

## NEUROLOGY IN ANCIENT INDIA—SOME EVIDENCES

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Dating from the Vedic era ancient yogic teaching makes substantial contribution to understanding of structure and functions of human nervous system, which closely tallies with known facts of modern neurology.

Selecting relevant verses from different ancient and medieval sanskrit texts and giving their precise literal translations, this paper compares them with diagrams borrowed and adapted from modern text books by well known western authors.

It is found that the ancient verses contain deep and accurate descriptions covering wide areas of human neurology as we know it today.

Yogic neurology has so far been described as mysterious and mythical by most scholars. It is proved here, that Yoga deals with the physiologic anatomy of human nervous system in all its width and depth and there is nothing mystical about this master-achievement of ancient Indians.

### INTRODUCTION

We are told that the ancient civilizations of the world knew nothing about human neurology (Gray's *Anatomy* 1973). The entire credit for starting scientific medicine upon its course and for providing the basic elements of anatomy-physiology goes to the ancient Greeks (Singer and Underwood 1962, see chart II).

A study of ancient Indian literature reveals that the facts are different.

### THE AVAILABLE LITERATURE

*Saubhāgya-Lakṣmī upanīśad* is a part of *Ṛgveda*. It deals with the central neural axis (*suṣumṇā*) and its nerve stations (*cakras*) in its third chapter.

Another text of Vedic era giving detailed description of human nervous structure and functions is *Yoga-Yāgavalkyam*, authored by Ṛṣi Yāgavalkya, the famous seer (Draṣṭā) of *Kṛṣṇa-Yajurveda*.

*Yoga-sikhā-upanīśad* describes the central neural axis as carrier of *prāṇa*-flow. *Prāṇa* is the vedic word meaning motor nerve—impulse. By its etymology *prāṇa* is synonymous with electricity (see Plate 4). Thus, it is proved that the electrical nature of nerve impulse was known to Vedic Indians.

*Kauṣītaki Brāhmaṇa upanīśad* differentiates all motor impulses (*prāṇa*) from all sensory impulses (*prajñā*), while simultaneously stressing it that these two are physically identical though functionally different. This is confirmed by *Śrīmad Bhāgawat* (3/26).

*Ṣaṭ-cakra-nirūpaṇa* written in 1577 during the reign of Mogul King Humayun is perhaps the most comprehensive text on yogic neurology yet available. In a few aphoristic verses it gives the gross and microscopic anatomy of the central neural axis and the choroid plexuses within the cerebral ventricles secreting cerebrospinal fluid. The sympathetic chains are described as separate entity on either side of the vertebral column (*meru*). A grey column with three horns and its central canal is described within a bone-white outer column in the neural axis (*suṣumṇā*), and the woven network of neuronal communication is compared to a spider's web. Further, the word *vidyut* and *taḍit*, both synonyms of electricity have been used nine times in the text to show the nature of nerve-impulse traffic.

After this, the text goes on to describe the core part of yogic neurology, i.e. the six *cakras* and *kuṇḍalinī*. These six nerve stations with their ascending and descending nerve-tracts and reflex pathways perform specific tasks allotted to each.

To understand these concise and aphoristic verses properly, it is necessary to obtain references from other yogic and tantrik texts.

*Kuṇḍalinī*—This chief instrument of *Laya-Yoga* is the supraphysical force which causes the manifestation of human body. It is beyond the jurisdiction of modern science which places total emphasis on the physical. The present author has explained this concept in a separate paper.

This highly advanced neurology was used by ancient Indians for attaining *Yoga-siddhi*. It was not meant for academic advancement, nor was it ever applied to therapeutics. It forms no part of *Āyurveda*. (see Discussion).

In ancient times knowledge was mostly transmitted through the words of mouth. Despite it we have a large number of ancient texts with neurological content available today as shown in Chart I. These texts spreading over a long era of Indian history show a surprising uniformity in their descriptions, which proves that yogic neurology has its base on a sound foundation. This chart is compiled on the basis of *British Encyclopedia—Hinduism. History of*.

Yoga teaching and practice flourished in ancient and medieval India with sprouting of Tantra in the latter era. From the Vedic times onwards there have been countless numbers of *Siddha Yogis*—up to the Muslim invasion and subjugation of the country followed by the British. There are quite a few precious texts on Yoga about which we know today only through the references available in other texts.

Chart I—The presently available ancient texts with neurological accounts

Period and events	Ancient texts with neurological description
<p>Vedic Post-Vedic and ancient era up to 700 A.D.</p> <p>Hindu religion and culture flourished together with Yoga —philosophy and practice Countless Siddha Yogis.</p>	<p>उपनिषदे—</p> <p>ऋग्वेदीय — एतरेय उप० कौशितकीब्राह्मण उप०, सौभाग्यलक्ष्मी उप०, नादविन्दु उप० ।</p> <p>शुक्ल यजुर्वेदीय — ईशावास्य उप०, बृहदारण्यक उप० ।</p> <p>ऋग्वेदीय — श्वेताश्वतर उप०, कठ उप०, मैत्री उप०, तैत्तरेय उप०, ध्यानविन्दु उप०, योग- कुण्डली उप०, योगशिखा उप० ।</p> <p>सामवेदीय — छान्दोग्य उप०, केन उप०, जाबालदर्शन उप०, योगचूडामणि उप० ।</p> <p>अथर्ववेदीय — योग उप०, योगराज उप०, योगतत्व उप०, प्रश्न उप० ।</p> <p>ब्रह्मसूत्र, तत्व समास, योग-याज्ञवल्क्य, योग वशिष्ठ, महाभारत (भगवद्गीता), श्रीमद्भागवत्, पातञ्जल योगसूत्र ।</p>
<p>Medieval era from 701 A.D. to 1800 A.D.</p> <p>Yoga and Tantra flourished. Many famous Yogis. Profuse Tantric literature. Erosion of yoga and religion by Foreign invasion and subjugation.</p>	<p>हृदयामल तंत्र, वामकेश्वर तंत्र, भूतशुद्धि, मातृकाभेद तंत्र, सम्मोहनतंत्र, त्रिपुरासारसमुच्चय, कंकालमालिनीतंत्र, विश्वसारतंत्र, मायातंत्र, शारदातिलक, गन्धर्व मालिका, काली- कुलामृत, शाक्तानन्द तरंगिणी, षष्टितंत्र, सांख्यकारिका, योग- वार्तिक, सांख्यप्रवचनभाष्य, हठयोगप्रदीपिका, धेरण्ड-संहिता, शिवसंहिता, गोरक्ष-संहिता, ज्ञानेश्वरीगीता, श्रीतत्वचिन्तामणि (षट्चक्रनिरूपण) ।</p>

It was towards the later half of the nineteenth century that efforts were made by some princely states and private organisations to save the fast disappearing tantrik texts. In this context Sir John Woodroffe deserves a special mention for publishing his Tantrik Text series in which is included *Ṣaṭ Cakra Nirūpaṇa*.

#### THE PRESENT OBSERVATIONS

In a previous paper (Joshi 1982) it was shown that the relevant features of Human Neurology were well-known to ancient Indians.

The present paper now submits a few evidences for the same. Yogic neurology is a vast domain and only the fringes have been touched on some basic aspects. The core part is not covered.

The tradition of Sanskrit verses is to point epigrams with masterful condensation of thought, in which accurate accounts of neuro-anatomy-physiology are available in the briefest words. For example, the word *prāṇa* (Vedic origin) adequately explains the electrical nature of nerve impulses. (See Plate 8).

#### METHOD AND SOURCE MATERIAL

Verses chosen from different ancient sanskrit texts are cited with their literal translations by the author. To bring out the correct meaning of these aphoristic verses, it has been necessary to observe sharp precision during translation, avoiding allegory, metaphor and mysticism. Where a word has double meaning, or multiple recensions of text are available, the meaning or recension that tallies with scientific neurology has been accepted as correct. This method has brought rich rewards.

