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I.

STUDIES IN ANCIENT INDIAN MEDICINE.

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II. ON SOME OBSCURE ANATOMICAL TERMS.

(Continued from the *Journal*, 1906, p. 941.)

(3) *Skandha*.

IT has already been stated (*ante*, p. 918, Oct. 1906) that *skandha*, in the plural number, denotes the cervical vertebræ (not the shoulders). To the examples there given the following may be added:—

In the Atharva Veda, vi, 135, verse 1, we read:

XXVII. *Skandhān = amuṣya śātayan = Vṛtrasy = eva Śacīpatiḥ*.

That is, Severing the cervical vertebræ (i.e. the neck) of him yonder, as Śacīpati (or Indra, cut off the neck) of Vṛtra.

The passage refers to the well-known story of Indra decapitating the demon Vṛtra; and, therefore, it cannot be translated, as done by Griffith, 'rending the shoulders.' Whitney (vol. ii, p. 382) also translated 'cutting to pieces the shoulders,' but he rightly explains, "*skandha*, shoulder, is always plural, and so is not precisely equivalent to the word used to render it." *Skandhāḥ* (plural) are the cervical vertebræ, and these make up the cervical column or *skandhaḥ* (singular).

Again, in Atharva Veda, xii, 5, clause 67, we find :

XXVIII. *Pra skandhān=pra śīro jāhi.*

That is, Strike off the cervical vertebræ (i.e. the neck), off the head.

(4) *Uṣṇihā*, same as *skandha*.

Two passages, bearing on the word *uṣṇihā*, have already been quoted, Nos. V and VI (p. 917, Oct. 1906). Two others may be here given.

Atharva Veda, ix, 8, verse 21, has :

XXIX. *Anūkād=arṣaṇīr=uṣṇihābhyah śīrṣṇo rogam=anīnaśam.*

That is, From the truncal vertebræ the piercing pains, from the cervical vertebræ, from the head the disease I have removed.

In this case, however, the Pāippalāda Recension has a rather different reading, which is mentioned by Professor Lanman in his edition of Whitney's Translation, vol. ii, p. 551, and which is discussed below (p. 16).

Again, Atharva Veda, x, 10, verse 20, has :

XXX. *Āsnas=te gāthā abhavan=n=uṣṇihābhyo balaṁ vaśe |*

That is, From thy mouth the gāthās came, from thy cervical vertebræ (or neck) strength, O Cow !

Here Whitney's Translation, vol. ii, p. 607, has 'nape-bones' for *uṣṇihābhyo*, by which term, I presume, the cervical vertebræ are indicated. With respect to the connection, in this passage, of the idea of strength with the cervical column, the passage, already quoted, No. VII (p. 918, Oct. 1906), may be compared, in which the same idea is expressed by *virya*.

(5) *Prṣṭi* or *prṣṭi*.

In the dictionaries *prṣṭi* (or *prṣṭi*) is said to mean a rib. They also have a homonymous word *prṣṭi*, meaning the back (= *prṣṭha*). As a fact, I believe, there exists only a single word *prṣṭi* (or *prṣṭi*), which means primarily the

transverse process (or lateral projection) of a vertebra (see *ante*, p. 918, Oct. 1906, under No. VII), and secondarily the truncal part of the vertebral column (spine, backbone) and hence the back. In his translation of the *Śatapatha Brāhmaṇa* (Sacred Books of the East, vol. xlv, p. 164, footnote 2), Professor Eggeling suspects the truth; for though always translating *prṣṭi* by 'rib,' he says that "it is by no means clear that there is no distinction between the two terms," namely, between *parśu* and *prṣṭi*. So also Whitney, in his *Translation of the Atharva Veda*, vol. i, p. 548, says, "the distinction between *prṣṭi* and *parśu* is not clear," and though usually rendering *prṣṭi* by 'rib,' he twice translates it by 'side-bones.' Examining the two words, however, with the help of a skeleton, it is not so very difficult to see the distinction. They denote two entirely different parts of the body: *parśu* denotes a rib (side-bone of the breast), but *prṣṭi*, the transverse process (side-bone) of a vertebra, and hence the vertebra itself. The word is always used in the plural, because the truncal portion of the spinal column consists of seventeen vertebræ with thirty-four transverse processes; and hence the word, in the plural, practically comes to mean the vertebral column, or simply the back.

