



Study of the Vedic Period

Science and Technology

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Vedic Science

- Cosmology
- Science of Speech
 - Division of Space
- Science of Communication
 - Science of Phonetics
 - Science of Mind
 - Medical Sciences
 - Meteorology
 - Hydrology
 - Astronomy
 - Mathematics

Cosmology

- The universe has an order ṛta ऋत, that deals with cause and purpose.
- It is the first thing that was created (RV X.190.1)
- Every manifested object or action “belongs” in its existence.
- The first manifested object is “truth”, satya सत्य
- The universe has two aspects; “sat” सत् that is manifested and “asat” असत् that is not manifested.
- “sat” सत् manifests from “asat” असत्, RV X.72.2
- In the material universe, the first element is “sky”, which gives rise to “air”, “air” gives rise to “fire”, “fire” gives rise to “water”, “water” gives rise to “vegetation”, “vegetation” produces “food.” The human is made out of “food”. Taittīrīya Up II.1
- “aham annam, aham annādaḥ” – “I am food, I eat food!” T.U. III.10

Science of Speech

- The universe can be expressed through human speech.
 - Vāk वाक् is the manifestation of the original sound in a human voice.
 - Vāk वाक् carries the meaning of the object (RV X.71.4)
 - Vāk वाक् resides in human “mind” मनः, and “mind” resides in Vāk. Aitereya Up. I.1
 - There are four stages in the production of speech (RV 1.164.45). The first three are latent and the fourth is uttered* .
 - The speech consists of seven scales सप्तवाणी (RV I.164.24)
 - (Pāṇini analyzes syllables and grammar later.)
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- We have tried to identify various speech stages from a neurological point of view in a paper to the XVI World Sanskrit Conference, Bangkok. (Misra, Kosaras, Nagar, Singh, 2015).

Division of Space

- The Space can be divided into three layers. The three-fold division of space delineates the earth भूः , the atmosphere भुवः and the outer space सुवः
- The ground भूः bhūḥ shelters human beings, trees, animals, mountains and oceans. All manifested objects are called bhūta (originating from the earth)
- The bhuvah is antarikṣah अन्तरिक्षः, it can be “seen.” It contains air वायुः It blows wind, produces rain and lightening. It is also known for dust storms and vortices which hinder the production of rain.
- The topmost layer is ākāśa “The Bright space”. It is luminous and slow-changing. It contains the sun and is the home of other luminous (self-illuminating) objects, the moon and the stars.
- bhūḥ and antarikṣah are combined to make a new word pṛthvī. The ākāśa is called dyauh द्यौः, signifying its divine status.

Science of Communication

- The cosmic order ṛta can be reached through yajña, a ritualistic sacrifice, controlled by astronomical charts jyotiṣaḥ ज्योतिषः
- The original yajña offered mentally produced Chanda RV X.90.9.
- Different divine objects “accept” melodic meters of different lengths, recited in discipline.
- The surface layer भूः accepts eight syllable Gayatri, the middle layer भुवः takes eleven syllable Trishtubh, and the outer space सुवः takes twelve syllable Jagati RV X.130.4
- The other part of the yajña is the agni “fire”. It communicates to the celestial objects. RV 1.1.2. “fire” is the only cosmic element which can be created on earth.
- Agni is the primary “priest”, and is supplemented by human priests in the ritual.
- The extra-terrestrial elements appreciate receiving “soma”, possibly an intoxicating herbal drink.

Science of Phonetics

- Speech is created through the syllables
- Syllables are expressible through time measures, Mātrā मात्रा
- Unit of speech sound is a Varṇa वर्ण
- Varṇa(s) are of two kinds: svara स्वर, vyañjana व्यञ्जन
- Varṇa(s) get combined when uttered next to each other producing new speech sounds through compounding सन्धि
- Compounding is the outcome of transition, like from day to night through सन्ध्या
- Though independent, the syllables can assume distorted sounds through the process of सन्धि
- Origins of many words are unknown and they have to be pronounced in tact संज्ञा
- The words can have three tonal qualities: high pitch उदात्त, low pitch अनुदात्त, normal pitch स्वरित