Diagrams for comparison have been borrowed and adapted mostly from "Gray's Anatomy"—a modern authority.

#### THE ANCIENT TEXTS

1. *Yoga Yāgavalkyam*—authored by sage Yāgavalkya—the famous seer (*mantradraṣṭā*) of *Kṛṣṇa Yajurveda* fame, text published by Mahārāja of Travancore who saved it from extinction.

2. *Ṣaṭ Cakra Nirūpaṇa*—Authored by Poorṇānand Swāmi in 1577 and original manuscript preserved in Calcutta (See Preface to *Serpent Power*). The text saved from oblivion by Sir John Woodroffe who published it in his Tantric Text series and later translated it to write his *Serpent Power* (1918).

3. *Mahā Kāla Saṃhitā*—Only a small part (*Kāmakalākhaṇḍa*) of the original text is now available that was saved from extinction by Sir Ganga Nath Jha who brought a manuscript copy from Nepal.

4. *Mahā Bhārata*—Edited by Sripada Damodar Satvalekar. The epic needs no introduction.

5. *Śrīmat-Bhāgawat*—Needs no introduction.

6. *Bhāgawat Gītā*—Needs no introduction.



## PLATE 1

**SUṢUMNĀ MEANS NOT THE SPINAL CORD BUT  
THE ENTIRE NEURAL AXIS**

*Meroh madhye nāḍi suṣumṇā, kanda madhyāt śirasthā.  
S. Ni-1.*

*Pr̥ṣṭha madhye sthitā yā tu sā hi mūrdhni vyavasthitā.  
Yo. yā and R.yā 27/5/52.*

*Suṣumṇā nāḍi* lies inside the spine extends from the mid-perineum to the inside of cranium. The one that lies inside the backbone, the same (*Suṣumṇā*) reaches inside the cranium.

*Suṣumṇā pr̥ṣṭhavamsākhyā viṇādaṇḍasya madhyagā.  
Mūrdhni brahma randhrāntā nāsāgrāt dvādaśāṅgulam.  
Bhāvopaniṣad.*

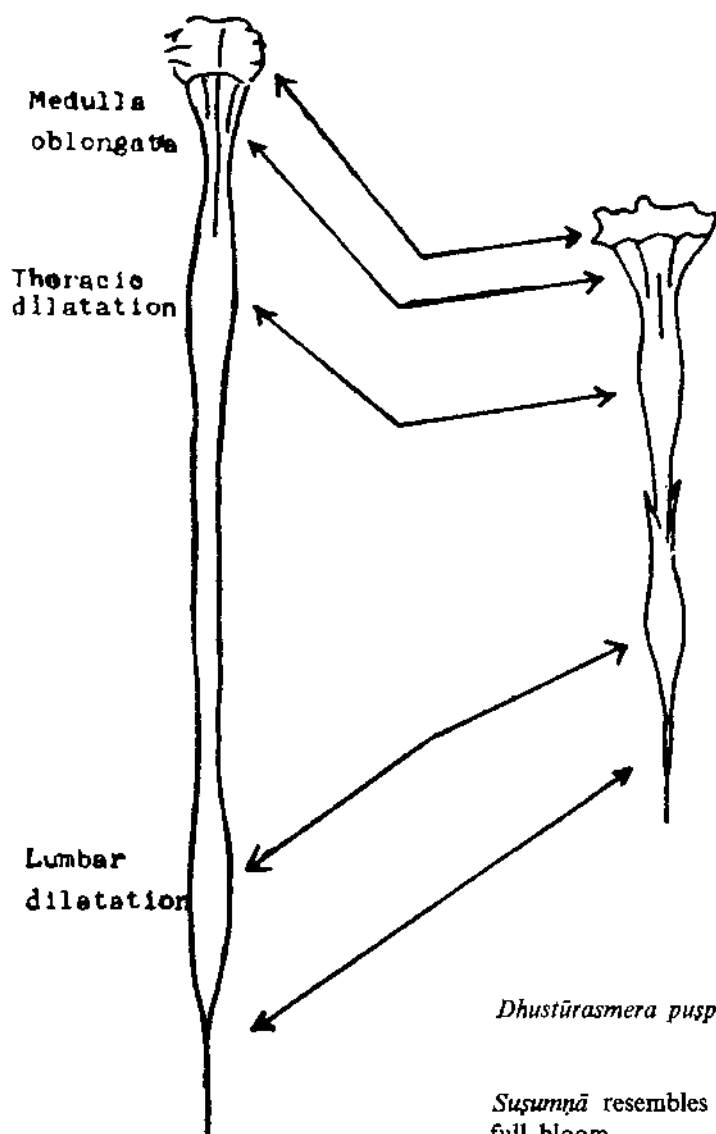
*Suṣumṇā* runs through the middle of spine and inside the head it reaches the cerebrum, twelve fingers breadth from the tip of nose.

*Suṣumṇā cavyavalliva meruśliṣṭā purogatā.  
Grivantam prāpya galitā tiryagbhūtā varānane.  
Bhūta Śuddhi.*

*Suṣumṇā* attaches to the vertebral column like a creeper, then it goes further. Reaching the end of neck it bends horizontally and disperses.

*Athādhāra padmani suṣumṇāsya Iagnam. Bhujādho  
gudordhvam catuḥṣoṇapatram. S. Ni. 4.*

Above the anus and below the penis is the mouth of *suṣumṇā* attached to *mūlādhāra cakra*.

MORPHOLOGY OF *SUṢUMNĀ*

Spinal medulla (from Gray's *Anatomy*, 35th Ed.) compared with *dhattura* flower (drawn from actual).

A THREE HORNED GREY COLUMN INSIDE A WHITE COLUMN AGLOW WITH ELECTRIC IMPULSES



Cervical Cord.



Lumbar Cord.

*Vajrākhyā medradeśāt śīrasi parigatā madhyameśyā jwalantī. Tanmadhye citrinī sā praṇava vilasitā yoginām yogagamyā. S. Ni-1, 2.*

In the *Suṣumnā* is the glowing *Vajrā*. Inside it (*Vajrā*) is *Citrinī* which bears the 'OM' motif. It is known by (*dhyāna*) yoga.

*Vajrā*, is made from bone. Hence, *Vajrā* literarily means bone-white.

*Vajrākhyā hāranihāra gouri.—Tri. Sā. S.-3/45 Citram kirmīra kalmāṣa śabalaitasca karbure. Amara kośa.*

*Vajrā* is pearl white and snow white. Hence, it is proved to be the spinal white column.

*Citrā* is synonym for grey colour (*Amarakośa*).

The 'OM' motif is three horned. Hence *citrinī* is proved to be the 3 horned spinal grey column.

T.S. of spinal cord from Gray's *Anatomy* 35th Ed.

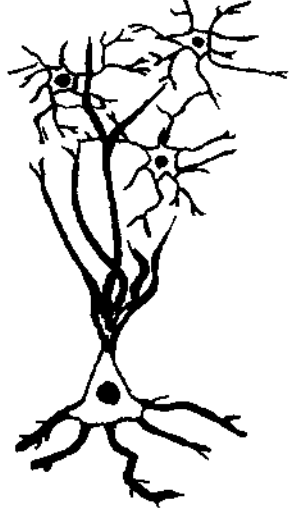
"Om" motif present on three sides of grey column.

## MICROANATOMY OF GREY COLUMN OF NEURAL AXIS

*Citrini lūtātantūpmeṃyā dedīpyate, Tat grathanaracanayā  
śuddha bodha prabodhā. S. Ni—2.*

Comparable to a spider-web (in structure) *citrini* is alight. (With electric impulses).

Because of this (spider-web) composition it imparts pure information.



Inter neuronal communication in dorsal grey column. Adapted from Gray's *Anatomy*, 36th Ed.

“*PRĀṆA*”—A VEDIC WORD SHOWS THAT ELECTRICAL NATURE OF NERVE-IMPULSE WAS KNOWN TO ANCIENT INDIANS.