It is a rare word. So far as I know, it never occurs outside the Vedic literature. In the R̥gveda it occurs twice; in the Atharva Veda, seventeen times. But while there is not a single passage in which the word may not mean a vertebra quite as well as a rib, there are some passages in which it cannot mean a rib. For example, Atharva Veda, ix, 7, clauses 5 and 6:

XXXI. *Br̥haspatiḥ kakud, br̥hatī kīkasāḥ, devānām patnīḥ
pr̥ṣṭaya, upasadaḥ parśavaḥ.*

That is, Bṛhaspati is the hump, the br̥hatīs are the bodies of the vertebræ, the consorts of the Devas are the transverse processes of the vertebræ, the attendant worshippers are the ribs.

Griffith's translation (i, 454) has here: "The consorts of the gods are the ribs, the attendants are the ribs." But

it must be obvious that in this connection the two words *prṣṭi* and *parśu* cannot have the same meaning. In Whitney's translation (ii, 548) a distinction is indicated by the renderings 'side-bones' and 'ribs.' The enumeration follows exactly the anatomy of the bull's body. Topmost and median comes the hump; under the median comes the body of the spine; next, on either of its sides, the transverse processes of the vertebræ; still farther, on either side, come the ribs.

An exactly similar case we have in Atharva Veda, x, 9, verse 20, quoted above (No. II, p. 917, Oct. 1906), where also we find *prṣṭi*, backbones, mentioned by the side of *parśu*, ribs. Whitney, here again (ii, 604), translates 'side-bones.'

Again, in Atharva Veda, xii, 1, verse 34, we read :

XXXII. *Yac=chayāṇaḥ paryāvarte dakṣiṇaṁ savyam=abhi, Bhūme, pārśvam | uttānās=tvā pratīcīm yat=prṣṭībhir=adhiśemahe ||*

That is, When, as I lie, I turn upon my right side (or) my left, O Earth; when lying supinely in sleep on our back against thee, (do not injure us!).

Obviously, one does not lie supinely on the ribs, but only on the back.

Again, Atharva Veda, xviii, 4, verse 10, runs thus :

XXXIII. *Yūyam = Agne śantamābhīs = tanūbhir = ījānam = abhi lokam svargam | aśvā bhūtva prṣṭi-vāho vahātha yatra devaiḥ sadha mādaṁ madanti ||*

That is, Do ye, O Fire, with your most kindly forms, turned into horses, carry on your backs the sacrificer to the heavenly world where with the Devas together they revel in revelry.

Obviously, a horse does not carry the rider on his ribs, but on his back. *Prṣṭi-vāha* means literally 'back-carrier,' or, as Whitney (ii, 874, though with a query), 'back-carrying horses.'

There is also the passage from the Śatapatha Brāhmaṇa, quoted above (No. XI, p. 923, Oct. 1906). In it the two

retahsieh bricks, one on either side of the median line of the lowermost layer of the altar, are said to represent the *prṣṭi*, that is, the transverse processes on either side of the bones composing the vertebral column. That the transverse processes are meant is shown by their position relative to the breast-bones. The latter lie in the median line of the uppermost layer of bricks; and exactly below them lies the spinal column.

Again, Rīg Veda, x, 87, 10 (identical with Atharva Veda, viii, 3, 10), has :

XXXIV. *Tasy = Agne, prṣṭir = harasā śṛṇāhi.*

That is, O Agni, his spine with thy flame consume !

On this Sāyana, in his commentary, remarks, *prṣṭih pārśva-sthān=rakṣasān*, i.e., the *prṣṭi* are the Rakṣasas that stand on either side (of the devotee). In giving this explanation Sāyana may have been, and probably was, thinking of the ribs; but not necessarily, for it fits the transverse processes of the vertebræ quite as well (cf. quotation No. XXXI). But in any case, Sāyana's date (c. 1350 A.D.) is much too late to give any weight to his interpretation of an obscure anatomical term. In his time anatomical knowledge was practically defunct, even in the medical schools.

Probably both *parśu* and *prṣṭi* have the same etymological meaning, 'side-piece' (from root *sprś* ?); but while *parśu* denotes the side-pieces of the thorax, that is the ribs, *prṣṭi* signifies the side-pieces of the vertebræ, that is the transverse processes, and hence comes to mean the back (Professor Ludwig translates Rücken), i.e. the spine or vertebral column. But even in the latter sense *prṣṭi* is always used in the plural number, and thereby betrays its original meaning. The point particularly to observe, however, is that the transverse processes of the vertebræ were noticed already in Vedic times, and a particular term, *prṣṭi*, coined to denote them. So far as the thorax is concerned, therefore, the Vedic term *prṣṭi* corresponds to the medical term *sthāla*, or socket of the ribs, while the term *parśu* corresponds to the medical term

pārśvaka or *parśuka*. The rib is furnished with a 'tubercle' which articulates with a facet in the transverse process of the corresponding thoracic vertebra. In the anatomical system of Charaka (representing that of Ātreya), the 'shaft' of the rib is called *pārśvaka* or *parśuka*, the 'tubercle' is called *arbuda*, and the transverse process with its facet is called *sthālaka*, or socket.

