilation of the pubes which is here forbidden. There are six imortant rules and six minor rules of ordination for the female members or Śramaneris of the Buddhist order. One of the six minor rules is: A female must not shave the hair in any place but the head.[2] "Aristphanes, a contemporary of Hippocrates,[3] Persius[4] and Juvenal[5] refers to the depilation of the pubes as being common among certain classes, and the early Christian Fathers deplore the practice. See also the remarks of Seutonius on the conduct of Domitan"[6]. Prosper Alpinus (16th century) "found the custom still prevalent among the Egyptian women"[7]. "The custom survived in France, and Italy in the 16th century"[8].

Keśa Prasādhanī or Comb.

Suśruta directs us to comb the hair to free the head from dust,

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[1] Macdonnel's Sanskrit Literature, p. 164.

[2] See I'Tsing, P. 97, Foot-note 3. Vinaya Saṅgraha. Chap. xii.

[3] Hippocrates, Ran. 516, Lys 89, 151.

[4] Persius, iv. 37.

[5] Juvenal, vii. 114.

[6] Seutonius, xxii.

[7] Medicina Aegyptiorum, III. xv.

[8] Milne, Surgical Instruments &c., p. 90-91.

louse and dandruff.[1] Bhāvamiśra advises us to comb the hair every day to keep it clean, as it stimulates the growth of hair.[2] Caraka[3] also recommends us to keep the hairs clean. The practice of combing the hair is very ancient; the Atharva-veda mentions a comb with a hundred teeth.

Looking-glass.

The looking-glass should be constantly used as thereby the complexion is said to be improved and life prolonged[4]. For an account of the looking-glass of the ancient Hindus, see Mitra's Indo-Aryans[5].

Dress.

Silk, chintz and red clothes are good for the winter, for they are said to be useful for derangement of air and phlegm. Thin silk is cooling and is efficacious for biliary disorders; so it should be used during the summer. It should be coloured tawny or red. White clothes are auspicious and are neither hot

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[1] केशप्रसाधनी केशा रजोजन्तु मलापहा।

Suśruttā Saṁhitā, IV. xxiv.

[2] केशपाशी प्रकुर्व्वीत प्रसाधन्या प्रसाधनम्।
केश प्रसाधनं केश्यं रजोजन्तु मलापहम्॥

Bhāva Prakāśa, I. i.

[3] साधुवेशः प्रसाधितकेशो * *

Caraka Saṁhitā, I. viii.

[4] आदर्शालोकनं प्रीतिं माङ्गल्यं कान्तिकारकम्।
पौष्टिकं वलमायुष्यं पापलक्ष्मी विनाशनम्॥

Bhāva Prakāśa, I. i.

[5] The Indo-Aryans Vol. 1, p. 240.

nor cold; therefore they should be worn during the rains[1]. Caraka says that pure dress conduces to longevity, happiness and fortune[2].

Uṣṇīṣa or head dress.

Suśruta[3] advises us to use a cap on our head which is thus protected from injury. Bhāvamiśra says that the habitual use of some form of covering for the head stimulates the growth of hair, increases beauty of the head and protects it from dust, draughts and accumulation of phlegm. Only light caps should be used as the heavy varieties derange bile and cause diseases of the eyes.[4] For the diagrams of the various forms of turbans used by the ancient Hindus, see Mitra's Indo-Aryans.[5]

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[1] कौशेयौर्णिक वस्त्रञ्च रक्तवस्त्रन्तथैव च।
वातश्लेष्म हरन्तत्तु शीतकाले विधारयेत्॥
"कौशेयं" पट्टाम्बरं चसरवस्त्रञ्च।
मेध्यं सुशीतम्पित्तघ्नं कषायं वस्त्रमुच्यते।
तद्धारयेदुष्णकाले तदापि लघु शस्यते॥
कषायढौकटौ इति लोके, कषाय रागरक्तं वा।
शुक्लन्तु शुभदं वस्त्रं शीतातप निवारकम्।
नचीष्णवा शीतन्तत्तु वर्षासु धारयेत्॥
Bhāva Prakāśa, I. i.

[2] काम्यं यशस्यमायुष्यमलक्ष्मीघ्नं प्रहर्षणम्।
श्रीमत् पारिषदं श्रेष्ठं निर्म्मलाम्बरधारणम्॥
Caraka Saṁhitā, I. v.
Bhāva Prakāśa, I. i.

[3] पवित्र केशसुखीषं वातातपरजोऽपहं।
Suśruta Saṁhitā, IV. xxiv.

[4] उष्णीषं छात्रिलुतकेशं रजोवात कफापहम्।
लघु तच्चक्षुने यस्माद् गुरु पित्तविरोगकृत्॥
Bhāva Prakāśa, I. i.

[5] The Indo-Aryans, Vol. I, p. 220.

Chatra or umbrellas.

Suśruta says: Umbrellas are useful for protecting men from the rains, draughts, glare of the sun, exposure to cold, and dust. They are auspicious and are beneficial to the eyes[1]. Caraka[2] advises us to use it as it protects us from the sun, rain &c. Bhāvamiśra[3] also describes its efficacy similarly. Umbrella is one of the insignia of royalty in India, and is always held over the heads of kings as shown in the Sanchi and Amarāvatī sculptures[4]. It is still commonly used in India.

Yaṣṭi or sticks.

Caraka[5] directs us to use a stick as a support. Suśruta says: "By using sticks, a man gains in strength, prowess and manliness. He becomes courageous, patient and forbearing. He can stand erect and is not troubled by any fear"[6]. It

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[1] वर्षानिलरजोघर्म हिमादीनां निवारणं।
वक्त्र चक्षुष्य मौजस्यं मङ्गलं छत्रधारणं॥
Suśruta Saṁhitā, IV. xxiv.

[2] दैवेविधसनं वल्यं गुणावरणमङ्गलम्।
घर्म्मानिलरजोऽभ्युग्रं छत्रधारणमुच्यते॥
Caraka Saṁhitā, I. v.

[3] छत्रस्य धारणं वर्षातपवात रजोग्रहम्।
हिमघ्नं हितमक्ष्णोश्च माङ्गल्यमपि कीर्तितम्॥
Bhāva Prakāśa, I. i.

[4] See Indo-Aryans, I, p. 266.

[5] खलतः संप्रतिष्ठानं शत्रुघ्नश्च निसूदनः।
अवष्टम्भनमायुष्यं भयघ्नं दण्डधारणम्॥
Caraka Saṁhitā, I. v.

[6] पुनः सरीसृपव्याल विषाग्निभ्योभयापहं।
श्रमस्खलन दोषघ्नं स्थविरैच प्रशस्यते॥
सच्चोत्साहबलक्लैव्य धैर्य्यवीर्य्य विवर्द्धनम्।
अवष्टम्भकरत्वापि भयघ्नं दण्डधारणं॥
Suśruta Saṁhitā, IV. xxiv.

protects a man from dogs, snakes &c. Bhāvamiśra[1] apparently quotes these verses from Suśruta.

Upānaha or shoes.

The ancient Hindus used two kinds of shoes, made of wood and leather. The wooden pādukā is recommended to be used before and after dinner[2]. The good effects claimed by its use are, an increase of the power of vision, strength and longevity.[3] When travelling, the upānaha or leather shoes are to be used. Besides the advantages mentioned above, shoes are very comfortable to the travellers and prevent many diseases of the feet[4]. If any one often travels barefooted, he feels out of sort, his senses fail, vision becomes impaired and his expectation of life is reduced.[5]

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[1] Bhāva Prakāśa, I. i.

[2] पादुकारोहणादुर्ध्वं पूर्वं भोजनतः परम्।
पादरोग हरं ह्यं चक्षुष्यायुषी हितम्॥
Bhāva Prakāśa, I. i.

[3] चक्षुष्यं स्पर्शनहितं पादयोर्ब्रह्मनापहम्।
बल्यं पराक्रमसुखं ह्यं पादवधारणम्॥
Caraka Saṁhitā, I. v.

[4] पादरोगहरं ह्यं रक्षोघ्नं प्रीतिवर्द्धनं।
सुखप्रचारमोजस्यं सदापादवधारणं।
अनारोग्य मनायुष्यं चक्षुषोरुपघातकृत्।
पादाभ्यामनुपानद्भ्यां सदा चंक्रमणं नृणां॥
Suśruta Saṁhitā, IV. xxiv.

[5] उपानद्वारणं नेत्रमायुष्यं पादरोगहृत्।
सुखप्रचारमोजस्यं ह्यञ्च परिकीर्त्तितम्॥
पादाभ्यामनुपानद्भ्यां सदा चंक्रमणं नृणाम्।
अनारोग्य मनायुष्यमिन्द्रियघ्न महृष्टिदम्॥
Bhāva Prakāśa, I. i.

The Hindus wore sandals like the ancient Greeks. They also used boots, which look like the modern boots used by Europeans. Buddha gave the Bhikkhus permission to wear boots or shoes, with thick lining[1]. Hiuen Tsiang[2] says that "here (Avantī) Tathagatha gave permission to the Bhikkhus to wear kih-fu-to (boots)." For an account and figures of ancient boots used by the Hindus, see Indo-Aryans.[3]

Vyājanī and cāmara. The fan.

The fan was used for airing the patients to drive away flies.[4] Suśruta mentions the cāmara *i.e.*, the tail of the Thibetan yolk (Bos grunnius) to be used as a fan. "It soothes the inflammation of boils and also acts as a fly-brush to prevent infection of the open wound"[5]. The cāmara is also one of the insignia of royalty and as such we have many representations of it in the sculptures of ancient India[6]. For diagrams of the ancient fan, see Indo-Aryans[7].

Caraka directs us to use a kulā or fan to winnow corn, prepared from the kāśa (Saccharum Spontamum) to resuscitate a still-born child[8].

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[1] Mohāvagga, varga 13 ff 6. S. B. E. vol. xvii. p. 35.

[2] Beal's Records. of Buddhist Religion, vol. II. p. 280.

[3] Indo-Aryans, Vol. I, p. 123-6.

[4] बालव्यजन मौञ्जस्थं मक्षिकादीनपोहति।
शोथदाह श्रमस्वेद मूर्च्छाघ्नो व्यजनानिलः॥
Suśruta Saṁhitā, IV. xxiv.

[5] व्यज्येत बालव्यजनैर्व्रणं नच विघट्टयेत्।
Ibid, I. xix.

[6] See Indo-Aryans, vol. II, p. 267-70.

[7] For diagrams, see Indo-Aryans, vol. I, p. 263.

[8] तथा संक्लेशविहतान प्राणान् पुनर्लभेत क्षुचकपालिकाग्र्येण चैनमभिःनिधुनीयाद्-यावेत् स्यात् यावत् प्राणानां प्रत्यागमनं तत्तत्सर्व्वमेवकुर्य्यः॥
Caraka Saṁhitā, IV. viii.

Bhāvamiśra[1] mentions fans made of the following materials:—palm leaf, bamboo, yolk's tail, cloth, peacock's feather and cane. He attributes peculiar properties to each fan.

Rājavallabha says[2] that "the palm-leaf fan overcomes disturbances of all the three humours, and is light and agreeable; the bamboo fan causes heat and irritablity, and promotes inordinate secretion of the two humours—air and bile; the cane, cloth and peacock's feather fans, overcome disturbances of the three humours; the hair fan is invigorating etc."

The Buddhist Bhikṣus used the palm-leaf fan. "Not unfrequently there is added a lotus-leaf shaped fan, made from a single frond, with an edging of bamboo or light wood, and furnished with a handle fashioned like the letter "S". The palm from which the leaf is taken, is also that used for the mss., namely the Talipot; hence the name Talponi given to the Bhikkhus by the early Portuguese adventurers in Burma. When he attended a meeting at which women are likely to be present, every Bhikkhu must have the fan."[3]

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[1] व्यजनस्थानिनो दाह स्वेदमूर्च्छा श्रमापहः।
तालवृन्तभवो वातश्लिदोषशमको मतः॥
वंशव्यजनजस्तूष्णो रक्तपित्तप्रकोपणः।
चामरो वस्त्रमम्भूतो मायूरो वेतवजन्तथा॥
एते दोषजिता वाताः स्निग्धा ह्रदाः सपूजिताः।

Bhāva Prakāśa, I. i.

[2] तालव्यजनगुणः—त्रिदोषशमनत्वम्। लघुत्वञ्च॥ वंशव्यजनगुणः—रूक्षत्वम्। उष्णत्वम्। वायुपित्तकारित्वञ्च॥ वेतवस्त्रमयूरपुच्छव्यजनगुणः—त्रिदोषनाशित्वम्। बालव्यजनगुणः—तेजस्करत्वम्। मक्षिकादि निवारकत्वञ्च।

Rājavallabha.

[3] The Way of Buddha, p. 53-54.

Filters.