*Yasmāt prayāti aṇurbhūtvā tasmāt prāṇa itiryate.—M.S. 247*

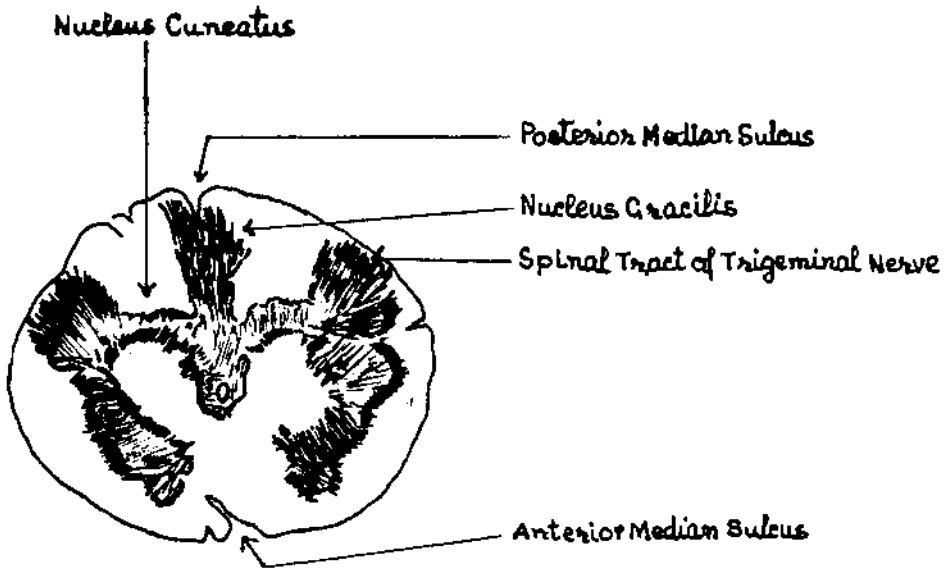
*Idā pīṅgalā souṣuṃṇā satatam prāṇa vāhinyah—Yo. Ś. Up: 29*

*Prāṇa* is so called, because it is a flow of *aṇu* (the smallest particle of matter).

‘*Prāṇa*’ constantly flows through neural axis.



## GREY COLUMN IN MEDULLA OBLONGATA SHAPED ON "OM" MOTIF



T.S. through Medulla Oblongata at level of Pyramidal decussation (From Gray's *Anatomy*, 36th Ed.)

*Ājñā padmaṃ bhraṇmadhye. Si S. 5/122*  
*Tadantaḥ cakre pradīpābha jyotiḥ praṇava*  
*viracana. S. Ni—35.*

*Ājñā-cakra* is at eye-brow level.  
 Within this *cakra* is an "OM"  
 formation glowing like the flame of a  
 lighted lamp.

CENTRAL CANAL, CHOROID-PLEXUS OF FOURTH VENTRICLE AND  
C.S.F.

*Tanmadhye brahmanāḍi, vidyunmālāvīlāsā tanturūpā susukṣmā. Tadāsyē sudhādhāragamyam pradēśam. S. N.i 2-3.*

In the middle of *citrinī* lies the fibre—thin *brahma-nāḍi*, garlanded by electric discharges. At its mouth is the place reached by stream of nectar.

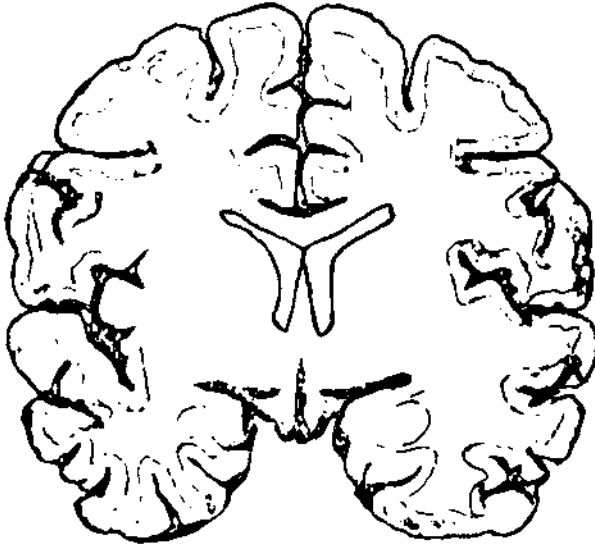
*Tadūrdhve candrārḍhah. Tat ādye nāde asou jaladhavala sudhādhār santānhāsi. S. Ni-35*

On top of that ('OM' in Med. Oblongata) lies a half moon and star. Over this half moon flows its own produce—a stream of sparkling and clear water-like nectar.



Central canal and choroid plexus in IV ventricle—from Gray's *Anatomy*, 35th. Ed.

## THE VENTRICLE AND CHOROID-PLEXUS INSIDE THE CEREBRUM



Coronal section through the brain showing the ventricle in the centre.

*Tadūrdhve padmam daśaśatdalaṃ pūrṇacandrati śuvram  
 Trikoṇam tasyāntah sphurati ca satatam vidyudākārarūpam  
 Tadantah śūnyam tat sakala surgaṇaih sevitam ca atiguptam  
 Sudhādhārāsāram niravadhi vimuñcan atitaram.*

S. Ni—43.

The thousand petal lotus is like a very bright full moon. Well hidden inside it is a triangular vacant space with all the special senses in attendance. This space glitters with electric impulses constantly. A profuse flow of nectar is released in it without halt.

## PRĀṆA—THE MOTORS NERVE IMPULSE

*Yasmāt prayāti aṇuhbhutwā, tasmāt prāṇaitiryate. M.S.—247.*  
*Prāṇasya hi kriyā śaktiḥ, buddheḥ vijñāna śaktitā. S: Bh—3/26/31*

Etymologically “prāṇa” means—A flow of *aṇu*, the smallest particle of matter. Hence it is the same as electric current. Power of action (in all living beings) belongs to *prāṇa*.

## TEN DIVISIONS OF PRĀṆA

Div. I is cranial Parasympathetic.

*Āsy anāsikayormadhye hṛtmadhye nābhimadhyame, prāṇālaya iti prāhuḥ.*  
*Ucchwās niśwās kasāśca prāṇa karma iti kirtiyate. Yo. Yā.—4/50*

*Svāsocchvās bibhañjanena jagatām jīvo yayā dhāryate. S. Ni-11*  
*Prāṇāpāna samāyuktah pacāmi annam caturvidham. Gītā-15/14*  
*Viśvadari tu yā nāḍi sā bhūṅkte annam caturvidham. Yo.si.up. 4/23*

Div. I ‘Prāṇa’ is sited at mouth, nose, heart and umbilical levels. Inspiration and expiration are actions of ‘Prāṇa’. *It maintains all life by dividing inspiration from expiration: ‘Prāṇa’ and ‘apāna’ cause all food to be digested by acting through the vagus nerve (Viśvodari).*

Div. V ‘Apāna’ is sacral para-sympathetic.

*Apāna vāyoh karmaitat viṣṭutrādi visarjanam. Yo. Yā 4/66.*

Excretion of faeces, urine, semen and foetus are action of *apāna*.