(6) *Kikasā*.

In Sir M. Monier-Williams' Dictionary (2nd ed.) *kikasa*, masc., is said to mean 'the breast-bone and the cartilages connected with it' (i.e. the sternum and costal cartilages); *kikasā*, fem., vertebra or rib; and *kikasa*, neut., a bone, also vertebra or rib. The St. Petersburg Dictionary has, masc. vertebral column; fem., vertebra; neut., bone. Indian Sanskrit dictionaries (*koṣa*) appear to know the word only as a neuter noun, and assign to it the meaning of bone (*asthi*); see, e.g., Halāyudha's *Abhidhānaratnamālā* (ed. Aufrecht), iii, 10, and Hemachandra's *Abhidhānacintāmaṇi* (ed. Böhtlingk and Rieu), verse 626 (p. 114). I have once met with it denoting the 'aggregate of bones,' skeleton (*asthi-saṁgraha*). In the *Śārīra-padmīnī*, a small work on Anatomy, by Bhāskara Bhaṭṭa, the osteological summary is introduced by the statement *kikasam trisata-saṁkhyam*, i.e. 'the skeleton numbers three hundred (bones).'¹

The true meaning of *kikasā*, fem., may be seen from the quotation No. XXXI (*ante*, p. 3). The word denotes the vertebra, irrespective of its transverse processes, that is, the 'body' of the vertebra. It is always used in the plural number; and, being thus used, it signifies the column of vertebræ. Whether the transverse processes of the vertebræ are or are not included, depends on the context. In the passage just referred to (No. XXXI) they are not included, for they are specially mentioned by the term *prṣṭi*. The same is the case in Atharva Veda, ix, 8, verses 14, 15:

¹ From a manuscript in the possession of Dr. P. Cordier, and kindly communicated to me by him.

XXXV. *Yā hrdayam = uparṣanty = anutanvanti kīkasāḥ | yā pārśve uparṣanty = anumikṣanti prṣṭiḥ | (ahims°).*

That is, (The ills) that penetrate into the heart, (and) extend onward to the vertebræ; that penetrate both sides and press onward to the transverse processes (of the vertebræ), (let them depart, etc.).

The heart, as Hemachandra's *Abhidhāna Cintāmaṇi* (verse 603) says, lies *stan-āntaram*, or in the midst between the two breasts, that is, between the two *pārśva* or rib-pieces (hence *pārśvaka*, a rib). To the heart and the two rib-pieces, one on either side, in front, correspond, at the back, the 'body' of the vertebral column and its transverse processes. The disease is represented as penetrating the heart and ribs and passing onward through the body to the vertebral column and its transverse processes, that is, as thoroughly permeating the body.

Although *kīkasāḥ* (plur.) is the name of the whole vertebral column, it may, in any particular case, be limited to some particular portion of it. Thus, in the passage No. IV (*ante*, p. 917, Oct. 1906) it is limited to the uppermost or cervical portion of the vertebral column, because there it is contrasted with the anterior cervical cartilages (windpipe). On the other hand, in the passages Nos. VI and XI (*ante*, pp. 917, 923, Oct. 1906), it is limited to the middle, or thoracic, portion of the spine, because it is contrasted with the lumbar vertebræ and the costal cartilages respectively.

(7) *Anūka* or *Anūkya*.

It is generally admitted that the word *anūka* or *anūkya* denotes the backbone or the vertebral column. With this meaning, for example, we have it in Atharva Veda, iv, 14, verse 8:

XXXVI. *Ūrdhvāyām diśy = ajasy = ānūkām dhehi, diśi dhruvāyām dhehi pājasyam |*

That is, In the upward direction lay the goat's backbone, in the downward direction lay his belly.