Filters were used by the Hindus and are recommended to be made of an earthen or metallic vessel, the mouth being closed by a piece of cloth tied round its neck.

If the water be filthy, Suśruta[1] advises us to purify it by boiling it or by exposure to the sun; or by throwing hot iron balls, sand or clay balls into the water and then allowing it to cool. Such purified water should be scented with the flowers of Nāgakeśara (Mesua Ferrea), Campaka (Michelia Champaca), Utpala (Nymphœa Stellata) and Patala (Bignonia Suaveolens).

Suśruta mentions seven means of purifying polluted water[2], *viz.*,

1. Kataka phala or nirmālaya or seeds of Strychnos Potatorum.
2. Gomedaka or a kind of gems.
3. Viṣagranthi, or root of Nelumbium Speciosum.
4. Śaivālamūla or root of Vallisneria Spiralis.
5. A piece of cloth.
6. Pearls.
7. Precious Stones and crystals.

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[1] व्यापन्नानामग्निक्वथनं सूर्य्यातपप्रतापनं तप्तायःपिण्डसिकताश्मोष्टकानां वा निर्व्वापनं प्रसादनञ्च कर्त्तव्यं नागचम्पकोत्पलपाटलापुष्पप्रभृतिभिर्य्याधिवासनमिति।

Suśruta Saṁhitā, I. xlv.

[2] तत्र सप्तकलुषस्य प्रसाधनानि भवन्ति। तद्यथा। कतकगोभेदकविषयग्रिशेवालमूलवस्त्राणि मुक्तामणिश्चेति। पञ्चनिक्षेपणानिभवन्ति। तद्यथा। फलकं वाटकं सुवलयं उदकमक्षिकाशिक्यञ्चेति। सप्तशीतिकरणानि भवन्ति। ऽवातस्थापनमुदकप्रक्षेपणं यष्टिकाघातणं व्यजनं वस्त्रोद्धरणं वालुका प्रक्षेपणं शिक्यावलम्बनञ्चेति।

Ibid.

He mentions five kinds of means for preventing contact of the water vessel with the earth[1] :—

1. Phalaka or planks as of Śālmali wood.
2. Tryastaka or octogonal tripod of wood.
3. Muñjvalaya or circular pad of Saccharine Muñja.
4. Udakamañcikā or a raised framework of cane and bamboo.
5. Śikya or a loop suspended by three strings.

He mentions seven ways of cooling water :—

1. Exposure to air.
2. Sprinkling water on the vessel.
3. Stirring the water with a rod.
4. Fanning the water.
5. Filtration through cotton fabrics.
6. Putting the vessel of water on a sand bed.
7. Suspension of the vessel in a loop.

He advises us to use rain water filtered through a broad piece of white and clean cloth[2]. In collecting water from the rivers and ponds, the Hindu females still use a kalasī or earthen vessel, the mouth being closed by a piece of cloth.

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[1] In the English translations of the Suśruta Saṁhitā, Bibliotheca Indica, Dr. Cattopādhāya translates the passage incorrectly. He misunderstood the terms phalaka, &c. to be remedial agents, necessary in the prorification of water.

[2] गाङ्गं पुनः प्रधानं तट्प्राददीताश्वयुजे मासि शुचिशुक्लिते तपटेकदेशच्युतमथ वा शुक्लातलपरिवृतमुखैर्वा शुचिभिर्भाजनैर्ग्रहीतं ।

Suśruta Saṁhitā, I. xlv.

Suśruta[1] deprecates impure water as injurious to the human system and advises us not to drink or bathe in such water as there is always the risk of being speedly affected with many diseases.

"It (filter) forms one of the eight sacred utensils necessary for a sramana of the Buddhist order. It is a strainer or water-dipper—an appratus for filtering the water which he drinks, so that he may not, even unwillingly, take animal life"[2]

One of the six requisites of a Bhikṣu is Parisrāvana, a water-strainer[3].

Water vessel.

To store water, Suśruta mentions vessels of gold, or silver, or earth[4].

"The clean water is kept separately from water for cleansing purposes (*lit.* 'touched' water), and there are two kinds of jars (*i.e.* kundi and kalasa) for each. Earthenware or porcelain is used for the clean jar, and the jar, for water for cleansing purposes (*lit.* touched water) is made of copper or iron. The clean water is ready for drinking at any time, and the 'touched' water for cleansing purposes after having been to the urinal.

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[1] व्यापन्नं वर्जयेदित्यं तोयं यद्याप्यनार्तवं।
दोषसञ्जननं ह्यं तन्नाददीताहितन्तु तत्॥
व्यापन्नं सलिलं यस्तु पिबतीहा प्रसाधितं।
श्वयथुं पाण्डुरोगञ्च लभ्दोषमविपाकतां॥
श्वासकासप्रतिश्यायगुल्मगुल्मोदराणि च।
अन्यान् वा विषमान् रोगान् प्राप्नुयात् चिप्रमेवच॥
Suśruta Saṁhitā, I. xlv.

[2] The way of Buddha, p. 53.

[3] I'Tsing, ch. x.

[4] सौवर्णे राजते मृन्मये वा पात्रे निदध्यात् तच्चार्द्धकालमुपयुञ्जीत तस्यालाभे भौमम्।
Ibid.

The clean jar must be carried in a clean hand, and be placed in a clean place, while the jar for the 'touched' water should be grasped by the 'touched' (or 'unclean') hand and be put in an unclean (or 'touched') place. The water in a pure and fresh jar can be drunk at anytime; the water in any other jar is called 'special water' (more *lit.* seasonable water *i.e.* water to be used at certain prescribed times, probably kâlodaka)."[1]

Bathing.

The Hindus in their daily life do not eat without having first washed themselves in a bath. They always use a bathing-sheet and this ancient practice is still followed.

Bhāvamiśra says[2] : "Bathing stimulates the appetite, virile power and strength, prolongs life, allays thirst and burning sensation, cures eczema, and washes out dirt and perspiration."

Besides the ordinary bath, there is some evidence of the use of a medical bath to cure diseases. I'Tsing says[3] : "The World-honoured One taught how to build a bath room, to construct a brick pond in an open place, and to make a medical bath in order to cure a disease. Sometimes he ordained the

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[1] I'Tsing, ch. vi.

[2] दीपनं इथमायुष्यं स्नान मोजो बलप्रदं।
कण्डूमलश्रमःस्वेदतन्द्रा तृड्दाह पापनुत्॥
बाह्येाय सेके: शीतार्थं रुग्णान्तर्याति पीड़ित:।
नरस्य स्नातमात्रस्य दीप्यते तेन पावक:॥
शीतेन पयसा स्नातं रक्तपित्तप्रशान्तिकृत्।
तदेवोष्णेन तोयेन बल्यं वातकफापहम्॥
शिर: स्नानमचक्षुष्य मत्युष्णेनाम्बुना सदा।
वातश्लेष्म प्रकोपेतु हितत्वञ्च प्रकीर्त्तितम्॥
Bhāva Prakāśa, I. i.

[3] I'Tsing, ch. xx.

whole body to be anonited with oil, sometimes the feet to be rubbed with oil every night, or the head every morning; for such a practice is very good for maintaining clear eyesight and keeping off the cold." "Bathing should always take place when one is hungry. Two kinds of benefits are derived by having meals after bathing. First, the body is pure and empty, being free from all dirt, second, the food will be well digested, as the bathing makes one free from phlegm or any disease of the internal organs. Bathing after a good meal is forbidden in the 'Science of Medicine'" (Kikitsā-Vidyā).

Drinking vessel.

Scented water is advised to be drunk out of cups made of gold, or silver, or copper, or bell-metal, or lapis lazuli or earth.[1] Bhāvamiśra[2] also mentions cups of the same materials.

"To drink from a jar holding it upright in front is no fault; but drinking in the afternoon is not permissible. A jar must be made to fit one's mouth; the top of the cover should be two fingers high; in it a hole as small as a copper chopstick is made.

Fresh water for drinking must be kept in such a jar. At the side of the jar there is another round hole as large as a small coin, two fingers higher than the drinking-mouth. This hole is used for pouring in water; two or three gallons may be put in it. A small jar is never used.

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[1] See foot-note 2, P. 65.

[2] अलपावन्तु तासस्य तदभावे सदोहितम्।
पवित्रं शीतलं पात्रं मठितं स्फटिकेन यत्॥
काचेन रचितन्नद्वत्तथा वैदूर्य्य सम्भवम्।

Bhāva Prakāśa, I. i.

If one fear that insects or dust may enter in, both the mouth and the hole may be covered by means of bamboo, wood, linen, or leaves. There are some Indian priests who make jars according to this style. In taking water the inside of the jar must be first washed in order to get off any dirt or dust, and then fresh water must be poured in.

A priest who travels, carries his jars, bowl, necessary clothes, by hanging them from shoulders over his cloak, taking an umbrella in his hand. This is the manner of the Buddhist priests in travelling[1]."

Dinner service.

Suśruta[2] advises us to use different kinds of vessels for distributing the various kinds of food :—

Iron vessels for ghee or clarified butter.

Silver vessels for drinks, soups and gruels.

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[1] I'Tsing, ch. vi.

[2] घृतं कार्ष्णायसे देयं पेया देयातु राजते ॥
फलानि सर्व्वभक्ष्यांश्च प्रदद्यादैदलेषु च ।
परिशुष्कप्रदिग्धानि सौवर्णेषु प्रकल्पयेत् ॥
प्रद्रवाणि रसांश्चैव राजतेषूपहारयेत् ।
कटूनाणि खडां श्चैव सर्व्वान् शैलेषु दापयेत् ॥
दद्यात्तासमये पानं सुशीतं सुघृतं पयः ।
पानीयं पानकं मद्यं सन्मृण्मयेषु प्रदापयेत् ॥
काचस्फटिकपात्रेषु शीतलेषु शुभेषु च ।
दद्याद्दृष्यपात्रेषु रागषाडवसङ्गकान् ॥
पुरस्तादिमले पात्रे सुविस्तीर्णे मनोरमे ।
मृदः सुपीदनं दद्यात् प्रदेहांश्च सुसंस्कृतान् ॥

Suśruta Saṁhitā, I. xlvi.

Plantain leaf vessels for fruits and sweetmeats.

Gold vessels for flesh.

Stone vessels for whey.

Copper vessels for milk.

Earthen vessels for water, sherbets and wines.

Glass, crystal, lapis lazuli vessels for rājṣāḍava and saṭṭaka.

In the Bhāva Prakāśa[1] we have a detailed description on the subject—"A dinner service of gold is the best from a medicinal point of view, and it is supposed to be the best tonic for the eye. Eating out of silver is equally efficacious for promoting hepatic functions. A service of zinc improves the intelligence and appetite. Food served in brass utensils promotes wind and heat, but cures phlegmatic disorders and expells worms. The use of steel or glass vessel cures chlorosis, jaundice and intumescence. A stone or clay service brings on poverty. Wooden plates are good appetisers, but help the secretions of phlegmatic humour. The use of certain leaves as plates acts as an antidote against poisons. When at dinner, a water jug with a cup should be placed on the right hand. A copper vessel is the best for the purpose. The next best is an earthen pot. Vessels made of crystal and lapis lazuli are also pure and cooling".[2]

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[1] चाक्षे काचपात्रे च भोजनं सिद्धिकारकम् ।
शोथ पाण्डुहरं वक्त्रं कामलापहमुत्तमम् ।
शैलिये सक्षये पात्रे भोजनं शीनिवारणम् ।
दारुजे विशेषेण रुचिदं न्नं प्रकारितु ।
पात्रं पलमयं रुच्यं दीपनं विषपापनुत् ॥

Bhava Prakāśa, I. i.

[2] History of Aryan Medical Science, p. 64-5.

Spoons.

I'Tsing says[1] : "As to the mode of eating in the West, they use only the right hand, but if one has had an illness or has some other reason, one is permitted to keep a spoon for use."

Spittoons.

Spittoons were commonly used by the ancient Hindus, and Caraka[2] mentions it as one of the things necessary for the sick room. It is also mentioned in the Mohāvagga[3]: "And the sethe's wife spat it out into the spittoon." Fa-Hian[4] noticed a "stone spitting vessel in this country (Kie-sha) belonging to Buddha."

Bedpans and urinals.

The bedpan and urinal were also used by the patients in ancient times. Caraka metions them to be necessary in a sick room.[5]

Pus basins.

Metallic basins marked with different measures were used for holding discharges after operations. In the Aśvavaidyaka[6]

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[1] I'Tsing. ch. xvi.

[2] चोपन्यस्तभाजार प्रतियत्नाश्च ।

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प्रतियत्नांश्चोपचारयेत् ॥

Caraka Saṁhitā, I. xv.

[3] Sacred Books of the East. VIII. i. II.

[4] Beal's Records, vol. I. Introduction, xxviii.

[5] See Page 36 and foot-note 1, P. 34.