PRĀṆA AND APĀNA ARE CRANIAL AND SACRAL PARASYMPATHETIC

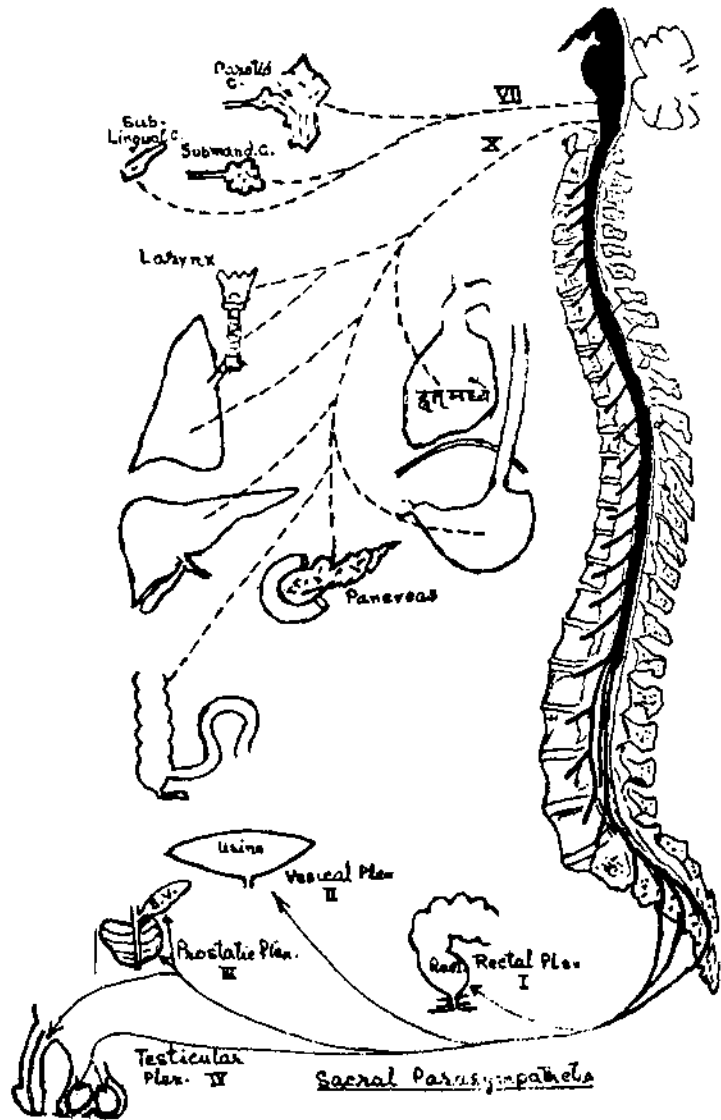
Āsya nāsikayor-  
madhye Yo. Ya.  
4/50 Pacāmi annam.  
Gītā. 15/14

Ucchyās niśyās  
kāśāśca Yo. Ya.  
4/66

Swāsocchyās  
bibhañjanena jag-  
tām jīvo yayā  
dhāryate S. Ni-11  
(Pulmonary stretch  
reflex).

Prāṇāpāna samā-  
yuktāḥ pacāmi  
annam. Gītā 15/14.  
Nābhi madhyame

Apāna vāyoh kar-  
maitat viḥ mūtrādi  
visarjanam. Yo.  
Ya. 66.



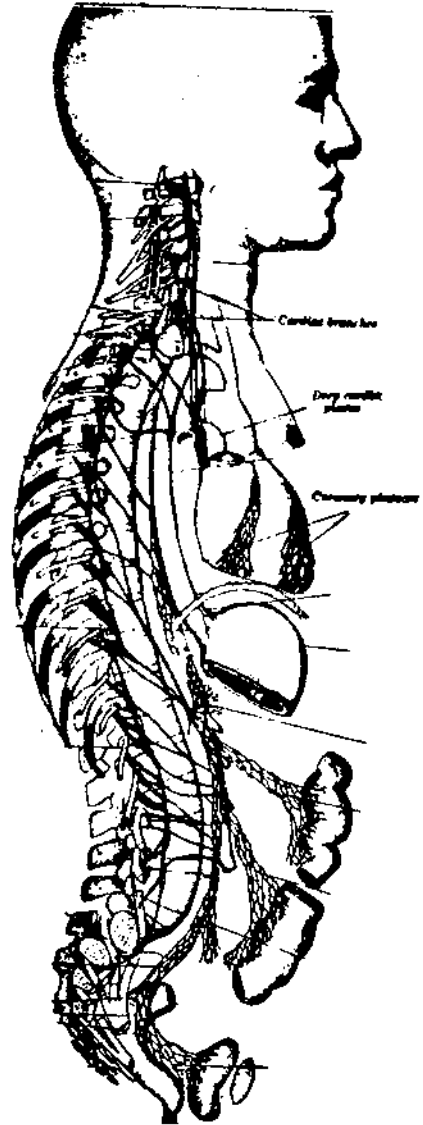
## SAMĀNA—THE SYMPATHETIC—MOTOR COMPONENT

*Meroḥ vāhya pradeśe śaśimihirīre savyadakṣe  
niṣaṇṇe. S. Ni-1*

*Idā ca piṅgalā caiva tasya vāme ca dakṣiṇe.*

*Suṣumnā kalitā jātā dakṣabhāgam samāśritā.  
Hṛt, gatā dakṣabhāgsthā jatru madhye  
samāśritā. Hṛt, gatā bāmbhāgasthā jatru  
madhye samāśritā. S. Vi.*

On left and right of vert. column are *idā* and *piṅgalā*. *Idā* attached to *suṣumnā*, supplies the heart from near mid-clavicle (L). *Piṅgalā* attached to *suṣumnā* supplies the heart from near the mid-clavicle (R). See next plate on *Samāna*.



Sympathetic system  
From Gray's *Anatomy*, 35th edn.

DIVISION III *SAMĀNA*—SYNONYM FOR SYMPATHETIC MOTOR

*Asit pīte samam nayati samānaḥ. Chp. up. Śān Bh. 3/13.*

*Samāna* means equal carrier of nutrition (to all the body).

*Samāna vāyunā sārđham rasam sarvāṣu nāđiṣu.  
vyāpayan dhātu rūpeṇa dehe caratimārutaḥ. Yo. Yā. 4/64.*

Digested food in the form of blood is circulated by *samāna* through all the blood vessels in the body.

*Rasān doṣāṃśca dhātuñca vartayan paridhāyati. M.B.B.P. 203/29.*

Nutrition, excretions and blood are circulated by *samāna*.

*Uchvāsaniśvāsāvetahutī samam nayati sa samānaḥ. Praśna Up. 4/4.*

The boluses of expired and inspired air are equally carried in the body by *samāna*.  
(Carriage of O<sub>2</sub> and CO<sub>2</sub> in blood)

## TWO SYMPATHETIC CHAINS

*Merorvāhya pradeśe śaśi mihirśire savyadakṣe niṣaṇne. Ś. Ni-1*

On the outer region of vertebral column on its left and right are Moon head and Sun head *nāđis*.

*Iđā ca piṅgalā caiva tasya vāme ca dakṣiṇe. Rjyibhūte śire te ca vām dakṣiṇa bhedataḥ.  
R. Yā. 27/5/51*

*Vāmdakṣinabhedena beṇibandhakrameṇa ityarthāḥ.*

*Iđā* and *piṅgalā* on the left and right of *suṣumṇā* interlace with it like a plait.

*Suṣumṇā kalitā jātā vāmbhāgamī samāśritā. Hṛtgaṭā vām bhāgasthā jatru madhye  
samāśrita. S.C.Vi.*

Attached to *suṣumṇā* at its origin the left *nāđi* supplies the heart as it lies near the left midclavicle.

*Suṣumṇā kalitā jātā dakṣa bhāgamī samāśritā. Hṛtgaṭā dakṣa bhāgasthā jatrumadhye  
samāśritā. S.C.Vi.*

Attached to *suṣumṇā* at its origin the right *nāđi* supplies the heart as it lies near the right midclavicle.

## UDĀNA IS THE SOMATIC MOTOR DIVISION



*Udāna karma tatproktaṃ dehasya unnayanādi yat. (Yo. Ya.-4/68)*

*Prayatne karmaṇi bale ya ekaḥtriṣu vartate. Udāna karma tatproktaṃ adhyātma viduṣo janāh. (M.B.B.P. 203/19)*

Raising up of the body and other movements are the work of *Udāna*. (*Yoga Yagavalkyam*).

Routine work, effort and feats of strength all these three are the work of *Udāna*. (*Mahābhārata*).