Science of Mind

- Vedanta Trinity– mana “mind”, vāk “speech”, prāṇa “life”.
BrAUp. I.5.3
- vāk operates on bhūḥ (local), manaḥ on antarīkṣaḥ (motion) and prāṇa on suvaḥ (transformational)
- manaḥ and vāk are linked in their operation. As one goes, so the other.
- “mind” मनः शृणोति “hears”, पश्यति “sees”, विजानाति “recognizes”,
BrAUp I.5.3
- manaḥ has the desire kāma काम
- manaḥ can cause sin by affecting “work” कर्म or “words”
वचन (RV X.37.12)
- manaḥ मनः is a sheath to “knowledge” विज्ञान and “joy” आनन्द
- manaḥ मनः is covered by “life” प्राण, and “body(food)” अन्न

Medical Sciences

- Personalized medicine and treatment: physical well-being is a function of mental health.
- The physician must understand the patient's profile completely in order to develop a procedure. *suśruta saṁhitā*.
- Detailed qualitative classification of skin types, feature types, pulse types, tongue colors, urine colors, stool types and colors.
- Detailed knowledge of the medicinal qualities of the herbs.
- Knowledge of heat and cooking in processing patient's food
- Knowledge of diurnal variation and seasonal variation of the potency of intake
- Use of milk, ghee and dairy products, animal meat, fish in food.
- Knowledge of tissue types in different parts of the body.
- Use of insects in sucking out pus and bad blood.

Meteorology

- Rain forms through deep clouds, but is unpredictable. Indraḥ इन्द्रः needs be invoked!
- Wind is a forerunner of rain. vāyuḥ वायुः has to be invoked for Indra to arrive.
- There can be lulls in rain systems. vṛtraḥ वृत्रः the demon, blocks Indra.
- Dust-devils and tornadoes can be of different sizes and intensity. Marut(s) मरुतः create hindrance to rain making system of Indra.
- Rains can be heavy and can cause devastation. Invoke varuṇaḥ to restrain and maintain ṛta. varuṇaḥ is the reservoir of water in deep sky.
- mitraḥ, “the sun,” is partner to varuṇaḥ in rain making and creating prosperity. RV V.63.2

Hydrology

- River flow. River Sindhu (RV X.75.1), River Sarasvati (RV I.1.10) and many other tributaries.
- Seven rivers divide further into seven branches each and flow in three speeds सप्तसप्त त्रेधा हि चक्रमुः (RV X.75.1)
- River Sindhu has the most powerful flow सृत्वरीणाम् ओजसा (RV X.75.1)
- Ocean समुद्रः as a destination for the river (RV VII.49.1)
- Water अपसम् is obtained from the sky through Varuṇaḥ वरुणः (RV I.2.9)
- Excessive rains cause floods and damage (RV 7.70.2)
- Water blockages - by vṛtraḥ वृत्रः (RV I.32.8) - these possibly had to do with major flow turns in the river through orography.

Astronomy

- Naked eye observation, Sun – bright and luminous object, (RV X.139.1)
- Association of observations to earthly events, six physical layers “loka” RV I.164.6
- Twelve ādityaḥ आदित्यः, six ṛtuḥ ऋतुः
- Movement of the sun, months, seasons RV I.164.11-16
- Sunrise, uṣā, light patterns RV I.48, seven strands of light RV I.164.5 सप्ततन्तून् saptatantūn
- Night and the stars, starlight RV X.127
- Measurement of time: (a) eye-blink, (b) utterance of a syllable, (c) gravity flow of water through orifice. Assumptions of a relativistic time scale in space.