[6] प्रदेशे लोमशे नित्यं लोमान्युत्पाट्य वेधयेत् ।
प्रमाणार्थञ्च पात्रेषु रक्तं यत्नाति बुद्धिमान् ॥

Aśvavaidyaka, XV. verse 30.

blood let out in the operation of phlebotomy, is recommended to be collected in a basin, so that the quantity may at once be determined.

Pestle and mortar.

Pestle and mortar are mentioned in the Ṛgveda for preparing the Soma juice.[1] And their use in pharmacy was well-known to the ancients.

Besides the pestle and mortar of pharmacy, we find mention of a large wooden pestle used in reducing dislocation by Suśruta.[2] Caraka says that two pestles and motars should be kept in a lying-in-room, the object being to allow the woman some kind of work; and then she will not lie down idly on her bed if there be any delay in the delivery of the child[3]. Suśruta also recommends it[4]. "The mortar (ulukhala) and pestle (muṣala) are to be made of very hard wood, *viz.*, both of Varana wood (Crataiga Roxburghii), or the mortar of Palāśa wood (Butea Frondosa), and the pestle of Khadira wood (Acacia Catechu). The former

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[1] उलूखलसुतानामवेविंष्टे जन्गुल: ॥

* * * *

यत्रेदि ते मदे मदे उलूखलक युज्यसे ।

Ṛgveda, 1 M. 28 S. 1 & 2 R.

[2] See foot-note 6, P. 172.

[3] See P. 39, and foot-note 1, P. 40.

सा चेदावीभि: संक्लिश्यमाना न प्रजायेतार्थैनां ब्रूयात् उत्तिष्ठमूषलमन्वतरञ्च मद्गोष्वानेनेतद्दुःखं धान्यपूर्णे मद्दर्भुरधिशेहि सुदर्भुरवजुह्वस्व चक्रमस्व चान्तरान्तरा इत्येवमुपदिश्यन्यकै ।

Caraka Saṁhitā, IV. viii.

[4] कालातीतस्थायिनि गर्भे विधिवत: सधान्यमुदूखलंमूषलेनाभिहन्यादिषमे वा यानासने सेवेत ।

Suśruta Saṁhitā, III. x.

is to be of the height of the knee and the latter three aratnis (cubits) long[1]."

On the inner face of the left pillar in the eastern gate of Sanchi Tope, there is a beautiful representation of a kitchen scene, in which the ancient mortar and pestle are shown. "The mortar and two-handed pestle same as those in use at the present day in India. The mortar (okhli) is exactly the same as the Greek ὑγδη, and the Roman pila; and the pestle (musar) is the same as the Greek Κόπανον, and the Roman pilum"[2]

The pestle and mortar used in pharmacy was called aśmabhālam. It is still used to pulverise medicaments, and is made of iron or brass.

In the Mahāvagga[3] we find a reference to the pestle and mortar. "I allow, O Bhikkhus, the use of a chunam as a medicine by whomsoever has the itch, or boils, or a discharge or scabs, or whose body is ill smelling, and to those in health the use of dry dung, and of clay, and of coloring matter. I allow, the use, O Bhikkhus, of a pestle and mortar" (udukhalam nusalañ ca).

Sieves, strainers and filters.

There is evidence that cloth seive was used by the Hindus in ancient days, we find it mentioned in the Ṛgveda[4]. The purpose of straining and filtering solid and liquid medicines respectively is mentioned to have been served by two or

[1] Schol. on Katy. 1.3.3.6. footnote, Śatapatha Brāhmaṇa (Sacred Books of the East, 1.1.4.8.)

[2] Cunningham's Bhilsa Topes, p. 207.

[3] Mohāvagga VI. 9. 2.

[4] Ṛgveda, 10m. 71s. V 2

three layers of a piece of cloth. And we know that in the prehistoric Soma rites, it "was pressed, passed through a seive, mixed with milk, and offered as the main oblation".

The reference to a cloth sieve, we find in Mohāvagga[1]: "Now at that time the Bhikkhus who were sick had need of sifted chunam as medicine.

They told this thing to the Blessed One.

"I allow, O Bhikkhus, the use of a chunam sieve".

They had need of the chunam very fine.

"I allow, O Bhikkhus, the use of a cloth sieve".

Pavitra was used in the Vedic times[2]. It was a filter. Wilson translates it: "Trough the purifying filters".

Cold and hot applications.

To relieve colic pains, vessels made of silver, copper or precious stones, containing cold water, are directed to be placed upon the part or better upon the navel[3]. Besides these, leather vessels containing cold water are also directed to be used for reducing the temperature in dilirium tremens.[4]

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[1] Mohāvagga VI. 10. 1.

[2] मध्व: पुनाना: कविभि: पवित्रैर्द्यूभिर्हिन्वन्त्यद्रुभिर्धनुतौ: ॥
Rgveda, 3m. 31 s. 16 Rk.

घंशं दृह्लन्ति हरिलो भरित्रैर्मध्व: पुनन्ति धारया पवित्रै: ॥
Ibid, 3m. 36s. 7 Rk.

[3] मणिराजत तास्राणि भाजनानि च सर्व्वश:।
वारिपूर्णानि तान्यस्य शूलस्योपरि निक्षिपेत् ॥
Suśruta Saṁhitā, VI. xlii.

[4] हैमराजत कांस्यानां पात्राणां शीतवारिभि:।
पूर्णानां छिद्रपूर्णानां हृतानां पवनाहता:॥
Caraka Saṁhitā, VI. xii.

Heat is directed to be applied to the patient's body in various ways[1] :—

I. Tāpasveda :—palm of the hand, brass dish, sand, cloth, potsherd &c. are the means mentioned for applying heat to the body.

II. Uṣṇasveda :—potsherds, stone, bricks, or iron balls are to be heated to redness and then water is to be sprinkled upon them. The part to be fomented is covered by a wet piece of thick lint and then the heated materials are to be applied over it. Or heat may be applied by means of a narrow vesssel containing hot decoctions. The vessel is to be surrounded by a piece of

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[1] चतुर्विधः स्वेदस्तद् यथा। तापस्वेद उष्मस्वेद उपनाहस्वेदोद्रव स्वेद इति। अत्र सर्वस्वेद विकल्पावरोधः॥

तत्र ताप-स्वेदः। पाणि कांस्यकन्दकपाल वालुकावस्त्रे: प्रयुज्यते शयानस्याङ्गतापो वहुशः स्वादिराङ्गारैरिति। उष्म-स्वेदस्तु कपाल पाषाणेष्टकालोह-पिण्डानग्निवर्णानद्भि रासिञ्चेदस्य द्रव्येणैते राद्रालक्तक परिवेष्टितमङ्ग-प्रदेशं स्वेदयेत्। मांस रस पयोदधि धान्याम्लवातहर पत्रभङ्ग क्वाथ पूर्णा वा कुम्भीमनुतप्तां प्राङ्मुखीमाशं यदीयात्। पार्श्व छिद्रेण वा कुम्भेनाधोमुखेन तस्य मुखमभिसन्धाय तस्मिन् छिद्रे घनि गण्डाकारां नाडीं प्रणिधाय तम् स्वेदयेत्।

सुखोपविष्टं स्वभ्यक्तं गुरु प्रावरणावृतं।
घनिशुल्लिकया नाड्या स्वेदयेद्वात-रोगिणं॥
सुखा सर्व्वाङ्गगा स्वेदा नच क्लिश्नाति मानवं।
व्यायामाद्यासा सिर्वक्ता घनि घस्र समाकृतिः॥
स्वेदनार्थे हिता नाड़ी कैलिङ्गी घनी शुल्लिका।

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उपनाह स्वेदस्तु वातहरमूलकक्षीरस्य पिष्टैर्लवण प्रगाढैः सुस्निग्धैः सुखोष्णैः प्रदिह्य स्वेदयेत्। एवं काकोल्यादिभिः मरसादिभिस्तिलातसी सर्षप कल्कैः क्षीरा पायसौत्कारिकाभिर्वेसवारैः शाल्वणैर्व्वातनुवस्त्रावनद्धैः स्वेदयेत्।

द्रव स्वेदस्तु-वातहर द्रव्यक्वाथ पूर्णे कोष्ण कटाहे द्रोण्यां वावगाह्य स्वेदयेत्। एवं पयोमांसरस-घृत-तैल-धान्याम्ल-घृत-वसा सूक्ष्मेष्ववगाहेत सुखोष्णैः कषायैः परिषिञ्चेदिति।

Suśruta Saṁhitā, IV. xxxii.

cloth to prevent the skin from being burnt. Or heat may be applied by the following device:—an earthen vessel or kalasī containing hot decoctions is to be closed; and the vessel is then to be inverted. Then a hole should be bored on its side, and a tube shaped like an elephant's proboscis is fitted to it; the vapour issuing from the tube is allowed to play on the part.

To apply vapour bath:—put the hot infusion of medicinal substances into an earthen vessel and close its mouth. Drill a hole into the side of the vessel and adapt a tube to it. The tube may be either metallic or wooden. The tube should be two hands (forearm and hand) long and made of three pieces; the end of the tube which should taper like a cow's tail must be six aṅguli long. The patient should be seated on a stool and well covered with cloth. The tube is then introduced inside the blanket, and thus the issuing vapours heat the whole body. (Śārṅgadhara[1]).

Suśruta says that the tube should be half byām (*i.e.*, the distance between the two hands when extended) long, bent thrice and shaped like an elephant's proboscis. Sometimes a large stone slab is to be heated with burning wood of Acacia Catechu. Then after removing the ashes, the patient is directed to lie upon it. A tent or cloth-cover having four doors is sometimes required for the patient to sit in, and heat is applied by burning wood outside it.

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[1] अथवा वातनिर्गमिद्रव्यक्काथरसादिभिः।
उच्चैर्घटं पूरयित्वा पार्श्वे छिद्रं विधाय च॥
विमुद्राग्रं विखण्डाच्च धातुजां काष्ठजां तथा।
षड्ङ्गुलाग्रां गोपुच्छां नाडीं युञ्जात् द्विहस्तिकां॥
सुखोपविष्टं स्वभ्यक्तं गुरुप्रावरणावृतम्॥
हस्तीयुष्मिकया नाड्या स्वेदयेद्वातरोगिणम्॥

Śārṅgadhara Saṁgraha, III. ii.

III. Upānahasveda or poultices :—roots of medicinal plants are to be pressed and formed into a paste with mustard, sesame etc. This is to be heated, put on a thin cloth and so applied.

IV. Dravasveda or hot bath :—the patient is to sit in a tub or vessel of hot water. Iron pails or tubs are recommended to be used by patients to take bath in some infusions. Śārṅgadhara says[1]: The tub (droṇī) should be made of gold, or silver, or copper, or iron, or wood. The height and length of the tub should measure thirty-six aṅguli each. When the patient sits inside, the height of water should stand six aṅguli above the navel. A droṇī filled with oil is to be used for placing an unconscious patient in it to overcome the shock caused by fall, blows, fractures and other injuries.

Cakradatta[2] describes the four methods of applying heat, Bhāvamiśra also describes them similarly[3]. Hārita, however, mentions seven methods of heat-application[4].

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[1] सौवर्णं राजतं वापि ताम्रमायसमेव दारुजम् ।
कोष्ठकं तच्च कुर्व्वीतोच्चायै षट्त्रिंशदङ्गुलम् ॥
षडाभिस्तदवस्थाचतुष्कं मस्तकं तथा ।
नाभेः षडङ्गुलं यावन्मध्यः कायस्य धारया ॥
Śārṅgadhara Saṃgraha, III. ii.

[2] तत्रैः सैकतपाषिकोश्चवसनैः स्वेदोऽयवाङ्गारक-
लोपाद्यातहरैः सहास्थलवणक्षेहैः सुखोष्णैर्भवेत् ।
एवं तप्तपयोऽम्बुवातगमनक्काथादिभिकादिभि-
स्तत्रैस्तोयनिषेचनोऽवहहणैः शिलाद्यैः क्रमात् ॥
Cakradatta, Svedādhikāra.

[3] स्वेदश्चतुर्विधः प्रोक्तस्तापोष्मस्वेदसंज्ञितः ।
उपनाही द्रवः स्वेदः सर्व्वे वातार्त्तिहारिणः ।
तापस्वेद उष्मस्वेदश्च ताभ्यां संज्ञितः ।
Bhava Prokāśa, I. i.

[4] स्वेदः सप्तविधः प्रोक्तो लोष्टस्वेदो वाष्पस्वेदोऽग्निज्वालास्वेदः ।
घटस्वेदो जलस्वेदो फलस्वेदो वालुकास्वेदश्च ।
Hārita Saṃhitā, V. iv.

Balance or mānadaṇḍa.