*DHANAÑJAYA* THE TENTH *PRĀṆA*—TISSUE-LIFE AFTER DEATH



*Na jahāti mṛtaṃ vāpi sarvavyāpi dhanañjayaḥ. Yo Si. (Up. 126.)*

Present in all parts of the body *Dhanañjaya* does not leave even the clinically dead.

(BASIS FOR TRANSPLANT-SURGERY)

**PRAJÑĀ IS SENSORY AFFERENT IMPULSE DIFFERENT FROM PRĀṆA—  
THE MOTOR IMPULSE**

*Prakarṣeṇa jñāti prajñā*

*Prajñā* is special sense energy.

*Yo vai prāṇah sa prajñā. Yā vā prajñā sa prāṇah*

*Saha hi aitou asmin śarīre vasatah saha utkramantau. K. B. Up.-Ch.3*

(Physically) *prajñā* is same as *prāṇa* (i.e. electrical). They live in the body together and leave it together.

*Prajñayā vācam samāruhya vācā sarvāṇi nāmāni āpnoti.*

*Prajñayā ghrāṇam samāruhya ghrāṇeṇa sarvān gandhāna āpnoti.*

*Prajñayā cakṣum samāruhya caksuṣā sarvāṇi rupāni āpnoti.*

*Prajñayā śrotam samāruhya srotreṇa sarvān śabdān āpnoti.*

*Prajñayā śarīraṃ samāruhya śarīreṇa sukhdukhe āpnoti.*

*Prajñayā upastham samāruhya upasthena ratim prajātim āpnoti. K. B. Up.-Ch.3.*

*Prajñā* rides over the tongue, nose, eyes, penis and all body tissues. It conveys the sensations of taste, smell, vision, sound, coitus and reproduction and pleasure and pain.

*Na hi prajñāpetā dhīḥ prajñātavyam prajñyāyeta.*

*Na hi prajñāpetau hastau karma kiñcana prajñāpayetām*

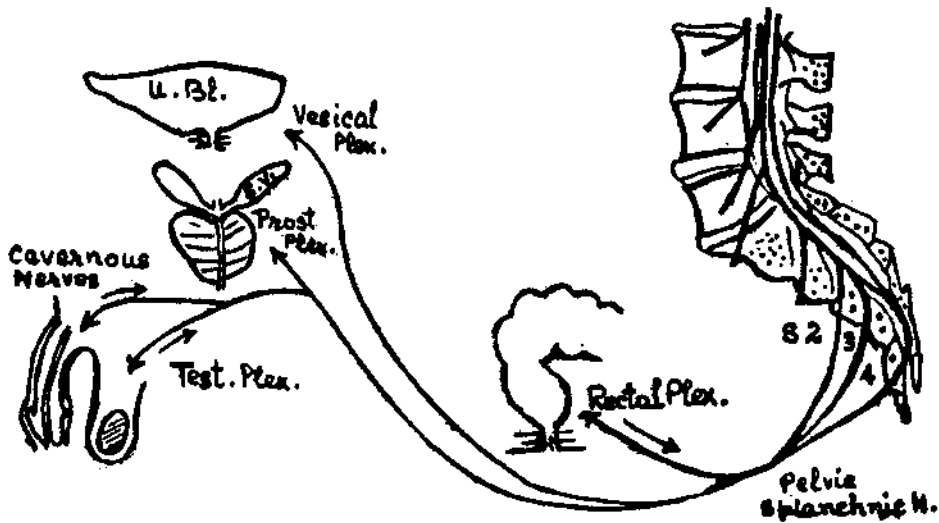
*Na hi prajñāpetau padāvityām kiñcana prajñāpayetām K. B. Up.-Ch.3.*

Bereft of *Prajñā* sense organs convey nothing.

Bereft of *Prajñā* hands do not convey action.

Bereft of *Prajñā* feet do not convey walking.

**MŪLĀDHĀRA CĀKRA IS INFERIOR HYPOGASTRIC PLEXUS**



**INFERIOR HYPOGASTRIC PLEXUS.**

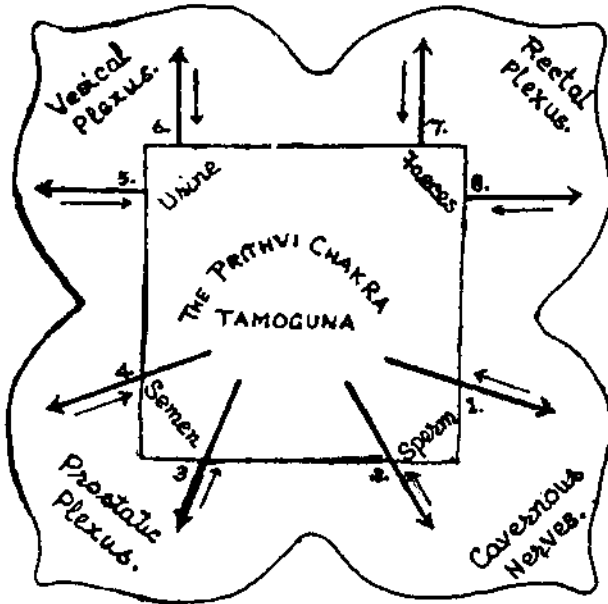
“Inferior hypogastric plexus is situated on the side of rectum, prostate and posterior part of urinary bladder. It consists of—

1. Middle rectal plexus, from the upper part, which controls normal defecation. As the rectum fills, sensory stretch impulses are sent to sacral part of spinal cord and reflex signals are retransmitted to distal parts of colon to empty the bowel.
2. Vesical plexus from anterior part. This has exclusive control on normal micturition. Stretching of the bladder sends impulses of sacral cord causing contraction of bladder as well as relaxation of urinary sphinctors, promoting micturition.
3. Prostatic plexus, from inferior part distributed to prostate, seminal vesicles and bulbourethral glands.
4. Greater and lesser cavernous nerves, from inferior part distributed to erectile tissue of penis. Sensory impulses converge on sacral cord and cause reflex erection and ejaculation.”

—Excerpt from Gray's *Anatomy*

*Athādhāra padmān suṣumṇāsya lagnam. Bhujādhogudurdhvam catuḥṣoṇa patram. S. Ni.*

## MŪLĀDHĀRA CAKRA IS INFERIOR HYPOGASTRIC PLEXUS

ŚULĀṢṬAKA  
(Eight weapons)

1. Lubrication Reflex
2. Erection Reflex
3. Emission Reflex
4. Ejaculation Reflex
5. Micturition Reflex
- 6.
7. Defecation Reflex
8. Anal Reflex

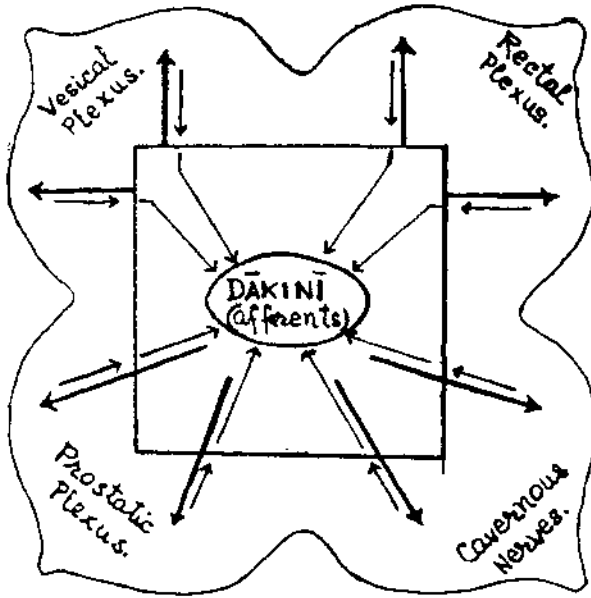
*Athādhāracakraṃ suṣumnāsyalagnam. Bhujādhogudordhvam catuṣṣoṇapatram.  
Amuṣmin dharāyāḥ catuṣkoṇa cakram. Samudbhāsi śulāṣṭakairāvṛtantat. S. Ni. 5.*

Situated below the penis and above the anus the *Mūlādhāra cakra* is attached to the mouth of the neural axis. It has four petals of red colour. (Red-*rajoguna* means action). Inside it is four cornered. *Prithvi cakra*, surrounded with eight weapons (of action). *Prithvi* has the maximum *tamoguna*. Hence it is the abode of all excretory processes and *apāna*. Eight weapons are all pelvic parasympathetic (*apāna*) reflexes.