However, as in the case of *kikasā*, in any particular instance, the application of *anūka* may be limited to some particular portion of the vertebral column. Thus in the quotation No. XXIX (*ante*, p. 2) *anūka* refers to the spine of the trunk, as contrasted with the spine of the neck. On the other hand, in the passage No. VI, *anūkyā* (p. 917, Oct. 1906) refers to the lumbar portion of the spine as contrasted with its thoracic portion. Just the reverse is the case in Śatapatha Brāhmaṇa, xii, 2, 4, clauses 12 and 14:

XXXVII. *Udaram=ekaviṁśaḥ | viṁśatir=vā antar=udare kuntāpāny=udaram=ekaviṁśam ; tasmād=udaram=ekaviṁśaḥ || Anūkaṁ trayastrīṁśaḥ | dvātrīṁśad=vā etasya karūkarāṇy=anūkaṁ trayastrīṁśam ; tasmād=anūkaṁ trayastrīṁśaḥ ||*

That is, The abdominal (or lumbar) portion of the spine is the 21-versed hymn-form. For within the abdomen there are twenty transverse processes (*kuntāpa*), and the 'body' of the abdominal portion of the spine (*udara*) is the twenty-first. Therefore, the abdominal portion of the spine is the 21-versed hymn-form. The thoracic portion of the spine is the 33-versed hymn-form. For there are thirty-two transverse processes (*karūkara*) in it, and the body of the thoracic portion (*anūka*) of the spine is the thirty-third. Therefore, the thoracic portion of the spine is the 33-versed hymn-form.

Here, clearly, *anūka* refers to the thoracic portion of the spine as contrasted with the abdominal, or lumbar, portion of it. Moreover, it is to be observed that both terms, *anūka* and *udara*, are here employed to denote the body of the vertical column, as distinct from its transverse processes. In this respect their use is similar to that of *kikasā* above explained.

Another point to observe, with respect to this passage, is a curious anatomical coincidence. The lumbar spine (*udara*) is said to comprise twenty, and the thoracic (*anūka*) thirty-two transverse processes. As there are two transverse processes to each vertebra, we have ten *plus* sixteen or a total of twenty-six vertebræ for the two portions of the truncal spine. This happens to be the correct total

number of the vertebræ in the entire spine, inclusive of the neck. According to modern anatomy there are altogether 26 vertebræ: 7 cervical, 12 thoracic, 5 lumbar, and 2 false (the sacrum and coccyx).

In this connection it remains to notice a very instructive phrase. In the Atharva Veda, xi, 3, clause 9, there occurs the simile *iṣe anūkye*, i.e. the two car-shafts are the two transverse processes of a vertebra. Here the word *iṣe* is in the dual number, and refers to the double pole or furcated shaft of a car; and this is well compared to a vertebra with its transverse processes, projecting, one on either side, outwards and backwards. Moreover, this phrase shows that *anūkyā* may denote, not only the whole vertebral column, or a single vertebra, but also a transverse process. In this respect it is a synonym of *prṣṭi*.

(8) *Karūkara*.

The dictionaries explain *karūkara* to mean either 'the vertebræ of the neck and spine' (St. Pet. Dict.) or 'the joint of the neck and backbone' (M.-Will. Dict.). The latter alternative is impossible, for *karūkara* is mostly used in the plural, and there is no more than one 'joint of the neck and backbone.' Whitney's *Translation of the Atharva Veda*, vol. ii, p. 652, suggests the meaning of 'a point or spinous process of a vertebra.' This is nearer the truth, but the word really denotes the two transverse processes of a vertebra, as may be seen quite clearly from the two passages, Nos. VII and XXXVII, already quoted (p. 918, Oct. 1906, and p. 8 *supra*).

The word *karūkara*, however, when used in the singular, may also denote the whole vertebral column. Used in this way it occurs in Atharva Veda, xi, 9, verse 8:

XXXVIII. *Saṁkarṣantī karūkaraṁ manasā putram = icchantī* |

That is (as Professor Bloomfield correctly translates in his *Hymns of the Atharva Veda*, Sacred Books of the East, vol. xlii, p. 124), She curves her spine while longing in her heart for her son.

(9) *Kuntāpa*.

The dictionaries explain the word *kuntāpa* to mean 'certain organs or glands in the belly.' But this meaning is impossible, for the passage in which it occurs clearly indicates some bony structure. The true meaning has been already suggested by Professor Eggeling in his *Translation of the Śathapatha Brāhmaṇa* (Sacred Books of the East, vol. xlv, p. 164, footnote 1). The passage referred to has been quoted above (p. 8), No. XXXVII. It clearly shows that *kuntāpa* denotes the transverse processes of a vertebra.

(10) *Uchlakha, kakāṭikā, kaphoḍa, kusindha, pratiṣṭhā, stana*.