For weighing medicinal substances, the scales and balance are often mentioned. They mention a set of weights and measures to be used in weighing substances. Alberuni[1] describes the Hindu balance thus:—"The balance with which the Hindus weigh things, are χαρίσ τίωσξες of which the weights are immovable, whilst the scales move on certain marks and lines. Therefore the balance is called tūla. The first lines mark the unit of the weight from 1 to 5, and further on to 10; the following lines mean the tenths, 10, 20, 30, &c. In Fergusson's Tree and Serpent Worship we have a diagram of steel-yard, where a man is represented as stepping in the scale, apparently to weigh himself[2]. The ordinary balance is still in common use amongst the kavirājes of the present day.

Collyrium Pots.

The Hindus used to apply collyrium to their eyes, from a very early time. It is said to stimulate the growth of eye-lashes, brighten the lusture of the eye-balls and clean the pupil[3].

Bhāvamiśra[4] recommends us to use collyrium as it improves the visual power and cures many diseases of the eye. It is

[1] Alberuni's India. Trans, by Sachau, vol. 1, p. 146.

[2] The Tree and Serpent Worship, the pl. lxxxiii. fig. 1.

[3] पद्मलं विशदं कान्तममलोज्ज्वल मङ्गलं ॥
नेत्रमञ्जन संयोगादभवेद्वामल तारकं ।

Suśrutā Saṁhitā, IV. xxiv.

[4] सौवीरमञ्जनं नित्यं हितमक्ष्णोस्तती भजेत् ।
लोचने भवतस्तेन मनोज्ञे सूक्ष्मदर्शने ॥
"सौवीरं" चेत सुरमा इति लोके प्रसिद्धम् ।
सोतोऽञ्जनं मतं श्रेष्ठं विशदं सिग्धुसम्भवम् ॥

contra-indicated in patients suffering from fever, emesis, exhaustion, &c.

Suśruta mentions collyrium pots of different metals intended for different kinds of collyrium then in use—

gold	pots	for	sweet	collyrium.
silver	pots	for	acid	collyrium.
horn	pots	for	salt	collyrium.
copper & iron	pots	for	astringent	collyrium.
lapis lazuli	pots	for	sour or acid	collyrium.
bell-metal	pots	for	bitter	collyrium.

He also mentions pots of ivory, or crystal, or coral, or horn, or conch-shell, or stone, or gold, or silver[1].

He also mentions a piece of bamboo for storing collyrium[2]. A bamboo is still used by the poor for keeping oil in India. For a similar purpose the wood of Khadira (Accacia Catechu) is also

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दृष्टेः कण्डूमलहरं दाहक्लेद रुजापहम्।
घृतक्षीरोपसेवी च सहनेभास्ततापयौ॥
नेत्ररोगा न जायन्ते तस्मादञ्जन माचरेत्।

"श्रीतोऽञ्जनं" कृष्णसुरमा इति लोके प्रसिद्धं॥ "विशदं" शोधनं विनापि।
"सिन्धुसम्भवम्" सिन्धुनाम पर्व्वतस्तत्र सम्भवम्।

रात्रौ जागरितः स्नात्वा क्षुद्वितो भुक्तवांस्तथा।
ज्वरातुरः शिरस्नाती नाक्षीरञ्जनमाचरेत्।

Bhāva Prokāśa, I. i.

[1] See foot-note 3, P. 67.

[2] कुजकाशोकशालासपियङ्गनलिनोत्पलैः॥
पृथ्वीरेणुकृष्णाद्राक्षापथ्यामलक संयुतैः।
सर्पिर्मधुयुतैर्युक्तैस्त्रिभाद्यामवस्थितैः॥

Suśruta Saṁhitā, VI. xvii.

recommended[1]. For storing oil, Dṛḍhavala[2] mentions the use of vessels of stone or the horn of a lamb or iron.

Medicine Glass.

Sukti or shell of mussell was used as medicine glass. The shell of the fresh water mussels unionacea is mentioned to be used for holding a dose of medicine for administering it to a patient[3]. They generally have equivalve, though not equisided, shells which are covered externally with a smooth brown epidermis and internally by a mother-of-pearl layer. Such a shell "is said to have been formerly much used in England by painters for holding their colour and so the commonest variety is termed unio pictorua. To apply oleaginous errhines, Suśruta[4] recommends us to use metallic pots or the shell of mussel. It is still used in India for feeding the babies with milk and also for administering medicines to the patient. Heyne[5] (1814) says that "according to the nature of the disender, the medicines should be taken out of gold, silver or brass vessels. But if these should not be at hand you may use iron or even earthen vessel."

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[1] सैन्धवीपहितं युक्त्याग्निहितं वैणवाङ्गरे।
मेदीयकदधृतक्षारं पिप्पल्यः सैन्धवं मधु॥
रसमामलकक्षापि पक्वं सम्यङ् निधापयेत्।
कोशे खदिरनिर्य्यासे तद्वत् क्षुद्राघ्नं हितं॥

Suśruta Saṁhitā, VI. xvii.

[2] See foot note, 4, P. 67.

[3] ततः उपसंस्कृतशरीरः प्रातः प्रातरुत्थाय पाणिग्रहिमाचं क्षौद्रेण प्रतिसंसृज्योपयुञ्जीत।

Suśruta Saṁhitā, IV. x.

[4] वामहस्त प्रदेशिन्य यौन्नामितनालायाय विगृह्य स्रोतसि दक्षिण हस्तेन स्नेहमुद्धान् तान् रजत सुवर्ण तामस्तत्पात्र मृन्मिनामन्यतम वं गृहा पितृना वा सुखोष्णं स्नेहमेतमासिञ्चेद अवच्छिन्न-धारं यथानेवेन प्राप्नोति।

Ibid. IV. xl.

[5] Dr. Heyne's Indian Tracts,

Dropper.

The Hindus used a tent of cotton as a drop conductor. Cakradatta[1] advises us to drop medicines into the eyes thus:—the patient should be made to lie down in a place free from draught; the surgeon is to open his eye with the left hand, while with the right, he allows 10 or 12 drops of medicine to fall from a height of two aṅguli on the eye from a tent of cotton, immersed in medicine contained in a clean vessel.

Grind-stone.

Grind-stone to pulverise medicaments is mentioned. In the Mahāvagga[2] we find a reference to it. "I allow, O Bhikkhus, the use of a grind stone, and of another stone to grind upon" (pisana-silâ ka pisana poto ka—Buddhaghosha).

Stone and iron muller.

For similar purpose a stone slab and iron muller are necessary to make pastes and powders of medicines. On the inner face of the left piller in the eastern gate of Sanchi Topes, the kitchen scene is represented, in which "a fourth woman is seated grinding spices or condiments on the sil, or flat stone, with a bant or round muller[3]".

Khal or elliptical mortar of stone and pestle.

To prepare medicines to be exhibited to the patients, a small

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[1] निवातस्थस्य वामेन पाणिनोन्मील्य लोचनम्।
शलाकाप्रलम्बयान्तेन पिचुवर्त्या कनीनिके।
दश द्वादश वा बिन्दून् दापयेत्लादवसेचयेत्।

Cakradatta, Āśotanayāñjana Adhikāra.

[2] Mahāvagga vi. 3.2.

[3] Cunninham Cunningham's Bhilsa Topes, p. 206.

elliptical mortar is generally used when the medicines require to be thoroughly mixed with some excipient.

The following appliances, besides those mentioned before, become necesary in pharmacy :—

1. Iron pails of various sizes.
2. Vessels of iron, copper, silver, brass and earth for storing medicines.
3. Spoons of wood or darvi ; large metallic spoon or hata.
4. Iron sandaṁśa or pinchers.
5. Rods of wood or iron.
6. Blacksmith's bellows.
7. Ankuśa or hooks like the elephant driver's goad.
8. Iron hammer.
9. Earthen crucibles of different sizes.

CHAPTER IX.

THE CONCLUSION.

In the recent edition of the System of Medicine, Prof. Albutt[1] begins his article on the History of medicine with the following observations: "The medicine of Egypt and the East, extensive and intricate as it was, in so far as it was not Greek did not contain even the rudiments of science. To it Western medicine owes virtually nothing, and in this article at any rate, it may be disregarded". Prof. Osler[2] also speaks in the same strain: "Crude and bizzare among the primitive nations, these ideas of disease received among the Greeks and Romans a practical development worthy of these peoples. There have been systemes of so-called divine healing in all the great civilizations, but for beauty of conception and for grandeur of detail in the execution, all are as nothing in comparison with the cult of the son of Appolo, and of Æsculapius, the god of healing." "Scientific medicine, the product of a union of religion with philosophy, had its origin in a remarkable conjunction of gifts and conditions among the Greeks in the sixth centuries".

Such opinions remind us of an assertion of Sir William Jones[3] "that there is no evidence that in any language of Asia there exists one original treatise on medicine considered as science". About a century has elapsed since the time of Sir William but we see that the same misconception still prevails in the minds of

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[1] Albutt and Rolleston. System of Medicine, vol. I, p. 1.

[2] Oslar and Mcrae's System of Medicine.

[3] Discourse xi. Sir William Jone's Works, Vol. I. p. 161.

the scholars. Macdonell[1] gives us a succint account of the intellectual debt of Europe to the various branches of science and art of the Hindus but regrets that the genetic connection of Indian medicine with that of Greece can not at present be definitely settled. "The question as to whether Indian medical science in its earlier period was affected by that of the Greeks can not be answered with certainty, the two systems not having hitherto been compared with sufficient care." The European mind is quite naturally in the habit of tracing all knowledge to Greece, the fountain of all their knowledge in philosophy and science. But impartial writers are not wanting to vindicate the claims of the Hindus. So Wise remarks as follows[2]:—"Facts regarding the ancient history of medicine have been sought for only in the classical authors of Greece and Rome and have been arranged to suit a traditional theory which repudiated all systems which did not proceed from a Greecian source. We are familiar from our youth with classical history and love to recall events illustrated by the torch of genius and depicted on our memories; and it requires a thorough examination of a subject, a careful weighing of new evidence, and a degree of ingenuousness not always to be found to alter early impressions. Still candour and truth require us to examine the value of new facts in history as they are discovered, so as to arrive at just conclusions". Royle maintains[3] that "from the mixture, however, of much ignorance and absurdity with what is valuable, many will be apt to despise altogether the medicine of the East. But if it be recollected how long in Europe prevailed the influence of Galen,

[1] History of Sanskrit Literature, ch. xvi.
[2] Review of the History of Medicine. Introduction.
[3] Antiquity of Hindu Medicine, p. 61.

as well as how many absurd formulas still figure in some continental pharmacopœas, as also how comparatively recent is the time since our own was so greatly improved; some feeling of humiliation will control the pride with which we now view the medical sciences". Neuberger says[1]; "The medicine of the Indians, if it does not equal the best achievements of their race, at least nearly approaches them. and owing to its wealth of knowledge, depth of speculation and systematic construction, takes an outstanding position in the history of oriental medicine." It is no doubt unsatisfactory to find that such notions are still allowed to stand in the way of impartial conclusions by eminent men of science especially by those who write history of medicine. But it is not the fault of the historians alone, the fault lies with us for not having supplied them with adequate materials. Something has been done in this field of research by men like Wilson, Heyne, Ainsle, Royle, Dutt, Thacore Shaheb, Jolley, Hoernle and others, but it is nothing when compared to what is required to be done. To supply this want partially, we have endeavoured in this monograph to describe the surgical instruments of the Hindus, with a comparative study of the instruments of the Greek, Roman and Arab surgeons, and of the surgeons in modern times. By a careful study of this subject, we can not avoid the conclusion that the medicine of India though it was not Greek, contained the requirements of science and has a fair claim to be considered in the history of medicine. To it western medicine really owes something and so the subject has been studied and investigated thoroughly.

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[1] Neuberger. History of Medicine. Trans. by Playfair. Vol. I. p. 437.

Apart from the usefulness of the study for collecting materials for the history of medicine, there are good reasons for a critical examination of the subject. The knowledge of the Hindus in medical science was by no means rudimentary. There is evidence to show that they were inferior to none in the quality or quantity of the knowledge of the science at that early age. Hoernle says:[1] "Its extent and accuracy are surprising when we allow for their early age—probably the sixth century before Christ—and their peculiar methods of definition." They practised dissection of human bodies and their anatomical studies have the mark of high order. "We have seen that they used various forms of surgical instruments. The Hindus cut for stone couched for the cataract and extracted the fœtus from the womb". They performed abdominal section, practised cranial surgery successfully and no region of the body was thought sacred to the knife. They repaired nose and ears by plastic operations, treated fractures and reduced dislocations, and were experts in performing amputations. They reduced hernia, cured piles and fistula-in-ano by surgical technique, and inoculated and vaccinated for small-pox. Field surgery was thoroughly understood and arrows were extracted with skill. They were acquainted with the circulation of the blood,[2]

[1] Hoernle's Osteology, Preface. P. iii.