*Apāna vāyah karmaitat vit mutrādi visarjanam. Yo. Ya. 4-67.*

Excretion of urine, stool, semen and foetus is the function of *apāna*.

## MŪLĀDHĀRA CAKRA IS INFERIOR HYPOGASTRIC PLEXUS



*Vasedatra devī ca dākinī abhikhyā. Prakāśam vahantisadā śuddha buddha. S. Ni*

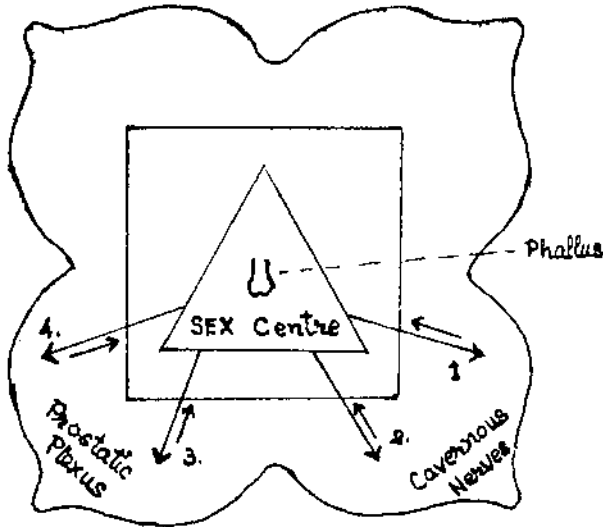
Here lives *Devī Dākinī* always carrying the illumination of pure information. (This proves that *Dākinī* represents sensory afferent centre). Compare this with—

*Prajñayā upastham āruhya upasthena ratim prajātim āpnoti.*

*Kauṣītaki Brāhmaṇa.*

Sensory impulses riding the penis/clitoris convey the pleasure of coitus and the pain of parturition (Joshi 1976). Thus, *Dākinī* consists of those peripheral ganglionic cells which receive the sacral parasympathetic afferents from all four petals of *Mūlādhāra*.

## MŪLĀDHĀRA CAKRA IS INFERIOR HYPOGASTRIC PLEXUS



## CATURĀSTRA

## Four Weapons

1. Lubrication Reflex.
2. Erection Reflex.
3. Emission Reflex.
4. Ejaculation Reflex.

*Caturāstrādikaṃ devi tat kuṇḍam kāmarūpakam. Homakuṇḍa midam devi sarvatantre pariṣkṛtam. Ma. B.T. 3/9/23.*

*Koṇantat traipurākhyam taḍidiva vilasatkomalam kāmarūpam. Kandarpo nāma vāyuh vilasatisātataṃ tasya madhye. Tanmadhye liṅgarūpī paścimāsyo kiśalayakārārūpaḥ svayambhu. Kāśivāsi vilāsi saridavartarūpa prakārah. S. Ni-9.*

That fire-pit representing sex with its four weapons etc. is eulogised in every Tantra.  
—*Mātrkā Bheda Tantra.*

That electrical triangle named *Tripura*, represents sex. In it flow the nerve impulses of sex—God. In its middle is the bud-shaped *Siva-liṅga* facing downwards and with a depression at its tip. The *Liṅga* is amorous and lives here as in Kashi. (*Siva-liṅga* is human penis).

Amorous—because penis is the receptor of pleasure of sex and executor of sex act. Lives here as in Kashi—means *Mūlādhāra* is the natural abode of phallus. Thus, this *Liṅga* is the peripheral ganglion cell controlling penile action,

## OBSERVATIONS

This consists of 18 plates with legends as follows:

*Legend Pl. 1:* "Suṣumnā" receives mention in every text of Yogic Neurology. It is grossly misunderstood by modern scholars when translated as the spinal cord.

Yoga does not recognise any artificial anatomical divisions of the central neural axis, the whole of which is *Suṣumnā*.

*Legend Pl. 2:* This marvellously exact simile of a *dhatturā* flower in full bloom, does away with the lengthy descriptions of the various dilatations and the filum terminale of the spinal cord.

John Woodroffe has spoiled this simile by accepting the wrong recension—"grathita" in place of "prathita" in *Serpent Power*.

*Legend Pl. 3:* The Yogic words *citrinī* and *vajrā* literally are synonyms for the grey and white columns of modern neurology.

The use of "Om" motif as a simile for the three horned grey column demonstrates the beauty of Sanskrit expression.

Note that this information is obtained by *Dhyānayoga* and not laboratory techniques.

*Legend Pl. 4:* The microanatomy of grey matter and its physiological function is described in same terms as modern neurology. This leaves no doubt that *Dhyānayoga* (which costs nothing) is a more effective tool of investigation than sophisticated laboratory techniques.

*Legend Pl. 5:* The simile of *Om* motif used again. The grey matter in the medulla oblongata has a strikingly sharp resemblance to *Om* except that the half moon at its top is missing (for which see Pl. 6).

Note the adjective "glowing like a flame." The glow—caused by electric impulses, cannot be appreciated on dead body dissection and slides.

*Legend Pl. 6:* The half moon shaped choroid plexus in the fourth ventricle is just above and behind the *Om* present in the medulla oblongata (Pl. 5). Thus, the *Om* now becomes complete.

The description of the cerebro-spinal fluid as sparkling water—like nectar is a bull's eye hit, and its secretion by the half moon of choroid plexus is correctly depicted with extreme brevity. Woodroff has again given a wrong recension "baṭa" in place of "jala" spoiling the entire meaning.

*Legend Pl. 7:* The two cerebral hemispheres together make a full moon, which conceals the vacant space (ventricles) having a second source of secretion of cerebrospinal fluid. Nerve tracts of all special senses traverse the walls of cerebral ventricle—*sakala surganāṅ sevitam*.

Note mention of constant glitter caused by electrical *prāna* impulses.

*Legend Pl. 8:* *Prāna* is a vedic word which literally means electric current. Vedic Indians knew not only about the electrical nature of nerve impulses but also the physical definition of electricity as representing a flow of smallest particles of matter.

The *prāna* topic is a vast area from where neurologists can learn much.

*Legend Pl. 9:* *Prāna* has ten sub-divisions of which five are main.

- |                 |                 |                  |                 |                 |
|-----------------|-----------------|------------------|-----------------|-----------------|
| 1. <i>Prāna</i> | 2. <i>Apāna</i> | 3. <i>Somāna</i> | 4. <i>Udāna</i> | 5. <i>Vyāna</i> |
|-----------------|-----------------|------------------|-----------------|-----------------|

The first sub-division, *prāna* constitutes of—

motor supply to digestive organs, i.e. the salivary glands, stomach, liver and pancreas,

motor supply to the heart,

motor supply to the larynx, airway and the lungs.

The pulmonary stretch reflex is described with clarity.

The vagus nerve is aptly named *viśvodari*.

The second sub-division, *apāna* constitutes of—motor supply to the rectum, urinary bladder and sex organs in both sexes. This is the *Mūlādhāra cakra* in anatomical terms. (Pl. 14).

Thus, these two divisions represent the cranial and the sacral parasympathetic divisions of modern neurology.

*Legend Pl. 10 & 11: Samāna* means equal carrier. It permeates through whole body. The two sympathetic chains *idā* and *piṅgalā* located outside the vertebral column constantly communicate with the central neural axis *suṣumnā*. They rank next in importance to *suṣumnā*. The cardiac sympathetic nerves are described with anatomical precision.

*Legend Pl. 12:* Here all voluntary muscular actions are scientifically graded into three categories: (a) routine work, (b) exercise, (c) show of strength. All these actions are caused by *udāna*.