All these six items occur in the earlier portion of the hymn on the wondrous creation of man, Atharva Veda, x, 2, verses 1-8, of which one verse has already been quoted, No. I (*ante*, p. 916, Oct. 1906). These earlier verses treat of the bony frame, the skeleton, of the human body, enumerating the bones in regular order from the foot upwards. They run as follows :—

- XXXIX. (1) *Kena pārṣṇī ābhṛte pūruṣasya, kena māṁsam sambhṛtaṁ, kena gulphau |*
ken = āṅgulīḥ peśanīḥ, kena khāni, ken = ochlakhaṁ madhyataḥ,
kaḥ pratiṣṭhām ||
- (2) *kasmān = nu gulphāv = adharāv = akrṇvan = n = aṣṭhīvantāv = uttarau*
pūruṣasya |
jāṅghe nirṛtya nyadadhuh kva svij, jānunoḥ sandhī ka u tac =
ciketa ||
- (3) *catuṣṭayam yuyjate saṁhit-āntam, jānubhyām = ūrdhvaṁ śithirām*
kabandham |
śronī yad = ūrū ka u taj = jāṇā yābhyām kusindham su-drḍham
babhūva ||
- (4) *kati devāḥ katame ta ūsanya uro grīvās = cikyuh pūruṣasya |*
kati stanau vyadadhuh, kaḥ kaphoḍau, kati skandhān, kati
prṣṭīr = acinvan ||
- (5) *ko asya bāhū samabharad = "vīryam karavād" = iti |*
aṁsau ko asya tad = devaḥ kusindhe adhyādadhau ||

- (6) *kaḥ sapta khāni vi tatarda śīrṣaṇi, karṇāv=imau nāsike-
cakaṣaṇī mukham |*
*yeśāṁ purutrā vijayasya mahmani catuṣpādo dvipado yānti
yāmam ||*
- (7) *hanvor = hi jihvām = adadhāt, purūcīm = adhā mahīm = adhi
śīrṣāya vācam |*
sa ā varivarti bhuvaneṣv=antar=apo vasānah, ka u tac=ciketa ||
- (8) *mastiṣkam = asya yatamo lalāṭam kakāṭikām prathamam yaḥ
kapālam |*
*citvā cityaṁ hanvoḥ pūruṣasya divaṁ ruroha, katamaḥ sa
devaḥ ||*

This may be translated as follows:—

- (1) By whom were fixed the two heels (*pārṣṇī*) of man? by whom was the flesh (*māṁsa*) constructed? by whom the two ankle-bones (*gulpha*)? by whom the slender digits (*aṅgulī*)? by whom the apertures (*kha*)? by whom the two metatarsi (*uchlakha*) in the middle? who (made) the tarsus (*pratiṣṭhā*)?
- (2) How, indeed, did they (the devas) make the two ankle-bones (*gulpha*) of man below, and the two kneecaps (*aṣṭhīvāt*) above? the two legs (*jāṅghā*), furthermore—how, pray, did they insert them; and the two knee-joints (*jānu-sandhi*)—who conceived them?
- (3) A four-sided frame (*catuṣṭaya*) is formed by their ends being firmly knit together, and, above the two knees (*jānu*),¹ there is the pliant abdomen (*kabandha*). The two hips (*śroni*) and the two thighs (*ūru*) that there are—who has created them, (those props) through which the trunk (*kusindha*) becomes so firmly set up?
- (4) How many devas, and who among them, contributed to build up the breast-bone (*uras*)² and the cervical cartilages (*grīvā*) of man? How many disposed the two breast-pieces (*stana*); who, the two shoulder-blades (*kaphodā*)? How many piled up the neck-bones (*skandha*); how many, the back-bones (*prṣṭhī*)?

¹ One here expects a word for 'lower limb' (*sakthī*), and perhaps *jānu* may be a false reading; or the knee, being in the middle of the lower limb, is chosen to represent the whole of it.

² The sternum consists of three parts: *manubrium*, *gladiolus*, and *ensiform process*, of which the first part remains separate through life. Hence 'to build up.'

- (5) Who constructed the two arms (*bāhu*) of his for the exertion of strength?¹ Which deva hoisted the two collarbones (*aṃsa*) on his trunk (*kusindha*)?
- (6) Who pierced the seven apertures (*kha*) in the head; the two ears (*karṇa*), two nostrils (*nāsikā*), two eyes (*cakṣan*), the mouth (*mukha*),—these (organs of sense) in whose surpassing might quadrupeds and bipeds walk their way in all directions?
- (7) For, within the two jaws (*hanu*) he fixed the tongue (*jihvā*), and installed the far-reaching, mighty voice (*vāc*). He (*deva*) wanders through the (three) worlds, he is dwelling in the waters, but who (among the devas) conceived it?
- (8) Whoever first constructed that brain of his (*mastiṣka*), the brow (*lalāṭa*), the facial bone (*kakāṭika*), the cranium (*kapāla*), and the structure of the two jaws (*hanu-citya*), and, having done so, ascended to heaven, who of the many devas was he?