[2] यामिरिदं शरीरमारान इव जलधारिणीभिः केदार इव च कुल्याभिरुपस्निह्यते-ऽनुगृह्यतेचाकुञ्चन प्रसारणादिभिर्विशेषैः। द्रुमपत्रसिवनीनामिव च तासां प्रतानास्तासां नाभिर्मूलं ततश्च प्रसरन्त्यूर्ध्वमधस्तिर्यक् च।

Suśruta Saṁhitā, III. vii.

देहस्रोत्पत्तिरसजो देहसेनैव धार्यते।
रक्तं जीवस्य चाधारस्तस्मादत्रैवसंयुधः॥

Bhāva Prakāśa, I. 4i.

the distinction between the artery and vein,[1] the use of anaesthetics, the means of arresting hæmorrhage and the proper treatment of surgical wounds. They enumerated 107 vital parts of the body to be avoided, if possible, by the surgeon in practising his handicraft.[2]

In medicine they first propounded the humoural pathology. Though it seems fanciful in the light of modern culture, it must be admitted that no other theory has been attempted to explain the causation of disease in recent times. "They were the first nation who employed minerals internally and to them we owe the therapeutic use of mercury and arsenic in intermittents". They introduced massage, postural treatment and magnet in therapeutics. They excelled in chemistry and contrived many instruments for the preparation of chemical compounds. Atomic theory was discovered by Kaṇāda; and "they knew how to prepare sulphuric acid, nitric acid and muriatic acid, the oxide of copper, iron, lead (of which they had both the red oxide and litharge),

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विस्रता द्रवता रागबलनं विलयस्तथा।
भूम्यादिपञ्चभूतानामेते रक्ते गुणाः स्मृताः॥
रक्ते दुष्टे भवेच्छोथो रक्तमण्डलमेव च।
व्यथा दाहश्च पाकश्च कण्डूश्च पीडकोद्गमः।
ह्रडे रक्ताङ्गनेत्रत्वं शिराणां पूर्णता तथा।
गात्राणां गौरवं निद्रा मेही दाहश्च जायते॥

Sārṅgadharā Saṁgraha, III. xii.
Bhāva Prakāśa, I. ii.

[1] इन्द्रगोपप्रभं श्रेयं प्रकृतिस्थसमंहतम्।

Sārṅgadhara Saṁgraha, III. xii.

गूढाः समस्थिताः स्निग्धा रोहिण्यः रुद्धशोणितम्।

Aṣṭāṅga Hṛdaya Saṁhitā, II. iii.

[2] सप्तोत्तरं मर्म्मशतं।

Suśruta Saṁhitā, III. vi.

tin, and zinc; the sulphuret of iron, copper, mercury, antimony and arsenic; the sulphate of copper, zinc and iron; and carbonates of lead and iron[1]". The processes of solution, calcination and distillation were discovered by them.

They understood the action of drugs and no less than 500 classes of medicinal agents are enumerated and arranged according to their virtues in curing diseases, and their remedial agents have been collected from the vegetable, animal and mineral kingdoms. There are 41 different forms in which the medicaments may be exhibited to the patient. We have the earliest notice respecting zoology and botanical geography in their works. They had a complete nomenclature of diseases which are described minutely as regards their ætiology, symptomatalogy, diagnosis, pathology, prognosis and treatment.

Veterinary science was well known to them, and treatises on horses and elephants—Aśvavaidyaka and Pālakāpya[2] are still extant, and will repay perusal. Even there is a treatise on the treatment of plants and trees[3]. Thus we see that the Hindu medical science must not be condemned offhand and requires a careful and sympathetic research by scholars, before it can be excluded from the history of the science.

But I must be careful not to allow my enthusiast admiration carry me too far. It is quite true that the Ayurvedic system has its faults. It has been remarked that "it consisted of erroneous

[1] Elphinistone's History of India, 8th ed. p. 160.

[2] Another book on the medicine of elephants is quoted by Alberuni. See Sachau's Preface to Indica, p. xl.

[3] For the bibliography of the Āyurvedic books, see my work "Materials, Biographical and Bibliographical, for the History of Hindu Medicine". (In the press).

doctrines founded upon a most fanciful anatomy, physiology and pathology. Much indeed could hardly be expected of a science based upon an anatomy which taught that the navel "constituted a centre from which a vascular system, including 40 principal vessels originated[1]; upon a physiology which declared that these vessels were destined to convey blood, air, bile and phlegm to all parts of the body, and upon a pathology which maintained that disease depended either upon derangements of one or more of these humours or "upon the influence of good or evil spirits".[2] It must however be remembered that this criticism refers to a theory elaborated some 3000 years before. The idea that the navel formed the centre of the vascular system apparently had its origin in the fœtal circulation[3]. The position of the heart was well-known and its function as a profeelling organ is

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[1] यावत्यस्तु सिराः काये सम्भवन्ति शरीरिणां।
नाभ्यां सर्व्वा निबद्धास्ताः प्रतन्वन्ति समन्ततः॥
नाभिस्थाः प्राणिनां प्राणाः प्राणान्नाभिर्वृणाश्रिता।
सिराभिराततां नाभिचक्रनाभिरिवारकैः॥

तासां मूलसिरायत्वारिंशत्तासां वातवाहिन्यो दश पित्तवाहिन्यो दश कफवाहिन्यो दश दश रक्तवाहिन्यः।

Suśruta Saṁhitā, III. vii.

तस्यान्तरेण नाभिस्तु ज्योतिःस्थानं ध्रुवं स्मृतं।
तदा धमति वातस्तु देहसैनास्य चेष्टते॥

Ibid. III. iv.

[2] A course of lectures on the Principles and Practice of Medicine delivered at Calcutta Medical College. By Francis. 1868.

[3] मातुस्तु खलु रसवहायां नाड्यां गर्भनाभिनाड्यौ प्रतिबद्धा तासु मातुराहाररस-जीवेनाभिवर्द्धते। तेनोपसेदुषैनास्याभिवृद्धिर्भवति।

Suśruta Saṁhitā, III. iii.

described in the ancient books[1]. In the later Tantras the origin of the nerves from the spinal cord and the brain is distinctly stated[2]. The ancient Hindus, like the Babylonians, thought the heart to be the seat of the understanding, and the liver as the central organ of the blood. The Greeks were the most cultured nation at that age, and the knowledge of the two nations can be compared to our advantage. The Hindus did not share with the Greeks the belief that the uterus is "an animal within an animal" and that it can be attracted by pleasant smells and repelled by pungent substances"[3]. The humoural pathology was also the keystone of the Greecian system. The belief in the good and evil spirit was the only alternative to the pathologists when the microscope and the germ theory of diseases were unknown. It is highly creditable to the classical Greek physicians for banishing superstition from the practice of the art; but we know that the later Greek writers Aetius, Alexander and Paulus, and the Latin medical literature, were not free from its baneful influence. The belief in charms and miracles in the cure of diseases seems to be universal and is

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[1] स रस: इत्युच्यते। तस्य च हृदयं स्थानं स हृदयाच्चतुर्विंशतीः धमनीरनुप्रविश्योर्ध्वगा दश दश चाधोगामिन्यश्चतस्रश्चतुर्थ्यगाः कृत्स्नं शरीरमहरहस्तर्पयति वर्द्धयति धारयति यापयति जीवयति चाहृष्टहेतुकेन कर्म्मणा।

Suśruta Saṁhitā, I. xiv.

[2] द्वे द तिर्य्यक्गते नाड्यौ चतुर्विंशति संख्यया।
मेरुदण्डेश्रिताः सर्व्वे सूत्रे मणिगणाइव॥
* * * *
ऊर्ध्वमूलमधःशाखं इचाकारं कलेवरं।
यथाश्वत्थदलं तद्वत् शरीरे नाड्यश्रिताः॥

Tantra.

[3] Paulus Ægineta, Adam's Commentary, Vol. I. P. 636.

working even at the present time. Adams says[1] that "considering the faith which many educated persons now repose in the virtues of galvanic rings and garters, the present generation has little ground for laughing at the credulity of our forefathers, with respect to amulets and other phylacteries".

In later times, attempts have been made to substitute other theories in the place of the humoural, and we know with what results. "Paracelsus substituted an equally baseless hypothesis, that the fundamental element of the human body were three principles: sal, the solid element; quicksilver, the liquid; and sulphur, the aerial. This formula was the badge of the Paracelsist school up to the end of the 17th century." Sylvius and Willi (17th century) of the Iatro-chemical school "referred most diseases to morbid matters or "acrimonies" produced by perverted secretions, and these being sometimes too alkaline, sometimes too acid, the antithesis of acid and alkali became the badge or catch word" of their system. Friedrich Hoffman (1660-1742) constructed another system which "supposed life to be a universally diffused ether, which entering the animal body, became transformed in the brain into Pneuma or nervous fluid. "George Ernest Stahl (1660-1734) believed in the hypothesis of Animism, and "the symptoms of disease were regarded as the conscious efforts of the soul to overcome the morbid influences". William Cullen (1712-90) "propounded a new system of medicine, intended to reconcile the opposing views of his predecessors. Its main feature was the importance attached to the nervous system in the causation of disease." Lastly the "Brunonian" system of John Brown, based on

[1] Adam's Commentary on Paul.

the doctrine of stimulus, and Hahneman's theory of homœopathy need be mentioned here to complete the list.[1] Thus we see that even some of the eminent men of science indulged in fanciful theories in quite modern times.

The study of ancient Hindu medicine has an antiquarian value. It is perhaps the oldest system of medical science still extant. Fragments of Egyptian and Assyrian medicine have no doubt been unearthed. But these cannot be compared with the complete system of the medical science as preserved in the early Sanskrit works on the subject. The Hindus believe their science of medicine to be of divine origin and this belief is founded upon the fact that the existence of the medical profession can be traced back to prehistoric times. The humoural theory is mentioned in the Ṛgveda[2] which according to the consensus of opinions amongst the European savants can not be later than 2000 B.C., and possibly earlier. The Buddhists relate a story, how, in one of his former births, Buddha was born as a medicine-man. "In the Mahosadha birth the archangel Sakka came to him as he was being born, and placing some fine sandal-wood in his hand, went away. He came out from the womb holding this in his fist. His mother asked him "What is it you hold, dear, as you come?" He answered "Medicine, mother!" So because he came holding medicine, they gave him the name of medicine-child (oṣadhadhāraka). Taking the medicine they kept it in a chatty (an earthenware water-pot) and it became

[1] Medicine in modern Europe. Payne in Albutt's System of Medicine, vol. I, p. 26, 29, 34.

[2] भीमानं मंथीर्ब्रह्मकाय सूनवे विधातु धर्मं वहतं शुभस्पती ॥

Ṛgveda, I. 34, 6.

a drug by which all the sickness of the blind and deaf and others as many as came, was healed—so the saying sprang up, "This is a powerful drug"; and hence he was called Mahosadha (The great medicine-man).[1] This early date of the science amongst the Hindus is not exceptional. It is now well-known that so severe an operation as trephining the skull was often performed in the early stone age. "Trephined skulls from neolithic period have been found in most European countries, in Algiers, the Canaries, North America, Mexico, Peru and the Argentine"[2]. In the Code of Hammurabi, king of Babylon (2285-2242 B. C.), there are thirteen articles regulating medical practice. One deals with the responsibilities of a surgeon performing operations on the eye. The laws Hammurabi lay down that:—

"If a Physician cause a severe operation wound with a bronze operating knife and cure the patient, or if he open a tumour (cavity) with a bronze operating knife and save his eye, he shall have ten shekels of silver.

"If it be a freedman, he shall have five shekels.

"If it be any one's slave, his owner shall give the physician two shekels of silver.

"If the physician make a severe wound with a bronze operating knife and the patient die, or if he open a growth with a bronze operating knife and the patient lose his eye, he shall have his hands cut off.

"If a physician make a severe wound on the person of

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[1] Rhys David's Buddhist Birth Stories, vol. I, p. 67-68.

[2] Neuberger's History of Medicine, P. 3.

a slave belonging to a freed man with the bronze operating knife and kill him, he shall replace the slave by another slave.

"If a physician heal a broken bone or cure diseased bowels, the patient shall pay the physian five shekels of silver."[1]

Homer pays tribute to Egypt for her

"Patron-god imparts
To all the Pharian race his healing arts."

Herodotus says that the Egyptian physicians were specialists of particular diseases, and Clement of Alexandria mentions forty-two Hermetic books on medicine by the god Thot.

"According to Manetho, he (Teta) constructed the Royal castle of Memphis and wrote a work on anatomy[2] being particularly occupied with medicine. The latter supposition is rendered more complete to a certain extent by the account, due to Ebers Papyrus[3], that the method of making the hair grow, described accurately therein, was supposed to have been discovered by our king's mother, Shesh."[4] Teta was the second king of the first dynasty of the old Memphis kingdom and flourished in 4366 B. C. King Senta of the second dynasty owned a medical work which belonged to Semti or Hesepti (4266 B. C.), the 5th king of the first dynasty.[5] "Tosorthros of the third dynasty, was said to have composed a treatise on medicine,[6] a fact which

[1] Neuberger. History of Medicine, P. 18.