*Legend Pl. 13: Dhanañjaya* is tenth sub-division of *prāṇa*. It is the life in the body tissues as distinct from clinical brain-life. Meat keeps fresh because of this. Cereals and vegetables too keep alive with *dhanañjaya prāṇa* (*Bṛhadāranyaka upaniṣad—5/12/1*).

*Legend Pl. 14:* Here the sensory afferent is named *prajñā* and clearly portrayed in all its detail. The sense organs (the ten *indriyas*) can convey their informations because of *prajñā*.

*Prajñā* is a congener of *prāṇa* because it is electrical nerve impulse.

*Legend Pl. 15:* As known to physiology today the inferior hypogastric plexus has four main channels for supply.

*Legend Pl. 16: Mūlādhāra* is a lotus of four petals and each petal has two weapons. The four petals dispense all the *apāna* functions with the help of their weapons.

*Apānu*, sited in *mūlādhāra* executes the excretion of urine, stool, semen and foetus (Pl. 9) plus the sexual act.

The eight weapons are the famous sacral reflexes known in physiology.

*Legend Pl. 17: Śuddha-buddhi* is a synonym for *prajñā* or sensory afferents (Pl. 14).

*Legend Pl. 18:* Sexual act and reproduction is under the control of a specific nerve centre within *mūlādhāra*. It controls the four physiological sex reflexes and the penis is represented here by a distinct ganglion.

## DISCUSSIONS

### RISE AND FALL OF YOGA-VIDYĀ IN INDIA

Hiranyagarbha is known to be the first pioneer of practical Yoga. A few aphorisms from his work are still available. The theoretical aspect called *Sāṅkhya* was pioneered by Kapil Muṇi.

During the Vedic and post-Vedic era it was normal for ascetics to attain the higher level of consciousness through control of one's nerve-impulses. Thus neurology formed a part of Yoga and was not meant for academic advancement or therapeutics.

The medieval era saw a continuation of Yogic traditions with sprouting of Tāntrism. Gorakhnāth (1100 A.D.) was perhaps one of the last of the great yogis.

Decline of Yoga started with the Muslim followed by the British invasions and subjugation of the country. During this period the yogic way of life suffered serious



erosion and a large number of precious ancient texts passed into oblivion. Today we know about them only through references available in literature. Efforts for revival of this literature were made by some agencies during the nineteenth century, but there was no revival of practice of Yoga.

Today, we have a flood of literature available on Yoga, all of which has no relation to the central purpose of Yoga, i.e. realization of self.

#### THE COMMUNICATION GAP

Thanks to the educational foundations laid by the British from the days of Macaulay, Sanskrit is an anathema for our intellectuals today. Rare is the scientific journal that would agree to publish even one line in Sanskrit.

We do have *Veda-vidvāna* in India, steeped in ancient literature, but they shun science for its materialism. Thus, the communication gap becomes complete.

Descriptions of neurology are available in a large number of ancient and medieval texts, but, I have chosen *Ṣaṭcakraṅirūpaṇa* for its comprehensive coverage and Yoga Yāgavalkyam for its comprehensiveness plus Vedic antiquity. Complete reference of *Ṛṣi* Yāgavalkya is available in *Śrīmat Bhāgawat* 12/6/62-74. A disciple of the famous Vaisampāyana Muṇi, he was the seer (*draṣṭā*) to whom one half of entire *Yajurveda* was first revealed. *Ṣaṭcakraṅirūpaṇa* antedates development of neurology in the post-seventeenth century Europe.

The first English translation of *Ṣaṭcakraṅirūpaṇa* was rendered by Sir John Woodroffe, a Session Judge, who had no initiation in scientific neurology. His translation suffers from a constant slant for mysticism and numerous errors which cannot be counted here. Unable to see the magnificent scientific content of the original work he writes in his Introduction to *Serpent Power*—

“Some modern Indian writers have helped to diffuse erroneous notions about *cakras* by describing them from.....a physiological standpoint..... Physiology does not know the *cakras* .....as centres of consciousness..... Those who appeal to physiology only are likely to return unsuited”.

Most modern scholars having a language-gap with Sanskrit are obliged to learn about Yogic Neurology from this above mentioned work. Those few who may have some initiation in the language are, yet unacquainted with its tradition of condensed brevity of expression, where small words like *Prāṇa* or *Anna* can speak volumes. (*Anna* explains the Nitrogen cycle by its etymology).

For these reasons, much of Yogic Neurology is misunderstood today. When correctly interpreted, the same not only tallies at every step with the modern scientific

knowledge, but is advanced far ahead of it in its applied aspects like *kuṇḍalini* awakening. Thus Yogic Neurology is not a dead branch of ancient mysticism, but, even more alive than the modern scientific neurology. For bibliographic proof, the present small demonstration shows that the ancient Indians had a masterful understanding of human neurology.

### THE YOGIC APPROACH TO NEUROLOGY

Yogic Neurology is aimed to help in *Yoga-sādhanā*. It has nothing to do with clinical therapeutics.

Yogic descriptions give a clear and true picture of physiologic anatomy of nervous system in all its width and depth, yet, keep unconcerned with several anatomic and clinical aspects of it that do not apply to Yoga. Thus, the somatic sensory and motor divisions are recognised only for record, while structures like the meninges are not even recognised because they do not transmit nerve impulses.

In its ten divisions of *prāṇa*, Yoga recognises all the different somatic and autonomic divisions of nervous system as we know them today, but, it reserves its royal treatment for the parasympathetic and the sympathetic divisions and the motor fibres, as these are the instruments for *Yoga-siddhi* (Joshi 1976).

The sensory nerve impulse designated *prajñā* is a congener of *prāṇa*—the motor impulse. *Śrīmat Bhāgavat* clearly differentiates between the two (Plate 8).

All somatic and autonomic afferent impulses are grouped under *prajñā*. The somatic afferent riding over the ten *indriyas* are accurately portrayed in *Kauṣītaki Brāhmaṇa Upaniṣad* (Plate 14). The autonomic afferents are described in each of the six *cakras* and are designated *Ḍākinī*, *Rākinī*, *Kākinī*, *Śākinī*, *Lākinī* and *Hākinī* (Plate 17) in *Ṣaṭcakraṇirūpaṇa*.

The six *cakras* are nerve stations present in the body which are allotted specific tasks for controlling all visceral mechanisms for circulation, respiration, digestion, excretion and sex and reproduction.

How such advances in scientific neurology could be made in absence of sophisticated laboratory techniques? This answer is available in the same ancient texts. It is done by meditation, as I have explained in previous papers.

### THE IMPACT OF NEUROLOGY ON ĀYURVEDA

Yoga and Āyurveda have different applications. Yet, on human physiology they reflect the same thought process of the ancient sages. In fact Āyurveda is known as the fifth Veda and upaveda.

The Āyurvedic concept on the creation of a human person as outlined in *Caraka, Śārīr*. Ch. I is the same as expounded by *Sāṅkhya Yoga*. The body is designated as *Kṣetra*. It is a compound of five *mahābhūtas* (*Śārīr* 1/65). It is *prāṇa* that gives action to the body making the difference between the living human and his vacant and unconscious corpse. This is exactly what is taught by *Bhāgawat Gītā* (Chapter 13) and *Śrīmat Bhāgawat* (3/26), both classics of Yoga.

In *Caraka Saṃhitā, Cikitsā*. 28/3-11 description of *prāṇa* and its five divisions under the caption of *vāta* and *vāyu* is in total conformity with Yogic teachings. The use of the term *vāyu* for *prāṇa* is acceptable because, *prāṇa* is *vāyu* in the human body. *Caraka, Ci, Su*. 12 is entirely devoted to explain the normal and pathological actions of *prāṇa*. The normal functions described here are again the same as taught in Yogic texts.