Mathematics

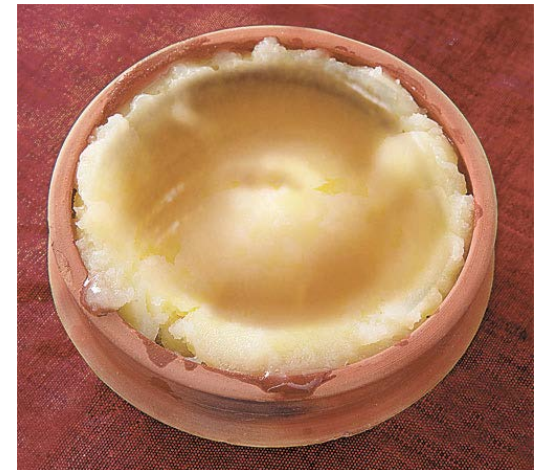
- Numbers and numerals. We don't observe any symbolic presentation of the numerals, though one sees the use of large numbers. Concept of sahasra सहस्र “thousand”, RV I.85.9.
- Decimal representation was “probably” known, since we also see the use of śata शत, “hundred” RV X.161.3-4.
- Geometry – sky maps, ritual pyres, bricks. A line of construction studies called shulbasutra provides instructions on measurements, fractions, geometry of areas.
- Making of the bricks, sizing, transformation, stability of structure, agnicayana
- Counting, cardinals, sequence, ordering of processes. Six physical layers
- Classification concepts, groupings, sets, property based classification – astronomy, medicine, grammar, meters, syllables, logic, philosophy.

Technology

- Chemical Technology
 - Tools
 - Transportation
- Housing/Construction
 - Food Preparation
 - Home Organization
 - Agriculture
- Medical Technology
- Technology of Voice
 - Modeling Life

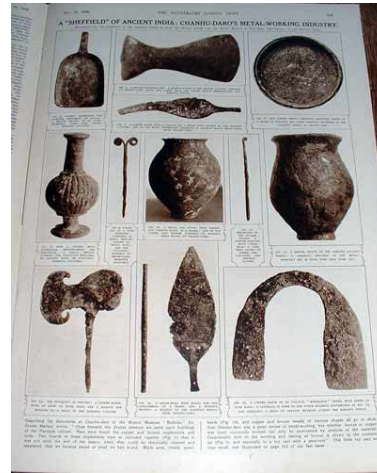
Chemical Technology

- Grinding - stone grinders to extract the *soma* juice. RV IX.18.1
- Mixing: as a chemical process in ritual, *soma* mixed with milk. RV IX.45.3
- Medicinal mixing of herbs, AV
- Boiling: heat treatment, making ghee out of milk, herbal synthesis AV, *suśrutasaṁhitā* सुश्रुतसंहिता
- Distilling: medicinal use AV, सुश्रुतसंहिता
- Herbs - in 107 places RV X.97.1



Tools

- Wood – Stumps on the ground for construction RV I.24.11 household material, ritual material
- Agricultural – plough RV IV.57.4
- Weapons, stone, metal, sharp javelin – RV I.129.8, axe RV III.8.6
- Surgical tools – suśrutasaṁhitā सुश्रुतसंहिता
- Sharpening of sword RV II.39.7
- Iron smelting RV III.53.22



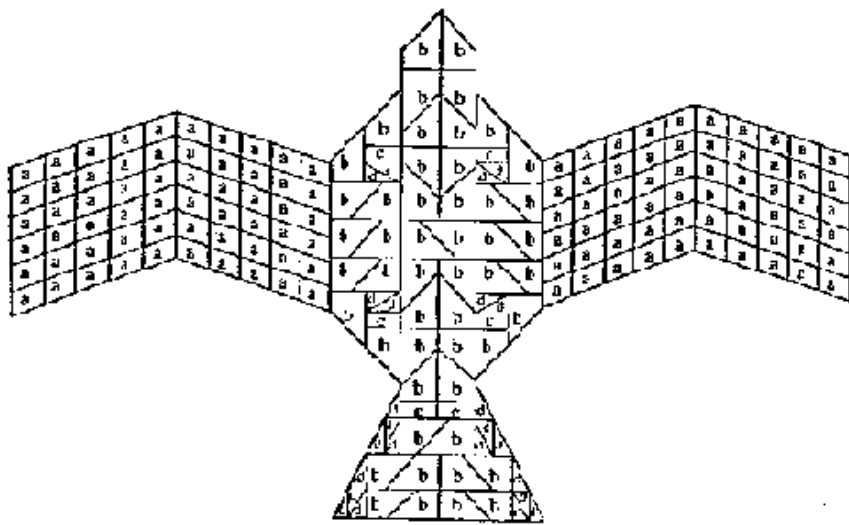
Transportation

- Wheels, trichakra त्रिचक्र , tridhātu त्रिधातु, tribandhura त्रिबन्धुर RV I.183.1, circular wheel RV IV.31.4
- Animal driven carts, RV I.164.2
- Chariots - Horse driven RV I.5.4, triangular shape RV I. 34.12
- Roads
- Artisan RV I.130.6
- Boat concept RV V.4.9
- Marine travel RV X. 56.5