[2] Manetho, in Müller-Didot, Fragmenta Historicum Græc, vol. II, pp. 539, 540.

[3] Ebers Papyrus, Pl. lxvi, 1, 5.

[4] Historian's History of the World, vol. I, Egypt and Mesopotamia. p. 91.

[5] Ibid, p. 68.

[6] Manetho, etc., vol. II, p. 544.

caused him to be identified with the healing god Imhotpû."[1] These facts suggest a great age for Egyptian medicine, Medicine floqrished among the Assyrians: "Fragments of an old work on medicine have been found, which show that all known diseases have been classified and their symptoms described; and the medical mixtures considered appropriate to each being compounded and prescribed quite in modern fashion."[2]

The oldest medical treatise extant amogst the Chinese is the Neiching, the authorship being attributed to Hwang-ti; it dates back to B. C. 2597. Mr. Gatzlaff,[3] missionary in China, has given us a short view of a celebrated work, in 40 volumes, on Chinese medicines, which is called Ching che chun ching *i. e.*, "Approved marking line of medical practice"[4] So the Hippocratic treatises (460 B. C.) are rather modern compilations compared to these ancient books; and as told by Plato, the priest of Sais was fully justified when he addressed to Solon: "You Greeks, you are but children."[5]

It will be seen again that a comparative study of the science discloses remakable affinity to the systems of the other contemporary nations. The fabulous origin of medicine in India and Greece can not fail to attract the notice of even a casual observer. The resemblance of Dakṣa, the preceptor of the two Aṣvins, the offspring of Sun, who after learning the

[1] Ibid, p. 544 and 545.

Quoted in Maspero's "The Dawn of Civilization." Edited by Prof. Sayce, 5th ed. p. 238.

[3] Assyria; its Princes, Priests and Peoples, Sayce, p. 119.

[4] Proceedings of the Asiatic Society, Part VII, p. 154.

[4] Royle. Antiquity of Hindu Medicine, p. 67.

[5] Timæus, p. 22.

Ayurveda from their father became the medical attendants of the gods, to Æsculapius—the reputed son of Apollo, and his two sons Machaon and Podalarius, celebrated in the Homeric poems, is indeed remarkable. More remarkable is the belief in humoural pathology shared by the two nations, separated from each other by continents and seas, and alienated from each other by the differences in customs, manners and religion. The theory of independent origin and developement falls to the ground, especially when we consider the strange coincidence in the surgical instruments used by the two nations in performing surgical operations. Some of the instruments used by the Hindus were not only identical in structure and shape to the instruments of the Greeks, but they had even the same name. Thus for instance, the alābu yantra of the Hindus corresponds to the description of the cucurbitula of the Greeks, and both the terms mean a gourd. A śṛṅga is the horn; aṅguli yantra or mudrikā is the finger or ring-knife; yoni-vraṇekṣaṇa is the diopter or vaginal speculum; aṅkuśa is the hook; &c. Some instruments though they have different names are identical in structure and uses. Thus, the Scammum Hippocraticum or the Plinthium Nelei is the Greek counterpart of the Hindu kapātaśayana; the lithotomy binding of the yantraśatakam; the clyster of the vastiyantra; the saw of the karapatra; the needle of the sūcī; &c. Again many surgical operations are similarly described in both the systems, as for examples, the operations for stone and cataract may be cited. In the description of diseases, passages occur in books which seem to be a literal translation of one from the other. Thus in describing the symptoms of hydrophobia, Paulus quotes Rufus who pronounces it to be a

species of melancholy and then observes "Which reason accords also with those who say that they think they saw the image of the dog that bit them in water". The word "those" in the above sentence becomes clear to us when we read a similar passage in the kalpasthāna of the Suśruta Saṁhitā, and it may be thus translated:[1] "If the patient sees the image of the animal that bit him in the water or mirror, he is sure to die." Other passages might be multiplied but our limited space forbids any further quotations. All these coincidences can scarcely be accidental; and though we may not be able to trace the actual progress of medicine from India to Greece, yet the evidence in favour of its transmission is too strong to be held in doubt.

Thus the question of the relation of the medical science of the Hindus to that of the Greeks naturally suggests itself for solution. The possibility of a dependence of the either on the other can not be dismissed offhand for we have historical evidence of communication between the two nations at a very early age. We need not dwell at length upon those shoals and quagmires of historical controversies, the alleged conquest of India by Egyptian Seostris as recorded by Diodorus Seculus[2] in prehistoric times; the connection of the Phœnician traders as proved by the articles of merchandise,—cinnamon, aloes, onyx, agate, ebony, tin and ivory[3] diamond, gold and

[1] अप्सुवा यदिवादर्शे रिष्टं तस्य विनिर्दिशेत् ॥
वस्त्यक्षाद् योऽभीक्ष्णं यत्राहष्टापि वा जले ।
जलवासनुविद्यात्तं रिष्टं तमपिकीर्तितं ॥

Suśrutā Sāṁhitā, V. vi.

[2] I. ib. I. ch. 43. Nolan.

[3] Strabo. xv 37. Quotes Megasthenes; Theophrastus quoted by MacCrindle in Ancient India as described by classical authors, p. 46; Virgil. Georg. II. 116-17 ("India alone produces black ebony"), Georg. I. 57. ("India sends Ivory"), Lonsdale and Lee's trans.; Horace, odes I. 31.

embroidered work[1] the commercial enterprises of the ships of Solomon (992 B. C.) from Ezion-Gaber[2] under the guidance of the mariners of Hiram (B.C. 980-917) which brought back the gold of "ophir," its almug trees and ivory, apes and peacocks; the possibility of an Indo-Hellenic intercourse to explain the remarkable coincidences between the systems of philosophy current amongst the two nations, and which culminated in the bold theory of Pococke[3] that Pythagoras, who is generally considered to be the founder of the healing art amongst the Greeks[4] was an adaptation of the Buddhugurus, and the assertion that Greece must have been an Indian colony before. Let us rather tread on firmer grounds and we know that two Greek physicians, Ktesias (about 400 B.C.) and Megasthenes (300 B. C.) visited Northern India. Ktesias in his Indica mentions the cochineal plant, its worm and dyes, monkeys, elephant and parrot. He says that the Indians were free from headache, toothache or ophthalmia and from mouth sores or ulcers. Alexander the Great (B.C.327), so says Nearchus, employed some Hindu vaids in his camp in India to consult them in cases of snake-bites and other dangerous ailments. Megasthenes mentions ebony as growing in Bengal, and tiger, monkey and elephants are also alluded to. Strabbo mentions that Daimacus was sent to the court of Candragupta's son, but unfortunately the book he wrote about India is lost to us. Mention also should be made of the intercourse of Egypt with India under the Ptolemies and we know, that Ptolemy

[1] Birdwood's Industrial Arts of India, pp. 263-4.

[2] I. King. ix. 27; xii, p. 22.

[3] India in Greece.

[4] See the Origin and Growth of the Healing Art—Bedros. 182.

Philadelphous sent an embassy headed by one Dionysos to the court of Pāṭaliputra. Another source of dessimination of Hindu learning over the Western world is the emigration of the Buddhist missionaries to the kingdoms of Ptolemies and Greek kings as proved by the edicts of Aśoka. "And the Greek Simnoi (venerable) were no other than the Buddhist sramanas (these simnoi 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 (venerable) sramanas).[1] The intercourse of the East and West after the Christian era is well known and will not supply us with any proof as to the indebtedness of the Greeks and Hindus to each other; though "Dietz proves that the late Greek physicians were acquainted with the medical works of the Hindus, and availed themselves of their medicaments"; but he more particularity shows that the Arabians were familiar with them, and extolled the healing art as practised by the Indians, quite as much as that in use among the Greeks.[2]

But what is more important to us as a proof of the influence of the Indian medical science upon the Greecian system is the identification of drugs of Indian origin in the meteria medica of the Greeks. For instance the Sacred Bean of Pythagoras has been identified with Utpalam or Indian Nelumbium.[3] Hippocrates the Great, who was contemporary and kinsman of Ktesias[4] the court physician to the king of Persia, mentions:—Sesamum Indicum (Tila); Nardostachys Jatamansī

[1] Lalitvistaram. Mitter's ed. ch. 1.
[2] Journal of Education, Vol. viii, p. 176.
[3] Pratt's Flowering Plants, Vol. 1, p. 67.
[4] Galen; Comment. in libr. de artic. iii.

(Jaṭāmāṁsī); Beswillia Thurifera (Kunduru); Zinziber Officinale (Śṛṅgavera); and Piper Nigrum (Marīci). Dioscorides (1st century A.D.) in his Materia Medica describes:—Agallochum, Bdellium, Ebony (Diosphynos Ebenaster), Ammomum zinziberis (Ginger), Calamus aromatious (sweet cane of Scripture), Eletteria Cardamomum (Elaci), Lycium Indicum or Russot, the product of Berbera lycium, Atramentum (Indigo), Onyx or the operculum of an Indian shell-fish, etc. In later times, we find Aetius, an Alexandrian writer of the 5th century describing Indian nuts, sandal wood, cocoanuts, etc. Symon Set mentions camphor; and Paulus Aegineta (7th century A.D.), a writer well known for his judicious condensation of the Greek medical literature, mentions Aloes, Cantharides (Mylabris Cichory), Cloves (Caryophyllum Aromaticus), Millet (Panicium Halicum), Costos (root of Auklandia Costos), Cassia (Cinnamomum Cassia), Indian stones as amulets, Malabathri or tejpāt (Laurus Cassia), Ambar, etc.

Now let us reproduce some of the conclusions arrived at by Western scholars as the result of the controversy. As regards philosophy, Colebrooke[1] asserts that "the Hindus were teachers and not learners". Cunningham[2] says: "Indians have the advantage in point of time; and I feel satisfied that the Greeks borrowed much of their philosophy from the East" Weber[3] remarks that "there is no ground whatever to suppose that Suśruta borrowed his system of medicine from the Greeks, on the contrary there is much to tell against such an idea".

[1] Transactions of the Royal Asiatic Society, vol. I.

[2] Bhilsa Topes, pp. 32-33.

[3] History of Indian Literature.

Prof. Diaz of the Konnigsberg University, detects the principles of Indian medicine in the medical literature of the Greeks". "It is to the Hindus" says Wise, "we owe the first system of medicine." Royle has proved beyond doubt the indebtedness of the Greeks and Arabs to the Hindus. Haas's theory that Suśruta is the Indian adaptation of the Arabic name of Suqrat or Buqrat, the Arabic corruption of the Greek Hippocrates, and that Kāsi is an adaptation of the Island of Cos has been deservedly condemned as "an elaborate joke". Neuberger says:[1]— "The similarity between Indian and Greek medicine of the period is in its outline and in certain details so striking that it is hardly surprising that the originality of the former has frequently been questioned or even denied. The more so is this true since the dates of the more important Indian works are fixed with the greatest difficulty, and before the discovery of the most recent manuscripts they were quite indefinite.

In consideration of the outstanding independent achievements of the Indians in most branches of science and art, and of their aversion from foreign influences, the trend of opinion to-day, informed by recent discoveries is in favour of the originality of Indian medicine in its most salient features."

Another fact must here be pointed out that the Hindus always acknowledged any help they might have received from other nations for the development of their science. The striking proof of this is found with reference to the science of astronomy— the only branch of learning which seems to have been influenced by the Greeks. Varāhamihira compiled his famous Pañca-sidhāntica or the collection of the five old treatises on astronomy,

[1] Neuberger. History of medicine, Vol. I, p. 45.

viz., Paulisa, Romaka, Vaśiṣṭha, Saura, and Paitamoha. Both Weber and Kern have no doubt that Paulisa was a Greek and the name Romaka speaks for itself. But in the Hindu medical literature there is no mention of any foreign help, and the Indian medical treatises do not contain a single technical term which points to a foreign origin. It is interesting to quote the well known passage of Garga: "The Yavanas (Greeks) are Mlecchas, but amongst them the science (astrology) is well established. Therefore they are honoured as Ṛṣis—how much more than an astrologer who is a Brāhmaṇ". It is a standing monument of the catholic spirit of the Hindus, and they know no better way to show their respect for the learned men of the world. To this may well be contrasted the behaviour of the Greeks towards the other nations. The doctrines of Pythagoras are pre-eminently Indian[1], but that philosopher has not a word to speak of the Hindus. In astronomy the Greeks are indebted to Babylon: Ptolemy mentions that Hipparchus worked out and improved upon the astronomical computations of the Babylonians with reference to the moon; but recent discoveries from the clay tablets have shown that the figures ascribed to Hipparchus are merely copied from the numerical values worked out in Babylon. "The discovery of the precession of the equinoxes is generally ascribed to Hipparchus. It was he indeed, who brought this fact to the Greeks, and he estimated its yearly amount as from 36 to 39 seconds, but it is certain that he learned about it in Chaldea, and that he obtained the elements of his calculations from the astronomical observations made on the lower Euphrates".[2] Paulus Aegineta

[1] See Enfield's History of Philosophy.