The significance of these verses comes out very clearly when they are compared with the osteological statements in the textbooks (*saṃhitā*) of Charaka, *Śārīra Sthāna*, iv, 7 (Jiv. ed., p. 370), and Suśruta, *Śārīra Sthāna*, iii, 5, clause 16 (Jiv. ed., p. 331). The three systems are shown in the subjoined conspectus :—

¹ Literally: saying “may it exert strength.” This brief reference to the arms implies that what has been said in verses 1–3 with reference to the lower limbs applies, *mutatis mutandis*, also to the upper limbs.

	ATHARVA VEDA.	CHARAKA.	SUŚRUTA.
1	<i>pārṣṇi</i> , heel	<i>pārṣṇi</i>	<i>pārṣṇi</i> .
2	<i>gulpha</i> , ankle-bone	<i>gulpha</i> and <i>maṇika</i>	<i>gulpha</i> .
3	<i>aṅgulī</i> , digit	<i>aṅgulī</i> (with <i>nakha</i>)	<i>aṅgulī</i> .
4	<i>uchlakha</i> , metatarsus	<i>śalākā</i>	<i>tala</i> .
5	<i>pratiṣṭhā</i> , tarsus	<i>adhiṣṭhāna</i> (or <i>sthāna</i>)	<i>kūrca</i> .
6	<i>janghā</i> , leg	<i>janghā</i> (and <i>aratni</i>)	<i>janghā</i> .
7	<i>aṣṭhīvat</i> , or <i>jānu</i> , kneecap	<i>jānu</i> (and <i>kapālika</i>)	<i>jānu</i> .
8	<i>ūru</i> , thigh	<i>ūru-nalaka</i> (and <i>bāhu-n.</i>)	<i>ūru</i> .
9	<i>śroni</i> , hip	<i>śroni-phalaka</i> , <i>bhaga</i>	<i>śroni</i> , <i>bhaga</i> , <i>guda</i> .
10	<i>uras</i> , breast-bone	<i>uras</i>	<i>uras</i>
11	<i>grīvā</i> , windpipe	<i>jatru</i>	<i>kaṇṭhamāḍī</i> .
12	<i>stana</i> , ribs	<i>pārśvaka</i>	<i>pārśva</i> .
13	<i>kaphoḍa</i> , shoulder-blade	<i>aṁsa-phalaka</i>	<i>aṁsa-ja</i> .
14	<i>skandha</i> , neck	<i>grīvā</i>	<i>grīvā</i> .
15	<i>prṣṭi</i> , backbone	<i>prṣṭha</i>	<i>prṣṭha</i> .
16	<i>aṁsa</i> , collarbone	<i>akṣaka</i> (or <i>aṁsa</i>)	<i>akṣaka</i> (or <i>aṁsa</i>).
17	<i>lalāṭa</i> , brow	<i>nāsikā-gaṇḍakūṭa-lalāṭa</i>	{ <i>nāsā</i> , <i>gaṇḍa</i> , <i>akṣikūṭa</i> , <i>karna</i> .
18	<i>śukāṭikā</i> , facial bone		
19	<i>kapāla</i> , cranium	<i>kapāla</i> with <i>śaṅkha</i>	<i>kapāla</i> with <i>śaṅkha</i> .
20	<i>hanu-citya</i> , structure of jaws	{ <i>danta</i> , teeth <i>dantolūkhala</i> , socket <i>tālūṣaka</i> , palate <i>hanu-asthi</i> , jawbone <i>hanu-mūla-bandhana</i> (tie- bone of jaw)	<i>danta</i> . <i>tālu</i> , palate. <i>hanu</i> , jawbone.

It would take me too far to enter into a detailed comparison of each item; that will be found in my forthcoming monograph on the Osteology of the Ancient Indians. What chiefly concerns us here is to observe, first, that all three statements enumerate the bones of the skeleton in the same

regular order, beginning with the extremities, and going on to the trunk, and finally to the head; secondly, that while Charaka enumerates the bones of the lower and upper extremities separately (see table, Nos. 2, 6, 7, 8), Suśruta enumerates only those of the lower extremities, adding the remark that the same count applies to the upper extremities. In this respect the Atharva Veda agrees with Suśruta; see footnote to verse 5.