Housing/Construction

- Stability of construction, material, water damage - RV
- Town planning, village
- Brick making, construction geometry - Agnicayana
- Water Supply
- City made of iron RV VII.15.14



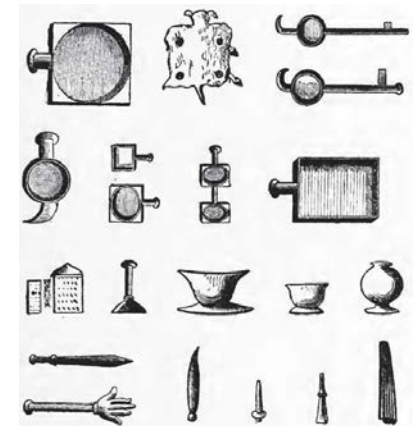
Food Preparation

- Cooking, mixing, boiling, filtering RV I.135.6
- Soup
- Yogurt, ghee RV IV58.4
- Animal products – suśrutasaṁhitā सुश्रुतसंहिता



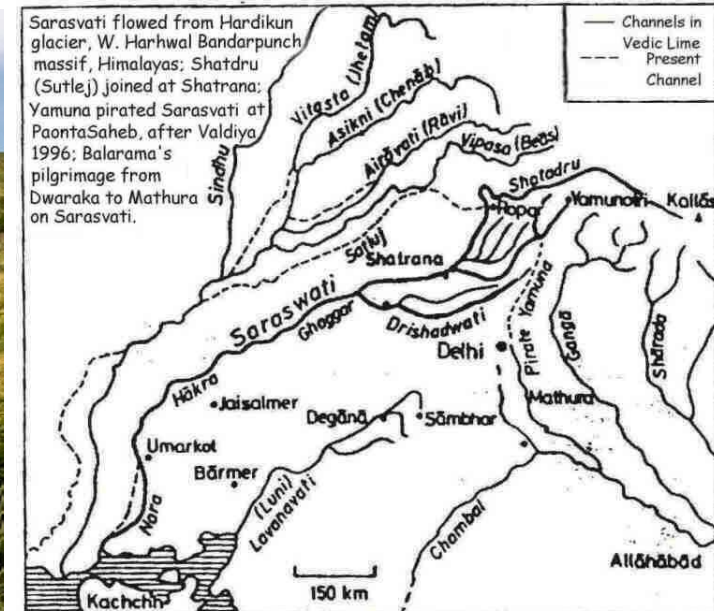
Home Organization

- Seating – kuśāsana कुशासन RV I.13.7
- Fire place
- Utensils, stone hammer RV I.28.1, containers (wooden, stone, metal) RV I.30.2, sruca RV I.110.6
- Bricks
- Garments to protect from cold RV I.34.1
- Granary RV I.34.12
- Leather containers RV I.20.6



Agriculture

- Fertile land, barren land, herbs, water RV IV33.7
- Benefits RV X.34.13
- Agricultural process RV X.101



Medical Technology

- Treatment of physical injuries
- Treatment of diseases creating medicine (growing herbs) RV I.43.2
- Mind concentration
- Rituals and willpower



Technology of Voice

- Mantra
- Sound clarity, intensity, variation, intonation
- Sound production, time duration, memory
- Meter
- Compounding – pratiśākhyam प्रतिशाख्यम् rules



Modeling of Life

- Philosophical speculations, life is one
- Classification of objects, modeling the perceptual universe
- Animation, anthropomorphic idea
- Modeling time



Thank you!