[2] Historian's History of the World. Vol, I, p. 596.

gives us a complete system of operative surgery of the ancients. Celsus, in the last two books of his work, has treated of the surgical operations with considerable accuracy; and though the former availed himself of the labours of the latter, Celsus is never mentioned as one of the sources of informations used by Paulus who appears to have been wholly unacquainted with his works; and Adams remarks "but when did a Greek writer ever acknowledge himself under obligation to a Roman"?

But are we to suppose that the Greeks wilfully concealed the names of the Indian physicians in their books? Surely not. The Greeks might not have known the real source of the informations which they probably received second-hand. There is historical evidence of an intercommunication between Greece and Persia from the time of Ktesias or the 4th century B. C. to the 6th century A. D. We also know of a tradition that the services of the Great Hippocrates—a kinsman of Ktesias, were required in the Persian court, but he declined the invitation. Again we know that books on ancient sciences of India were possibly made use of by the Persians in early times, and to this intercommunication may be due "the coincidences which have been observed between the science of the Greeks and that of the Hindus" (Royle).

As regards the indebtedness of the Persians to Sanskrit literature," we have positive testimony on the subject, as the Baron de Sacy, in his account of the well-known Sanskrit origin of the Fables of Pilpay, states that these were first translated in Pehlevi during the reign of the Persian king Nooshirwan, who ascended the throne in 531, and died in 579 and who is reported by historians to have encouraged learning, and to have induced Greecian philosophy at his court. The translation

were made by the physician Barzouyeh who had brought the original from India with other books, and who by more than one previous journey to that country, had acquired a knowledge of Sanskrit. He is stated particularly, to have made two journeys, one for the purpose of procuring medicaments and herbs, and the other for obtaining specimens of literature of the Hindus"[1]. "Previous even to this (A. D. 330), we hear of the Persian king Bahram visiting, in disguise, the court of Basdeo, sovereign of Canouge, to study the laws, religion and manners of the Hindus."[2]

But whatever differences of opinion there may be as regards the relation of the Greeks to the Hindoos, there is no doubt that the medical science of the Arabs was materially influenced by Hindu medicine. For we know that the medical treatises of Caraka, Suśruta and Mādhava were translated into Arabic in the beginning of the 8th century A. D., and the names of Scarac, Scirac or Xarac and Sarad occur in the Latin translations of Avicenna, Rhases, and Serapion.[3] Rāy dwells at length on the similaritry of description of leeches as written by Suśruta and Rhazes. The modern medical science of the West is principally based on the Greecian system as preserved in the books of the Arabian authors and so indirectly depends for some particulars at least upon the Indian system.

Sachau in his preface to Alberuni's India[4] remarks as

[1] Antiquity of Hindu Medicine, p. 168-69.

[2] Ibid, p. 73.

[3] Rhazes: 'De Emblico,' (Scarac Indianus), 'De Zinzibere, (Sarac) Serapion: 'De Myrobalanis' (Xarch Indus), 'De Emblicis et bellericis (Xarcha Indus); Avicenna: 'Sub Emblico' (Scirac Indum).

[4] Alberuni's India, Preface, p. xxx-xxxi.

follows:—"What India has contributed reached Bagdad by two different roads. Part has come directly in translations from the Sanskrit, part has travelled through Iran, having originally been translated from Sanskrit (Pali? Prakrit?) into Persian, and further from Persian into Arabic. In this way, *e.g.* the fables of Kalila and Dimna have been communicated to the Arabs, and a book on medicine probably the famous Caraka. *cf.* Fihrist p. 303". The Arabs also translated "Indian works on snakes (sarpavidyā), on poison (visavidyā).....on the veterinary art[1].....But not only were the medical books translated into Arabic we have evidence that Indian doctors practised in foreign courts. Sachau continues:[2] "Another influx of Hindu learning took place under Harun (A. D. 786-808). The ministereal family Barmak, then at the zenith of their power, had come with the ruling dynasty from Balkh, where an ancestor of theirs had been an official in the Buddhistic temple Naubehar, *i. e.*, nava vihāra—the new temple (or monastery). The name Barmak is said to be of Indian descent, meaning paramaka, *i. e.*, the superior (abbot of the vihāra?) *cf.* Kern, Geschichte des Buddhismus in Indien, ii. 445, 543. Of course, the Barmak family had been converted, but their contemporaries never thought much of their profession of Islam, nor regarded it as genuine. Induced probably by family traditions, they sent scholars to India, there to study medicine and pharmacology. Besides, they engaged Hindu scholars to come to Bagdad, made them the chief physicians of their hospitals, and ordered them to translate from Sanskrit

[1] Alberuni's India, Preface, p. xxxiv.

[2] Ibid p. xxxii.

into Arabic, books on medicine, pharmacology, toxicology, philosophy, astrology, and other subjects. Still in later centuries, muslim scholars travelled for the same purpose as the emissaries of the Barmak, *e. g.*, Almuwaffak, not long before Alberuni's time (Codex Vindobonensis, sive medici Abu Mansur liber, fundamentorum pharmacologiæ, Ed. Seligmann, Vienna, 1859, pp. 6, 10, and 15, 9)."

"Harun-al-Rashid (786-809) had two Indians Manka and Saleh, as physicians at his court"[1] Manka translated the classical work on medicine, Suśruta (*cf.* Steinschneider, Wissenschaftliche Blätter, Vol. I, p. 79) and a treatise on poison, ascribed to Kânakya, from Sanskrit into Persian (see Prof. Flügel, in Zietschrift der D. M. G. xi. 148 and s. 325). A Hebrew treatise on poison, ascribed to the Indian Zanik (Kanakya) is mentioned by Steinschneider Wissenschaftliche Blätter, Vol. I, p. 65). Alberuni mentions an Indian Kankah as astrologer of Harun-al-Rashid (Reinaud, memoire sur l' Inde, p. 315). He is likewise mentioned as a physican. Another Indian physician of Harun-al-Rashid is called Mankha (Reinaud). In the year 1381, a work on veterinary medicine ascribed to Salotar was translated from Sanskrit by the order of Firroz Shaha after the capture of Nagorecote. A copy of it was preserved in the Royal Library of Lucknow[2]. Among the Hindu physicians of the time one ابن دهن is mentioned *i.e.*, the son of DHN, director of the hospital of the Barmaks in Bagdad. This may be Dhanya, or Dhanian chosen probably on account of its etymological relationship with the name Dhanvantarī the name

[1] Prof. Dietz, quoted by Royle, p. 64.

[2] Maxmüller's Science of Language, Vol. I, p. 166.

of the mythical physician of the gods in Manu's law book and the epics (*cf.* A Weber, Indische Lithuraturgeschichte, pp. 284, 287). A similar relation seems to exist between the names Kanka, that of a physician of the same period, and Kankayana, an authority on Indian medicine (Weber l. c., pp. 287, note, and 284 note, 302). The name اطر, that of an author of a book on drinkables, may be identified with Atri, mentioned as a medical author by Weber, l. c. p. 288."[1]

For informations on the Arabic translations of Sanskrit works, see Analecta Medica by Dietz; Wustendeld's Geschichte der Arab Aerzte; Cureton, "A collection of such passages relative to India as may occur in Arabic writers"; Wilson's note to the above in J. R. A. S. old series, vi, pp. 105-115. Puschmann, p. 162; and Bedrœ, book iv. ch. 11. pp 286-299.

The Arabians added many durgs to the meteria medica of the Greeks and amongst them we find the following Indian drugs described:—

Diudar or Pinus Deodara	Devadāru[2]
Artemesia Indica	Nāgdamani.
Piper cubeba	Sugandha marica.
Cassia fistula	Suvarnakha.
Senna or Cassia obvata	Sonāmukhī.
Galangal or Alpina galangal, Roxb	Kulin-jana.
Ammomum grana paradisi.	
Macis	Mace.
Nux moschata	Nutmeg.

[1] Sachau. Ibid p. xxxii.

[2] It is described by Avicenna under its Sanskrit name, where he says that deiudar, "est ex genera abhel juniperus, que dicitur pinus Inda; et syr diudar est ejus lac" (Quoted by Royle).

Bdellium.....Guggula.

Tamarindus Indica.....Tintiḍī.

Trifolia.....Triphala.[1]

Myrobalani.....Haṙitaki.

Turpeth or Convolvulus Turpethum.....Trivit.

Sel or Aegle marmelos.....Vilva.

Santalum rubrum.....Candana.

Melia azadirachta.....Nimba.

Tembul (Piper betel).....Tāmbūl.

Faufil (Arecha catechu).....Khadira.

Nux vomica.....Viṣamuṣṭi.

Musa paradisiaca or plantain.....Kadalī.

Moschos moschifera (from Thibet & India)Mṛganābhi.

Dolichos lebleb.

Orange or Citrus aurantium.....Nāgaraṅga.

Limon or citrus medica.....Mātuluṅga.

Pearls and other precious stones such as lapiz lazuli. Borax, &c.

Rhabarburnum or Indian Rhubarb, etc.

We can trace the Arabic and Greek names of some of the medicuments to a Sanskrit source. Royle has discussed them at length, so we need give here only a synopsis of it:—

Triphalā (S)—Tryphalla (A)—Tryphalla (G)—Tryphala parva (modern).

Devadāru (S)—Deiudar(Avicenna)—Deedara (G)—Pinus deodaru.

Tvaka-kshira (S)—Tabosheer (A).

Tamālpatra (S)—Malatroon or Malabathrum (G).

Tejapatra(s), or tuj—Sadej (A).

[1] Actuarius copies from Serapion and Mesue, the use of this medicine. The very name is Sanskrit, meaning the 3 myrobalans. Serapion refers to Xarch indus or Charak, in his De Myrobalani (Royle, P. 37).

Tāmbula (S)—Tumbol (P)—Tunbol (A).

Pippalī (S)—Pippul (H)—pilpil (P)—filfil (A)—(G)—piper (E).

Śṛṅgavera (S)—Shimgveez (P)—Zinzabil (A)—Zingiber (E).

Aguru (S)—aggur (H)—Agila (M)—Pao-d'aglia (aquilia) (po)—Aod Hindee Agallochum (G).

Candana (S)—chundan (H)—Shandana (T)—Sundul (P)—Santal (E).

Kolinjana (S)—Galanga (G).

Vaca (S)—Wuz (A).

Dāvrusita (S)—Darcheeni (H)—Darsheeni (A).

Cacyn-nama (C)—Akimona (P)—Kaimanis (M)—Cinnamon.

Kuṣṭha (S)—Kooth (H)—Kust (A)—Koosrus (G)—Koshta (Sy).

Abnus—Ebony (E).

Kubara (S)—pupal (P)—fufal (A).

Sajikā (S)—Sajiimattee, sajiloon, sajii (H)—Sajimen vitri (Geber)—Soza or soda (E).

Khar, khari (S)—Kali. (A).

Kussas, missy (India)—misy (A)—misy (G).

Tincana (borax)—Tinkar (P)—tincal (E).

Ambara (S)—Kharoba (A)—Amber, Ambegrise (E).

Kassis (tin)—Kassiteros (G).

Tuttha (S)—tootum or tutia (H)—tutia (P)—tatanagum (T)—tutenagun and tutty.

Manaśilā (S)—Mansil (G).

Haritāl (S)—hartal.

Sarkarā (S)—sakkara (T)—sukkur (A)—Sugar (E).

Sandaracha (S) or sulphuret of arsenic—Zarnach (P & G).

Sphotaka (S)—phoska (B)—pocca (A. S.)—pocke (Ger).

Tintiḍi (S)—Tamar Hind (A)—Tamuarin (Fr)—Tamarinds (Italy & Sp.)—Tamarind (B)—Tamarindus India (L).

Masurikā (S)—Masern (Ger)—Measles (E).

Vraṇa (S)—verole (Fr)—variola (L).

Danga (Hindus)—Dandy—Dengue (Sp).

S—Sanskrit. A—Arabic. G—Greek. T—Tamil. P—Persian. M—Malayan. Po—Portuguese. Sy—Syriac. Ger—German. A. S.—Anglo-Saxon. H—Hindi. E—English. B—Bengali. Fr—French. L—Tatin. It—Italy. Sp—Spanish.