*Yoga-Yāgavalkyam*—4/57-65 describes the role of *prāṇa* in the process of digestion. *Prāṇa* produces the chemicals (*agni*) for the breakdown of food components. *Prāṇa* enters the stomach (vegal supply), and it also helps to burn the food in the body tissues after absorption. According to *Bhāgawat Gītā* (15/14) all food is digested with the help of *prāṇa* and *apāna* (large intestine).

Exactly the same description is available in *Caraka Saṃhitā (Ci. 15/6-8)*.

#### *Prāṇa Versus Vāyu and Vāta*

The *tridoṣa* theory forms the basis for the internal medicine of Āyurveda and *vāta* (synonym for *vāyu*) is the first *tridoṣa*. *Vāta* is same as *prāṇa* (*Caraka, Sū. 17/118*).

The general term *vāyu* is the name given to cosmic energy in all forms, i.e. the sun, the wind, fire, electricity and the vital energy of the living body (*Caraka, Sū. 12/8* also *Īśa Upaniṣad-4—Sāṅkarabhāṣya*).

*Prāṇa* includes both the sensory and motor nerve impulses, the latter has ten sub-divisions called ten *prāṇa* or ten *vāyu* (*Gorakṣā Saṃhitā* 1/32-34 also *Bṛhadāraṇyaka Upaniṣad* 1/5/3).

Technically, *prāṇa* is the correct term for vital energy, but *vāyu* is acceptable where the discussion pertains to living body, because *prāṇa* is *vāyu* in the body. It is so used in Āyurveda and also in Yoga. *Vāta* is the specific technical term of Āyurveda.

Thus, we see that the knowledge of human nervous function, which is the basis for Yoga also forms the basis for Āyurveda, both of which are magnificent Hindu contributions to science.

Chronologically the origins of Āyurveda are available in *Atharvaveda*. The first Āyurvedic text—*Agniveśa Tantra* is a record of symposia and dialogues among the sages in post-Vedic period. *Caraka Samhitā* which is an annotation (*bhāṣya*) of the original. *Agniveśa Tantra* has been placed at about 200 B.C. (P. V. Sharma (1981) in *Caraka Samhitā*—Introduction. Chaukhamba orientalia, Varanasi).

Thus, like Yoga, Āyurveda too certainly antedates the development of physiology in the West (See Chart. II).

#### YOGIC THINKING IS FAR AHEAD OF MODERN NEUROLOGY

The Yogic application of neurology is different from that of modern science. For this reason science has much to learn from Yoga in this sphere.

I have shown that, ancient Yogis were well acquainted with large areas of neurology including the recent discoveries of science regarding the electrical nature of nerve—impulses (Plate-8), and the separate identity of tissue life from clinical, brain-life and consciousness (Plate-13).

I have attempted a scientific explanation of the Nature of *Kula Kuṇḍalīnī*, in a separate paper under publication in '*Yoga-Mīmāṃsā*' of October 1984.

#### YOGA AND RESEARCH

The word Yoga means union with Truth. Hence, re-search is the antithesis of Yoga. You search again when you do not know the truth or doubt what you know. A *yogī* does not search again because he knows the truth and has no doubts (*Bhāgawat Gītā* 2/16). The *yogī* himself becomes Truth (*Soham*). Thus there is no scope for re-search in Yoga (*Bhāgawat Gītā* 7/2).

#### THE CHRONOLOGY

Chronologically the last text on Yogic Neurology—*Ṣaṭcakranirūpaṇa*, was written in 1577 A.D. (Preface to *Serpent Power*). In the first verse of this work the author makes it clear the six *cakras* are being described according to pre-existing Tantra, meaning that he is not the pioneer of this knowledge. Other texts used for this paper belong undoubtedly to the pre-Buddhist (i.e. pre-600 B.C.) era of Indian history, and the remaining profuse literature having neurological references is chronologically depicted in chart I.

In the West, while not even the smallest beginnings can be claimed before 300 B.C. (Herophilus and Alexandrian School), the worthwhile developments in neurology started only after 1800 A.D. (Eustachius, Cotugno and Willis etc.).

### CHART II

*Showing the development of Neurology in the West (Compiled from A Short History of Medicine by Singer, S. and Underwood, E.A. 1962, Oxford University Press)*

300 B.C.	Herophilus	Brain recognised as seat of intelligence. Distinguished motor from sensory nerves. Described the fourth ventricle.
250 B.C.	Erasistratus	Described his concept of pneumatism.
130 A.D.	Galen	Described effect of section of spinal cord. Described sympathetic chains, ganglia, rami and splanchnic nerves.
400 to 1100 A.D.		The dark age of European History.
1565	Eustachius	Drew plates on sympathetic nervous system.
1688	John Bohn	Observations on decapitated frog.
1727	Du Petit	Showed sympathetic does not arise from cerebrum.
1757	Haller	Recognised essential role of nerves in feeling.
1768	Robert Whytt	Gave outlines of principles of reflex action.
1778	Willis	Described thoracic sympathetic chain.
1786	Galvani	Obtained muscular contraction in frog-leg with electrical stimulus.
1811	Bell	} Gave conception of reflex arc.
1822	Magendie	
1812		Respiratory centre discovered in Medulla-oblongata.
1820	Burdoch	Recognised tracts in spinal white matter.
1836	Remak	Discovered microscopic structure of the nervous system.
1837	Purkinjec	Described nerve cell with nuclei and dendrites.
1850	Marshall Hall	Showed reflex nature of sphinctor action.
1852	Claude Bernard	Recognised vasomotor function of sympathetic nerves.
1862	Aurbach	Described mesentric plexus.
1870	Fritsch and Hitzig	Movements on opposite side produced by electrical stimulation of cerebr-cortex.
1918	Gustav Roussy	Nervous mechanism of control of urinary bladder.
1925	Barrington	Nervous control of rectum.

While crediting the Greeks with pioneering of Medicine and basic sciences, it may be remembered that the Alexandrian School was established by Alexander's general Ptolemy in 300 B.C. after his return from India from where some Indian Yogis had joined his entourage (Rapson, E.J.). The famous theory of Pneumatism propounded by Erasistrasus (250 B.C.) clearly seems influenced by the Yogic principle of *prāṇa-vāyu* and the Āyurvedic *vāta*.

The electrical nature of nerve impulses which was known to Vedic Indians (Plate 8) could not be conceived by modern science for a very long time, because scientists worked with dead bodies. Galvani obtained muscular contraction in frog's leg with electric stimulus in 1786 and it is only recently that electrical nature of nerve impulses was proved by Du Bois Raymond.

Western Medical Historians today, completely ignore the truly vast Indian contribution to Neurology since the Vedic era. They glorify the Greeks and the origin of Neurology is then traced from the eighteenth century Europe (See Chart II).

In the light of what I have demonstrated here, this narrow classical approach and concept of Western scholars is viciously wrong.

#### CONCLUSIONS

The ancient Greeks are usually credited with pioneering of Medicine and basic sciences without considering the substantial contributions made by the ancient Indians. Evidence is available, that even the Alexandrian School itself may have Indian influence at its start.

The ancient Indians had clear and deep understanding of human neurology as shown by the large Volume of Vedic and post-Vedic literature. Even the last text written on Yogic neurology (1577 A.D.) antedates the development of neurology in Europe.

Neurology was used in India for practice of Yoga *sādhana* only, which suffered decline consequent to foreign invasions of the country. A lot of precious literature on Yoga has disappeared during the past one thousand years of continued subjugation.

Yogic neurology is misunderstood by modern scholars due to communication gap with Sanskrit, resulting in total reliance on *Serpent Power*,—an erroneous translation by Sir John Woodroffe.

Modern Science can learn much from Yogic neurology, provided that the basic tenets of Yoga are first accepted.

In the West, no beginning of neurology was made before the Greek schools (300 B.C.) while the same was clearly understood in all its depth by ancient Indians, at least since three thousand years before the Greeks.

Hence the classical concept of Western Medical historians which denies this magnificent Indian contribution is viciously wrong and deserves condemnation.

#### ACKNOWLEDGEMENT

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