In the translations hitherto offered several of the anatomical terms have been much misunderstood. If, however, we carefully follow the order in which the terms occur in the hymn and the bones in the skeleton respectively, it becomes much easier to assign the terms to the bones. Thus, in the first verse the term *pratiṣṭhā* obviously corresponds to what Charaka calls *adhiṣṭhāna*, the tarsus, the pedestal, or base, on which the long bones of the foot, the metatarsals, are fixed. *Pratiṣṭhā* is not the pedestal of the body, but, as Charaka explicitly states, the base of the metatarsals (*śalākā*, *uchlakha*). Suśruta, it may be noted, calls the same organ *kūrca*, cluster, because the tarsus consists of a cluster of seven small bones. In the middle (*madhyataḥ*) between the tarsus (*pratiṣṭhā*) and the digits (*aṅgulī*) come the long bones of the foot, or the metatarsals. In the Atharva Veda (verse 1) the metatarsus (or aggregate of metatarsals) is called *uchlakha*. Suśruta calls the same organ *tala*. Charaka, on the other hand, speaks of the five metatarsals (distributively) as the five *śalākā*, or splints. The term *uchlakha* is a ἄπαξ λεγόμενον. Might it not be a false reading, and somehow connected with *śalākā*?

In the third verse, *kusindha*, as the context shows, refers to the trunk (see also verse 5). The term *catuṣṭaya*, or quaternion, refers to the four-sided frame, formed by the tibia and fibula of the leg, connected by the knee-joint above and the ankle-joint below.

In the fourth verse, *grīvā*, as already explained in Section 1 (*ante*, p. 916, Oct. 1906), refers to the windpipe. *Stana*, as the context shows, refers not so much to the breast in the narrower sense of the mammary gland, teat (so Whitney, p. 568), as in

the wider sense of breast-piece, rib-piece : it is synonymous with *pārśva*, *pārśvaka* of Charaka and Suśruta, and denotes the ribs. The two terms *skandha* and *prṣṭi* have already been explained ; see Sections 3 and 5 (*ante*, pp. 1, 2). The term *kaphoḍa* has been misunderstood altogether. Whitney (p. 568) and Ludwig translate it with 'collarbone' ; and Griffith and Muir give it the meaning 'elbow,' which is assigned to it by the St. Petersburg Dictionary and the Dictionary of Sir M. Monier-Williams. Neither of these meanings suits the context. The upper portion of the trunk comprises the following bones: (1) the ribs, (2) the sternum, (3) the thoracic vertebræ, (4) the clavicles, (5) the scapulæ. These five items are enumerated in verses 4 and 5 : *stanau* are the two rib-pieces, *uras* is the sternum, *prṣṭih* are the vertebræ, *aṁsau* are the two clavicles (see the definition of *aṁsa* under No. VIII, *ante*, p. 920, Oct. 1906). Hence the only term that remains to signify the two scapulæ is *kaphoḍau*. For *bāhū*, of course, signifies the two arms ; and *skandhān* and *grīvāh*, both of which are in the plural number, cannot denote the two scapulæ, but signify the back and the front of the neck, or the cervical vertebræ and the cervical cartilages respectively (as already explained under Nos. I-VII, *ante*, pp. 916-918, Oct. 1906).

In the sixth and seventh verses the seven orifices are considered from two points of view. They are primarily openings in the bony structure of the skull ; but, as such, they also functionate as organs of sense and speech. The second half of the seventh verse is rather obscure. It probably refers to the creating deva : the devas pervade the three worlds, they dwell in the seas, but who among them is it that designed the wondrous organs of sense and speech ? Or, it might also refer to man : though he wander, for enlightenment, through the worlds (sky, earth, and nether world) and the sea, yet how can he understand the working of those organs ?

The eighth verse refers to the skull, and enumerates its bones in agreement with the system of Charaka rather than with that of Suśruta. The former assumes the existence of a central facial bone, below which is a complicated

structure of jawbones, and above which are the cranial bones.¹ The cranium is denoted by *kapāla*, and the structure of jawbones by *hanvoḥ citya*. In the system of Charaka the central facial bone is denoted by *nāsikā-gaṇḍakūṭa-lalātam asthi*, that is, the bone which comprises the bones of the nose, the cheeks, and the brow. In the Atharvic system the central facial bone is enumerated in two portions: *lalāṭa*, brow, which forms the upper, and *kakāṭikā*, nose and cheek (nasal and malar bones), which forms the lower portion.

(11) *Bhamsas*.