Not only is the influence of the Sanskrit medical works detected in the Persian, Hebrew, Arabic, Greek and Roman works on medicine, there is evidence that the Hindu system of medicine was also adopted by the Tibetans and the Chinese. In the January No. 37 of the J.A.S.B. 1835 Vol. IV, an analysis of a Thibetan work is given by Alexander Csoma de Koros. It is called "rgyud bzhi" (the tract in 4 parts). It is attributed to Sakhya. "In the time of Khrisrong Dehutsan (*i.e.* 8th or 9th century of the Christian era) a Tibetan interpreter Bairotsana (or Vairochana) having translated in Cashmere, with the assistance of physician-pandit (Davam Non-gah) presented it to the above mentioned Thibetan king." In a Note on Thibetan surgical instruments, Walsh says:[1] "The present practice of surgery in Tibet is very simple, and, as already noted, consists chiefly of cupping, cauterizing, and bleeding. The Am-chhi informed me that the only instruments used are the cupping-bow (མེཕུར་ me-puṅ, or མེབུམ་ me-bum, both meaning 'fire vessel'), in which

[1] The Thibetan Anatomical System by E. H. C. Walsh in J. R. A. S. 1910, pp. 1244-45.

paper is lit and the bowl is placed while hot over the part to be blistered; the sucking-horn (འཇིབ་རུ *ḥjib-ru*), by which cupping by vacuum is done; the cautery (ཕྱག་སྨེ *ḥchags-me*), the lancet (རྩ་ཀུ *rtsa-u*), for bleeding, and a golden lancet (གསེར་གྱི་རྩ་ཀུ *gser kyi rtsa-u*) for operating on the eye.

In the journal of the Buddhist Text Society of Calcutta for 1894 three Tibetan block prints are illustrated, which contain representations of a large number of surgical instruments, some of them of an elaborate nature, including specula, saws, catheters, exploring needles, instruments for tapping hydrocele, and midwifery and other forceps. The block-prints were brought by Rai Saratchandra Das, Bahadur, from Lhasa,[1] and a description of the figures was given by the late Lama Śes-rab MGya Mtsho, the Abbot of Ghoom Monastery, near Darjeeling, who was formerly physician to the late Tashi Lama, which were explained in a paper read by Dr. Saradaprasad Banerjee.[2]

If the elaborate and various instruments shown in the block-print were ever in general use they appear to have now ceased to be used."

In the J.R.A.S. April 1907, is mentioned "a Chinese text corresponding to a part of the Bower manuscript" by Watanbe. The identified portion of the MSS. consists of the six leaves which appear in plates XLIX-LIV (Hoernle's ed). The corresponding Chinese text is contained in six translations of which the following three, correspond completely to the MSS.

[1] Journal of the Buddhist Text Society, Vol. II, Pt. III, Calcutta 1894. P. III.

[2] Ibid, pp. IX. X.

1. Mohamayuri vidya-rajui—translated by I'tsing 705 A.D.
2. " " " Amoghavajra 746 to 771 A.D.
3. " " " Sanghapala 516 A.D.

Again many articles are common to the Hindus and Chinese materia medica; as many aromatics (nutmeg, cloves, cinnamon and pepper), musk, rhubarb etc. And this is not at all surprising for we have evidence "that there was constant intercourse[1] between these countries even before the Christian era, by means of travellers and ambassadors; and that Buddhist priests in visiting China, took with them as presents classical Indian books. It is also worthy of note, in connexion with the chapter on this subject in Suśruta, that in A.D. 648, the Emperor of China having sent an ambassador to India, this officer met with a doctor, who told him that he was 200 years old, and that he possessed the recipe of immortality, upon hearing which, a second embassy was despatched in search of the philosophical stone" (Royle).

Even the modern medical science of Europe has been directly influenced by the Hindu system of medicine. In the materia medica used by the doctors in Europe now, we find the following curative agents—the produce of India. I quote here the list as prepared by Thakore Shaheb[2] :—

"Aconitum heterophyllum ... Ativisha.
Allium cepa ... ... Polandu.
Acacia catechu ... ... Khadira.

[1] See Asiatic Journal, July 1836.
[2] History of Aryan Medical Science, P. 128.

Alhagi maurorum	...	Yavasa.
Alstonia scholaris...	...	Saptaparna.
Ammomum elettarum	...	Ela.
Andropogon nardus	...	Ushira.
Andropogon schænanthus	...	Katurina.
Artemisia sternutatoria	...	Agnidamani.
Berberis lycium ...	...	Daruharidra.
Butea frondosa ...	...	Palasha.
Cassia lanceolata ...	...	Sonamukhi.
Cucumis colocynthis	...	Indravaruni.
Dhatura alba, niger &c.	...	Dhattura.
Justicia adhatoda...	...	Atarusha.
Luffa amara ...	...	Katukoshtaki.
Linum usitatissimum	...	Atasi.
Mallotus Philippiensis	...	Kapillaka.
Myrica sapida ...	...	Katfala.
Ophelia chiretta and Ophelia augustifolia ...	...	Kirata.
Pimpinella Anisum	...	Shatapushpa.
Pongamia glabra...	...	Karanja.
Ptychotis ajowan ...	...	Ajamoda.
Ricinus communis	...	Eranda.
Salvinia cucullata	...	Undurkarnika.
Santalum album & Santalum flavum ...	...	Chandana.
Shorea Robusta ...	...	Ajakarna.
Strychnos potatorum, Strychnos nux vomica ...	...	Katakafala.
Tinospora Cordifolia	...	Guḍuci.

Valeriana Hardwicki	...	Tagara.
Wrightia Antidysenterica	...	Indrayava."

To this list may be added the following drugs from the Indian and Colonial Addendum to the British Pharmacopœa, 1898:—

Acacia Arabica ...	...	Vāvvula.
Acalypha Indica ...	...	Muktabarṣi.
Andrographis Paniculata	...	Kirāta.
Aristolochia Indica	...	Arkamula.
Arachia Hypogaea	...	Bucanaka.
Citrus Aurantium	...	Nāgaraṅga.
Azadirachta Indica	...	Nimba.
Aegle Marmelos ...	...	Vilva.
Piperbetel ...	...	Tāmbula.
Butæa Gummi.		
Cæsalpina Sappan...	...	Patanga or Bakam.
Calotropis Procera and C. Gigantiæ	...	Arka.
Gossypium Herbaceum	...	Kārpāsa.
Cambogia Indica.		
Cissampelos Pariera	...	Ambashthai.
Coscinum Fenestratum	...	Dāru-haridrā or darvi.
Gynocardia Odorata	...	Chālmugra.
Hygrophila Spinosa	...	Kokilāk-a.
Anogeissus Latifolia		
Embelia Ribes and E. Robusta...		Viḍaṅga.
Plantago Ovata ...	...	Ispaghula.
Ipomæa Hederacea	...	Kālādāna.
Ipomæa Turpethum	...	Trivit.

Mylabris Phalerta.		
Terminalia Chebula	...	Haritakī.
Sesamum Indicum	...	Tila.
Picrorhiza Kurroa ...	...	Katuka.
Urginea Indica ...	...	Vanapalāṇḍu.

As regards the medicines used by the Hindus, Neuberger says[1]:

"The Pharmacopia, corresponding with the fruitful nature of the land was a rich one and stamps Indian medicine with a character entirely its own, whilst nothing speaks more eloquently for its originality than the fact that of all the many medicinal plants no single one was European."

Elphinstone wonders at the knowledge of simples in which the Hindus early gave lessons to Europe and "more recently taught us the benefit of smoking Datura in asthma and the use of cowitch against worms," and "the prescribing of Nux Vomica in paralysis and dyspepsia, and the revival of the use of Croton Tiglium" (Royle). In surgery, too, the modern surgeons of Europe have borrowed the Indian method of Rhinoplastic operation first made known to European surgeons by a letter which was printed in the Gentleman's Magazine for October 1794, p. 891. In fact Dr. Hirschberg of Berlin says that "the whole plastic surgery in Europe had taken its 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." The modern method of making pockets for the

[1] Neuberger, History of Medicine, vol. I. P. 54.

testicles under the Colles' fascia after the operation for scrotal tumour (elephantiasis) can be traced back to the age of Suśruta[1].

Thus we see that it can safely be affirmed that the medical science of Europe has been, both directly and indirectly, influenced by the Hindu System of Medicine.

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[1] पादौ निरस्तमुष्कस्य त्रसेन प्रोत्य चाचिषौ।
प्रवेश्य तन्त्रसेवन्या मुष्कौ सीव्येत्ततः परं॥

Suśruta Saṁhitā, IV. ii.

THE END.

APPENDIX.

I'Tsing[1] says:—

"The following are the eight sections of medical science. The first treats of all kinds of sores; the second, of acupuncture for any disease above the neck; the third, of the diseases of the body; the fourth, of demoniac disease; the fifth, of the Agada medicine (i.e. antidote); the sixth, of the diseases of children; the seventh, of the means of lengthening one's life; the eighth, of the methods of invigorating the legs and body. 'Sores' (1) are of two kinds, inward and outward. The disease above the neck (2) is all that is on the head *and face;* any disease lower down from the throat is called a 'bodily' disease (3). The 'Demoniac' (4) is the attack of evil spirits, and the 'Agada' (5, but 6 of Âyur-veda) is the medicine for counteracting poisons. By 'Children' (6, but 5 of Âyur-veda) is meant from the embrayo stage until after a boy's sixteenth year; 'lengthening life' (7) is to maintain the body so as to live long, while 'invigorating the legs *and body*' (8) means to keep the body and limbs strong and healthy. These eight arts formerly existed in eight books, but lately a man epitomized them and made them into one bundle. All physicians in the five parts of India practise according *to this book*, and any physician who is well versed in it never fails to live by the official pay. Therefore Indians greatly honour physicians and much esteem merchants, orf they do not injure life, and they give relief to others as well as benefit themselves. I made a successful study in medical

[1] A Record of Buddhist Practices, Ch. XXVII, pp. 127-8.

science, but as it is not my proper vocation I have finally given it up."

Dr. Takakusu[1] comments on the passage as follows:—

"The eight sections of Medicine which I-tsing describes are no doubt the eight divisions of the Âyur-veda. He mentions an epitomiser of these divisions, who seems to have been a famous physician and contemporary of I-tsing (or just before I-tsing). This epitomiser may be Susruta, who calls himself a disciple of Dhanvantari, one of the Nine Gems in the Court of Vikramâditya.

Prof. Wilson says in his Works, vol. iii, p. 274:—

'The Âyur-veda, which originally consisted of one hundred sections, of a thousand stanzas each, was adapted to the limited faculties and life of man, by its distribution into eight subdivisions, the enumeration of which conveys to us an accurate idea of the subject of the Ars Medendi amongst the Hindus.

The eight divisions are as follows:—

I. Sâlya (I-tsing's (1) cure of sores).

The art of extracting extraneous substances, grass, earth, bone, &c., accidentally introduced into the human body, and by analogy, the cure of all phlegmonoid tumours and abscesses. Salya means a dart or arrow.

II. Sâlâkya (I-tsing's (2) art of acupuncture).

The treatment of external organic affections or diseases of the eyes, ears, nose, &c. It is derived from Salâkâ, "a thin and sharp instrument," and is borrowed from the generic name of the slender probes and needles used in operation on the parts affected.

[1] A Record of Buddhist Practices, Ch. XXVII, pp. 222-3.

The above two divisions constitute the surgery of modern schools.

III. Kâya-*ḥ*ikitsâ (I-tsing's (3) treatment of the diseases of the body).

The application of the Ars Medendi (*Ḥ*ikitsâ) to the body in General (Kâya). It forms what we mean by the science of medicine.

IV. Bhûta-vidyâ (I-tsing's (4) treatment of demoniac disease).

The restoration of the faculties from a disorganised state induced by demoniacal possession. The art vanished before the diffusion of knowledge, but it formed a very important branch of medical practice through all the schools, Greek, Arabic, or European.

V. Kaumâra-bh*ri*tya (I-tsing's (6) treatment of the diseases of children).

The care of infancy, comprehending not only the management of children from their birth, but the treatment of irregular lactic secretion, and puerperal disorders in mothers and nurses.

VI. Agada (I-tsing's (5) Agada medicine).

The administration of antidotes—a subject which, as far as it rests upon scientific principles, is blended with our medicine and surgery.

VII. Râsâyana (I-tsing's (7) application of the means of lengthening one's life).

Chemistry, or more correctly alchemy as the chief end of the chemical combinations it describes, and which are mostly

metallurgie, is the discovery of the universal medicine—the elixir that was to render health permanent, and life perpetual.

VIII. Vâǵîkaraṇa (I-tsing's (8) methods of invigorating the legs and body).

Promotion of the increase of the human race—an illusory research, which, as well as the preceding, is not without its parallel in ancient and modern times.'

Prof. Wilson further remarks:—'We have, therefore, included in these branches all the real and fanciful pursuits of physicians of every time and place. Suśruta, however, confines his own work to the classes *Śâlya* and *Śâlâkya* or surgery; although, by an arrangement not uncommon with our own writers, he introduces occasionally the treatment of general diseases and the management of women and children when discussing those topics to which they bear relation.' (See Wilson's Works, vol. iii, p. 276.)"

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