In addition to the hymn discussed in the preceding Section, the Atharvic system of the skeleton is found very briefly stated in a single verse. This is Atharva Veda, ix, 8, verse 21, which, in the edition of Roth and Whitney, runs as follows:—

XL. *Pādābhyām te jānubhyām śronibhyām pari bhamsasah |
anūkād=arṣaṇīr=uṣṇihābhyah śīrṣṇo rogam=anīnaśam ||*

In the Pāippalāda Recension, however, the verse has a much fuller form. As stated in Professor Lanman's edition of Whitney's *Translation* (p. 551), it runs as follows:—

*Pādābhyām te gulphābhyām jaṅghābhyām jānubhyām=urubhyām
śronibhyām pari bhamsasah | anūkyād=arṣaṇīr=uṣṇihābhyah
grīvābhyas=skandhebhyas=śīrṣṇo rogam=anīnaśam ||*

This may be translated thus:—

Forth from thy two feet, two ankle-bones, two leg-bones, two kneecaps, two thigh-bones, two hip-bones, from the pubic bone, the spine, [the piercing pains, from the neck-bones], the cervical cartilages (windpipe), the cervical vertebræ (nape), the skull, the disease I have caused to disappear.

The list of bones is complete, and observes the regular order but for, on the one hand, the omission of the breast-bone, the collarbones, and the shoulder-blades, and, on the

¹ For details, see my monograph on the Osteology of the Ancient Indians.

other, the duplication of the neck-bones. In their proper order, the omitted bones should be enumerated between the spine and the neck. It is precisely here that we find the two terms *arṣaṇī* and *uṣṇihā* (enclosed in angular brackets in the translation), to both of which there are objections: *arṣaṇī* (piercing pains), as Professor Lanman points out, "spoils the metre"; it is also redundant by the side of *roga* (disease). *Uṣṇihā*, likewise, is redundant by the side of *skandha*; for both (in the plural) mean the same thing, cervical vertebræ (see *ante*, Sections 3 and 4, pp. 1, 2). It would appear, therefore, that neither of the two recensions is quite correct.

With regard to the term *bhāṁsas*, the dictionaries (St. Petersburg and Monier-Williams) say that it denotes "a particular part of the intestines or abdomen." Whitney translates it with 'buttock' or 'fundament.' To this there are several objections: (1) the context requires the name of a bone, not of a vessel or a muscle; (2) the word is used always in the singular number, while a word meaning 'buttocks' would be in the dual; (3) the translation 'the two hips and buttock' would indicate practically the same region of the body, while the context obviously enumerates distinct regions. The word *bhāṁsas* is of very rare occurrence, but whenever it occurs it points to a bone in the private parts; and in my opinion there can be no doubt that it denotes what the osteological summaries of Charaka and Suśruta call *bhagāsthī* or *bhaga*, i.e. the pubic bone (rather the pubic arch, made by the ossa pubis). Regarding it Charaka says, *ekam bhag-āsthī*, i.e. there is a single pubic bone: hence the singular number of *bhāṁsas*.

Two other examples of the occurrence of the word *bhāṁsas* are the following. Atharva Veda, ii, 35, verse 5, says:

XLI. *Yakṣmaṁ bhasadyam śronibhyām [bhāsadam¹] bhāṁsaso vi vrhāmi te |*

That is, The tabes of the hypogastric, or pubic, region from the two hips as well as from the pubic part, I eject for thee.

¹ *Bhāsadam* is a gloss to explain *bhāṁsaso*.

Like *bhaga*, so *bhamsas* comes to mean, in a narrower sense, the female external organs of generation (vulva). Thus, in a charm for the protection of a pregnant woman, we read in the Atharva Veda, viii, 6, verse 5 :

XLII. *Arāyān=azyā muṣkābhyām bhamsaso 'pa hanmasi |*

That is, The evil spirits from the two labia of hers, from her vulval cleft, we smite away.

With regard to verse No. XI, the reading of which is imperfectly transmitted, I would venture to suggest that for *bhamsasah*, pubic bone, *vakṣasah*, breast-bone, may have to be read. In that case, instead of the two words *aṛṣaṇīh* and *uṣṇihābhyah*, two terms denoting the collarbones and shoulder-blades (say, *akṣābhyām=amsothābhyām*, or such like) would come in. *Vakṣas* would come in its proper place. *Bhaga* is, by Suśruta, included among the five bones of the pelvic girdle (*śroni*, Jīv. ed., p. 331). *Bhamsas*, therefore, might be omitted, as being included in *śronibhyām*.

Erratum : On p. 938 (Oct. 1906), l. 12, for “peak of the shoulder” read “nape of the neck.”